


PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCN No.	ADG/20/11736	
1.3 Title of PCN	I2PAK, IPAK, Max247, Short IPAK, TO-220, TO-247 New Molding Compound Shenzhen (China) - Bouskoura (Morocco) - Tongfu Microelectronics (China) - INDUSTRIAL	
1.4 Product Category	Power MOSFET IGBT Power BIPOLAR	
1.5 Issue date	2020-03-09	

2. PCN Team

2.1 Contact supplier	
2.1.1 Name	RUSSELL HAROLD
2.1.2 Phone	+1 7814028525
2.1.3 Email	harold.russell@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Maurizio GIUDICE,Angelo RAO,Nicola LIPORACE,Mario ASTUTI
2.1.2 Marketing Manager	Natale Sandro D'ANGELO,Anna MOTTESE,Anna RANIOLO
2.1.3 Quality Manager	Vincenzo MILITANO,Francesco MINERVA

3. Change

3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	New direct material part number (same supplier, different supplier or new supplier), Mold compound	BOUSKOURA (Morocco) SHENZHEN (China) Tongfu Microelectronics (China)

4. Description of change

	Old	New
4.1 Description	Samsung SDI product termination of the following references of molding compound for I2PAK, IPAK, Max247, Short IPAK, TO-220, TO-247 packages.	Replacement of current mold compounds with alternative material. ST is already proceeding with new resins evaluation and qualification, to guarantee adequate products continuity.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	no impact	

5. Reason / motivation for change

5.1 Motivation	Product discontinuance from current supplier
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change

6.1 Description	by FG code or Q.A. number
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7. Timing / schedule

7.1 Date of qualification results	2019-09-11
7.2 Intended start of delivery	2019-12-13
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation

8.1 Description	11736 Rel17-2019.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2020-03-09

9. Attachments (additional documentations)

11736 Public product.pdf
11736 New Molding compound - IND.pdf
11736 Rel17-2019.pdf

10. Affected parts

10. 1 Current		10.2 New (if applicable)
10.1.1 Customer Part No	10.1.2 Supplier Part No	10.1.2 Supplier Part No
	STP5NK100Z	

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Automotive Discrete Group (ADG)
 Power Transistor Macro-Division
 LV & Body Smart Power Macro-Division

Process Change Notification

**I²PAK, IPAK, Max247, Short IPAK, TO-220, TO-247 New Molding Compound
 Shenzhen (China) - Bouskoura (Marocco) - Tongfu Microelectronics (China)
 INDUSTRIAL**

Dear Customer,

Following Samsung SDI production discontinuation announcement, followed by ST Corporate Advance Notification PCI CRP/19/11478, sent in April 2019, **this document is announcing the new molding compound for all products assembled in I²PAK, IPAK, Max247, Short IPAK, TO-220 and TO-247** package, manufactured in the plant of Shenzhen (China), Bouskoura (Marocco) and our Subcontractor Tongfu Microelectronics (China).

The new molding compound, guarantees the same quality and electrical characteristics as per current production, products is in full compliance with the ST ECOPACK®2 grade (Halogen Free).

The test vehicles involved in the qualification are listed in the following tables:

High Voltage Business Unit				
Technology	Test Vehicle	Package	Assy Plant	End of Qual.
MDmesh™ M2	STI24N60M2	I ² PAK	Shenzhen	Wk 38/19
MDmesh™ II	STU7NM62N-H	IPAK	Tongfu Microelectronics	Wk 37/19
MDmesh™ M5	STY139N65M5	Max247™	Tongfu Microelectronics	Wk 44/19
MDmesh™ II	APP762NF1	Short IPAK	Tongfu Microelectronics	Wk 37/19
FDmesh™ II	STP13NM60ND	TO-220	Shenzhen	Wk 37/19
MDmesh™ II	STP26NM60N	TO-220	Tongfu Microelectronics	Wk 44/19
MDmesh™ K5	STP4N80K5	TO-220	Shenzhen	Wk 37/19
SuperFREDmesh™	STP5NK52ZD	TO-220	Bouskoura	Wk 42/19
MDmesh™ K3	STP6N120K3	TO-220	Shenzhen	Wk 37/19
MDmesh™ K5	STP6N95K5	TO-220	Bouskoura	Wk 42/19
MDmesh™ M2	STW40N60M2	TO-247	Tongfu Microelectronics	Wk 40/19
MDmesh™ DM2	STW48N60DM2	TO-247	Tongfu Microelectronics	Wk 44/19

Low Voltage Business Unit				
Technology	Test Vehicle	Package	Assy Plant	End of Qual.
STripFET™ II	STD12NF06L-1	IPAK	Tongfu Microelectronics	Wk 37/19
STripFET™ F6	STP105N3LL	TO-220	Shenzhen	Wk 37/19
STripFET™ F6 P-Channel	STP10P6F6	TO-220	Bouskoura	Wk 42/19
STripFET™ F6	STP110N8F6	TO-220	Tongfu Microelectronics	Wk 44/19
STripFET™ F3	STP180N10F3	TO-220	Shenzhen	Wk 37/19
STripFET™ F7	STP270N8F7	TO-220	Shenzhen	Wk 37/19
STripFET™ II	STP55NF06	TO-220	Bouskoura	Wk 42/19
STripFET™ II	STP75NF20	TO-220	Shenzhen	Wk 37/19

IGBT & IPM Business Unit

Technology	Test Vehicle	Package	Assy Plant	End of Qual.
IGBT Planar	STGP10NC60KD	TO-220	Shenzhen	Wk 37/19
IGBT, Trench gate field-stop	STGP30M65DF2	TO-220	Shenzhen	Wk 37/19
IGBT Planar	STGP3HF60HD	TO-220	Shenzhen	Wk 37/19
IGBT Planar	STGW39NC60VD	TO-247	Shenzhen	Wk 38/19
IGBT, Trench gate field-stop	STGW80H65DFB	TO-247	Shenzhen	Wk 38/19
Power BIPOLAR	BULD118D-1	IPAK	Tongfu Microelectronics	Wk 37/19
Power BIPOLAR	TIP102	TO-220	Tongfu Microelectronics	Wk 44/19
Power BIPOLAR	TIP31C	TO-220	Shenzhen	Wk 37/19
Power BIPOLAR	TIP35C	TO-247	Tongfu Microelectronics	Wk 44/19

Any other Product related to the above series, even if not expressly included or partially mentioned in the attached table, is affected by this change.

Qualification program and results availability:

The reliability test report plan is provided in attachment to this document.

Samples availability:

Samples of the test vehicle devices will be available on request starting from week 38-2019.
Any other sample request will be processed and scheduled by Power Transistor Division upon request.

Change implementation schedule:

The production start and first shipments will be implemented after week 50 of 2019, after stock depletion.
Delivery of current products will be done until stock depletion of old molding compound.

This is a very special Process Change, the PCN approval has to be as fast as possible. Due to the current market conditions and the large space occupied by the old resin, we are unable to do enough stock.

Marking and traceability:

Unless otherwise stated by customer specific requirement, traceability product assembled in with new molding compound, will be ensured by Q.A. number.

Yours faithfully.



Public Products List

Public Products are off the shelf products. They are not dedicated to specific customers, they are available through ST Sales team, or Distributors, and visible on ST.com

PCN Title : I2PAK, IPAK, Max247, Short IPAK, TO-220, TO-247 New Molding Compound Shenzhen (China) - Bouskoura (Morocco) - Tongfu Microelectronics (China) - INDUSTRIAL

PCN Reference : ADG/20/11736

Subject : Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change.

STGW60V60F	STP5NK100Z	STP55NF06
STP20NM50FD	STGW15M120DF3	STW18NM60N
BDX53B	STP12N60M2	STP36N60M6
STP75NF75	STP80NF10	STP20NM50
STP40NF03L	STP22N60DM6	STW20N95K5
STP18N65M5	STP48N30M8	STW5NK100Z
STP60NF06L	STGW25M120DF3	STGP30H60DF
STW40N60M2	D44H8	STP30N10F7
STGP7NC60HD	STP7NK80Z	STGW19NC60HD
STP42N60M2-EP	STW10NK80Z	STP11NM60ND
STGW40V60DF	STP160N4LF6	STW52NK25Z
STW12N150K5	STP2NK90Z	STW13NK100Z
MJE2955T	STP8NK80Z	STU7N80K5
STB10NK60Z-1	STD17NF03L-1	STP24N60DM2
STGW25H120F2	STY50N105DK5	STW18N60M2
STP33N65M2	STD2HNC60Z-1	BD239C
STGW35NB60SD	STGPL6NC60D	STGP19NC60KD
STW12N170K5	STGW60H60DLFB	BUL138
STW33N60M2	STW26N65DM2	BDX54C
STW40N65M2	STP26NM60N	STGP6NC60HD
D44H11	STP4N80K5	STP10NK60Z
STW40N95DK5	STY112N65M5	STW36N55M5
STP90NF03L	STGW30H60DFB	BDX33C
STP10NM60N	STGP10M65DF2	BDW94C
STP33N60M2	STU7LN80K5	STW26NM60N
STW24NM60N	STGP10NB60SD	STP55NF06L
STW23NM50N	STW13N80K5	STW28N60M2
STP100N8F6	STGW35HF60W	STP165N10F4
STW4N150	STP16N50M2	STP11NM80
STP2N105K5	STW75N60DM6	STW32NM50N
STY60NM50	STW70N60M2	STGP5H60DF
STP110N8F6	STP3NK80Z	STP20N60M2-EP
STP220N6F7	STW15NK90Z	STU7NF25
STD4NK50Z-1	STP28N65M2	STW10N105K5
STGW40H120DF2	STP4NK60Z	TIP50



Public Products List

STP30N65M5	STW24N60M6	BUL416T
STP20NF20	STGW20V60DF	STP7N95K3
STW11NK90Z	STGW30V60DF	STGP30V60F
STGW30NC60WD	STGP10NB60S	BUV48A
STU6N65M2	STGP3HF60HD	STP20NK50Z
STP180N10F3	STU10NM60N	STP140NF55
STP35N65DM2	STP16N65M2	STGW40H120F2
STW28N65M2	BUL128D-B	STW20N65M5
STP13NM60N	STP25N60M2-EP	STP8N80K5
STP27N60M2-EP	STGP19NC60SD	STW6N95K5
STP57N65M5	BUL742C	STP9NK90Z
STP40N60M2	STU5NK50Z	TIP42A
STP24N60M6	STW25N80K5	STP18N60M2
STGW20H60DF	STGW80H65DFB	STP150N10F7
STGP15H60DF	STP16N60M2	STW48N60M6
STP5NK60Z	STP34NM60N	STP6NK90Z
STGW20NC60V	STP40NF10	STD12NF06L-1
STW63N65DM2	STP80NF70	STP60NF06
STY145N65M5	STP8N90K5	STP11N65M2
STW45N60DM6	STP260N6F6	STW56N65DM2
TIP137	STP105N3LL	TIP120
STP6N90K5	STW56N60DM2	STW70N65DM6
STP20N90K5	STU3N65M6	ST13009
STP13N60DM2	TIP121	STW88N65M5
STGW28IH125DF	STW43N60DM2	ST13005
STP18NM60N	STW48NM60N	STP12N120K5
2STW200	D45H11	STW7N95K3
STGP10H60DF	ST901T	STP30NF10
STW45NM60	STP80NF12	STGP10NC60HD
STW42N65M5	STI6N80K5	STP14NF10
STW36N60M6	STW9NK95Z	STL128D
STW7N90K5	STP11NM60FD	STW45N65M5
STI24N60M6	TIP35CW	MJE3055T
STP20N95K5	STP180N4F6	STP2NK100Z
STP160N3LL	STW21N90K5	STW18N60DM2
STP15N80K5	STP13N60M2	STW70N60DM6
STI13NM60N	TIP32C	STU3N62K3
STGW60H65DFB	STP130N8F7	STGP4M65DF2
STP9N60M2	STP17N80K5	STP100N6F7
STGW60H65FB	STP9N80K5	STP12N50M2
STP14NM50N	STP5N95K5	STW26N60M2
STP7N65M2	BDX34C	STW35N65DM2
STP16N65M5	STGW40H60DLFB	STW65N60DM6
STI33N60M2	STW15NK50Z	STB6NK60Z-1
STP6N95K5	STP7N105K5	STU6N90K5
STGW30NC60KD	TIP142	STP24N60M2
STP4N150	STGW30H65FB	STP8NM50N
STP270N8F7	STW33N60DM2	STP20NF06L
BD912	STW9NK90Z	STGP7H60DF
STP170N8F7	STP110N7F6	STGW40H65DFB



Public Products List

STP9NK70Z	STP34N65M5	STGP6M65DF2
STP7N80K5	STGP8NC60KD	STU7N60M2
STP80NF55-06	STW48N60M2	STW20N90K5
STGP8M120DF3	STP65NF06	STP20NM60
STP7N52K3	STW34NM60N	STP40NF12
STI6N62K3	STW48N60DM2	STP52P3LLH6
STU11N65M2	STW42N60M2-EP	STP10N60M2
STU9N60M2	STW24N60M2	STGW40V60F
STP9N65M2	STGP14NC60KD	STU7N70M6
STGP35HF60W	STGPL6NC60DI	STGW8M120DF3
STP240N10F7	TIP41C	STP11NK40Z
STP22NM60N	STW9N80K5	STGW15H120DF2
STP80NF06	STP16NF06L	TIP147T
STB4NK60Z-1	BUL38D	STP11N60DM2
STGP10NC60KD	STP120NF10	STI20N65M5
BUL741	STGP19NC60HD	STW75NF20
STI33N65M2	STP3NK90Z	STP33N60M6
STW70N60DM2	STW8NK80Z	BU508AW
BUL654	STW35N60DM2	STW68N65DM6
STP310N10F7	STP200N3LL	STP18N60M6
TIP36C	STW24N60DM2	STGP20V60DF
STW8N90K5	STI18N60M2	STP8N120K5
STD5NK40Z-1	STP200NF03	STP160N75F3
STP26N65DM2	STP19NF20	TIP112
STGW80V60F	STGW60V60DF	STGW60H65DF
STP18N65M2	STW23N80K5	STP22N60M6
STI42N65M5	STP25N10F7	STP12NK30Z
STP21N90K5	STI18N65M2	STP10N80K5
TIP35C	BDW93C	STD2NC45-1
STW18N65M5	STGW25H120DF2	STP20N65M5
STI24N60M2	STGP3NC120HD	STGY40NC60VD
STW28N60DM2	STP70NF03L	STW12NK90Z
STP62NS04Z	STW13N60M2	STW10NK60Z
STGY50NC60WD	STW20NM60FD	STU2N62K3
STGW80V60DF	STW12NK80Z	STW69N65M5
STGW39NC60VD	STGW30NC120HD	STP5NK52ZD
STP85N3LH5	STP2N95K5	STP24NF10
STW75N60M6	STP11NM60	STP36N55M5
STP40N65M2	STW8N120K5	TIP107
STW11NM80	2STW100	STP33N60DM2
TIP125	STGW75M65DF2	STP35NF10
STP10NK80Z	STGW40NC60KD	STGW80H65FB
BUL49D	STW12N120K5	STP80N10F7
STP100N10F7	STP42N65M5	STP24N65M2
STU7NM60N	STP10P6F6	TIP127
STGP15M65DF2	STP5NK80Z	STP21N65M5
STGW30H60DLFB	STGW60H65DRF	STGW10M65DF2
STW21N150K5	STP45N65M5	STP45N10F7
STP130N6F7	TIP3055	BUL7216
STP4N90K5	STW70N65M2	STP15NK50Z



Public Products List

STU6N60M2	STP6N62K3	STP30NF20
STP6NK60Z	STGW20H65FB	STP6N60M2
STI20N60M2-EP	STY105NM50N	STW56N60M2
ST13007D	STI28N60M2	TIP102
STP16NF06	STW6N90K5	STW3N150
BUTW92	STP110N10F7	STP28N60M2
STD4NK60Z-1	STGP30V60DF	STU5N80K5
STY60NK30Z	STP26N60DM6	STI6N95K5
STP45NF06	STW45NM50	BUL381D
STI21N65M5	STW26NM50	STP9NK50Z
STP5N60M2	STP25N80K5	BUL1102E
TIP31A	STW13NK60Z	STI45N10F7
STGP30H60DFB	BUL58D	STP5N105K5
STW11NK100Z	STGP20M65DF2	STP140N8F7
STW33N60M6	STP260N4F7	STP110N8F7
TIP31C	TIP142T	STW65N80K5
STW14NK50Z	STP46N60M6	STP4NK80Z
TIP29A	STP18NM80	STW74NF30
STW20NM50FD	STW20N95DK5	STP8NK100Z
STW34N65M5	STW240N10F7	STY100NM60N
STI4N62K3	STW10N95K5	STB7NK80Z-1
STP13NK60Z	STP5NK50Z	TIP147
STP7N90K5	STP15N60M2-EP	STP43N60DM2
STP7NK40Z	STGW40M120DF3	STP5N80K5
STGW20NC60VD	STY60NM60	STP140N6F7
STU13005N	STP6N65M2	STGW35HF60WDI
STP15N65M5	STW28NM50N	STP18N60DM2
STW7NK90Z	BD911	STP35N60DM2
STI40N65M2	BUL743	STW40NF20
BUL89	STU5N52K3	STU4N62K3
STP13N65M2	BUL216	STGP20V60F
STP75NF20	STP28N60DM2	STP17NF25
STP28NM50N	STP14NK50Z	IRF630
STU9N65M2	STW31N65M5	STP4LN80K5
STGW30V60F	STW23N85K5	STW18NM80
STP10N95K5	STGP40V60F	STP26N60M2
TIP42C	STP03D200	STP7LN80K5
BUL98	TIP2955	STW25N60M2-EP
BDX53C	STW15N95K5	TIP29C
STW30N65M5	TIP47	TIP132
STD1NK60-1	STP14N80K5	STW77N65M5
TIP115	STW15N80K5	STU5N60M2
STP15N95K5	STI57N65M5	STGW20IH125DF
STGW15H120F2	TR136	TIP36CW
STP10LN80K5	STI150N10F7	STGP30M65DF2
STP140NF75	STP35N60M2-EP	STP13N80K5
STP11NK50Z	STW40N90K5	STD3NK60Z-1
TIP105	2ST31A	STW3N170
STP3LN80K5	STW30N80K5	STGW20V60F
STP3N150	STU4N52K3	STP80NF55L-06



Public Products List

STP24NM60N	STW40N95K5	STY139N65M5
STGW40V60DLF	BUF420AW	TIP122
STP12N65M5	ST13007	STP38N65M5
STW68N60M6	STW9N150	STP40NF10L
STW38N65M5	STGW40H65FB	STP12N65M2
STW56N65M2	STI6N90K5	STP23N80K5
STP31N65M5	STP12NM50	STP11N65M5
STW120NF10	STGP20NC60V	STP20NM60FD
STP23NM50N	STP40NF20	STW35N60M2-EP
STP13N95K3	STU7N65M2	STW27N60M2-EP
STW20N60M2-EP	STP60NF10	STP2N80K5
STP18N55M5	STW20NM60	STP50NF25
STP45N60DM6	STP75NS04Z	STGW30M65DF2
STP33N60DM6	STW7N105K5	STGP15M120F3
STP10N105K5	STU10N60M2	BULD118D-1
BUL39D	STP9NK60Z	STGP20H60DF
STP19NM50N	STP7N60M2	STW20NK50Z
STP6N80K5	STP5N62K3	BUT70W
STP9NK65Z	STW57N65M5	STP318N4F6
BD241C		



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Q&R – ADG Automotive/Standard Discrete

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**INTERIM Reliability evaluation
results and plan for**
*New Molding Compound on I²PAK, IPAK,
 Max247™, Short IPAK, TO-220, TO-247
 manufactured in Shenzhen (China),
 Bouskoura (Morocco) and our Subcontractor
 Tongfu Microelectronics (China).*
INDUSTRIAL
Process change

General Information	Traceability
<p>Commercial Product:</p> <p>STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C</p>	<p>Diffusion Plant:</p> <p>SG6" - SG8" (Singapore) CT6" - CT8" Catania (Italy) HHGrace Subcontractor</p>
<p>Product Line:</p> <p>MQ6H01, F26301, VJ8101, VPN601, 7L3P01, 4D0K01, OD8L01, MM2L01, KV6301, KLF501, CW6101, IV6801, EWFR01, BA1201, FZ5201, VJL301, ED6E01, 6P6A01, M2A0K8, M5FN01, M2A0K8, M26601, MQ6L01, FQ6I01, AL6A01, 7D8G01, BV7601, BB0301, BA2101</p>	<p>Assembly Plant:</p> <p>STS Shenzhen (China) Bouskoura (Morocco) Tongfu Microelectronics (China) (Subcontractor)</p>
<p>Product Description:</p> <p>Power MOSFET, IGBT, Power BIPOLAR</p>	<p>Reliability Lab:</p> <p>Catania (Italy)</p>
Reliability Assessment	
<p>Package:</p> <p>I²PAK, IPAK, Max247™ Short IPAK, TO-220, TO-247</p>	<p>Passed <input type="checkbox"/></p>
<p>Silicon Technology:</p> <p>MDmesh™ M2, FDmesh™ II, MDmesh™ K5, MDmesh™ K3, STripFET™ F6, STripFET™ F3, STripFET™ F7, STripFET™ II, IGBT Planar, IGBT, Trench gate field-stop, Power BIPOLAR, SuperFREDmesh™, STripFET™ F6 P-Channel, MDmesh™ II, MDmesh™ M5, MDmesh™ DM2, Power BIPOLAR</p>	
<p>Division:</p> <p>Power Transistor Macro-Division</p>	

Disclaimer: this report is a summary of the qualification plan results performed in good faith by STMicroelectronics to evaluate the electronic devices conformance to its specific mission profile. This report and its contents shall not be disclosed to a third party, except in full, without previous written agreement by STMicroelectronics or under the approval of the author (see below)

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STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

REVISION HISTORY

Version	Date	Author	Changes description
1.0	28 August 2019	A.SETTINIERI	PRELIMINARY REPORT

APPROVED BY:

Corrado CAPPELLO
ADG Q&R department - Catania
STMicroelectronics

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STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

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ST24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

1. RELIABILITY EVALUATION OVERVIEW

1.1 Objective

Reliability evaluation for New Molding Compound on I²PAK, IPAK, Max247™, Short IPAK, TO-220, TO-247 manufactured in Shenzhen (China), Bouskoura (Morocco) and our Subcontractor Tongfu Microelectronics (China).

1.2 Reliability Test Plan

Reliability tests performed on this device are in agreement with JESD47 and 0061692 internal spec Guidelines and are listed in the Test Plan.

For details on test conditions, generic data used and spec reference see test results summary at Par.3 .

#	Stress	Abrv	Reference	Test Flag	Comments
1	Pre and Post-Stress Electrical Test	TEST	User specification or supplier's standard Specification	Y	
2	External Visual	EV	JESD22B-101	Y	
3	High Temperature Gate Bias	HTGB	JESD22A-108	Y	
4	High Temperature Reverse Bias	HTRB	JESD22A-108	Y	
5	Temperature Cycling	TC	JESD22A-104	Y	
6	Autoclave	AC	JESD22A-102	Y	
7	High Humidity High Temperature Reverse Bias	H3TRB	JESD22A-101	Y	
8	Intermittent Operational Life / Thermal Fatigue	IOL / TF	MIL-STD-750 Method 1037	Y	
9	ESD Characterization	ESD (HBM, CDM)	ESDA-JEDEC JES-001 and AINSI-ESD S5.3.1	Y	

1.3 Interim results comment

Preliminary reliability tests have been completed with positive results. Neither functional nor parametric rejects were detected at final electrical testing.

Parameter drift analysis performed on samples submitted to die and package oriented test showed a good stability of the main electrical monitored parameters.

Package oriented tests have not put in evidence any criticality.

ESD is accordance with ST spec.

On the basis of the overall results obtained, we can give a positive judgment on the INTERIM reliability evaluation for New Molding Compound on I²PAK, IPAK, Max247™, Short IPAK, TO-220, TO-247 manufactured in Shenzhen (China), Bouskoura (Morocco) and our Subcontractor Tongfu Microelectronics (China) in agreement with JESD47 and 0061692 internal spec.

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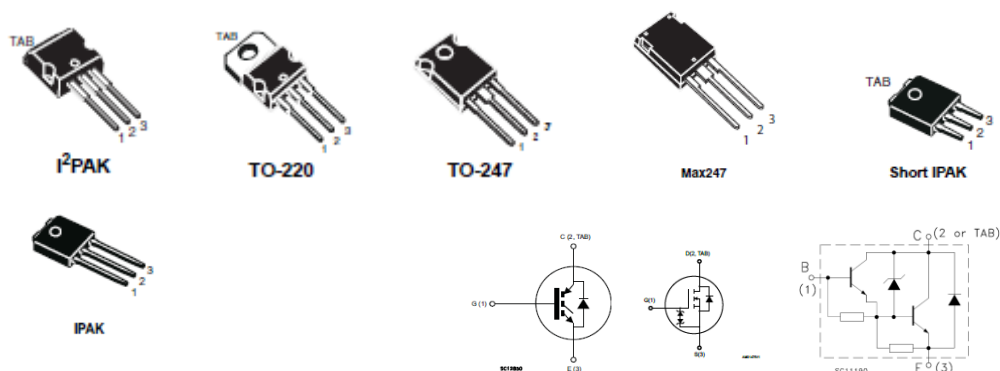
ST24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

2. DEVICE/TEST VEHICLE CHARACTERISTICS

2.1 Generalities

MDmesh™ M2, FDmesh™ II, MDmesh™ K5, MDmesh™ K3, STripFET™ F6, STripFET™ F3, STripFET™ F7, STripFET™ II, IGBT Planar, IGBT, Trench gate field-stop, Power BIPOLAR, SuperFREDmesh™, STripFET™ F6 P-Channel, MDmesh™ II, MDmesh™ M5, MDmesh™ DM2, Power BIPOLAR.

2.2 Pin Connection



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STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

2.3 Traceability

Reference “Product Baseline” document if existing, else provide following chapters/information:

D.U.T.: STI24N60M2
PACKAGE: I²PAK

Wafer fab information	
Wafer fab manufacturing location	SG6” (Singapore)
Wafer diameter (inches)	6”
Silicon process technology	MDmesh™ M2
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	4400 x 3840 μm ²
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	I ² PAK
Lead frame/Substrate	FRAME TO220 Mon Ve10 OpH/L/N/Q SeNi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mq 5mils / Source: Al 10mils
Molding compound	Halogen free

D.U.T.: STP13NM60ND
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6” (Singapore)
Wafer diameter (inches)	6”
Silicon process technology	FDmesh™ II
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	3950 x 2930 μm ²
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ve1 OpD/H/L 20u PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 10mils
Molding compound	Halogen free

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STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STP4N80K5
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	CT8" Catania (Italy)
Wafer diameter (inches)	8"
Silicon process technology	MDmesh™ K5
Die finishing front side (passivation)	TEOS + SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	2620 x 2150 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Cu Op/H/N 20u BARE COPPER
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate / Source Cu 2mils
Molding compound	Halogen free

D.U.T.: STP6N120K3
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	MDmesh™ K3
Die finishing front side (passivation)	TEOS + SiN (Nitride)
Die finishing back side	Ti/Ni/Au
Die area (Stepping die size)	5430 x 4300 μm ²
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ve1 OpD/H/L 20u PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 10mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STP105N3LL
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	HHGrace Subcontractor
Wafer diameter (inches)	8"
Silicon process technology	STripFET™ F6
Die finishing front side (passivation)	No Passivation
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	3930 x 1500 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ve1 OpD/H/L 20u PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 15mils
Molding compound	Halogen free

D.U.T.: STP180N10F3
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	STripFET™ F3
Die finishing front side (passivation)	No Passivation
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	6340 x 4600 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ver 1 Opt D/M PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 20mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STP270N8F7
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	CT8" (Catania)
Wafer diameter (inches)	8"
Silicon process technology	STripFET™ F7
Die finishing front side (passivation)	No Passivation
Die finishing back side	Ti/NiV/Ag
Die area (Stepping die size)	6340 x 4900 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ver 1 Opt D/M PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 20mils
Molding compound	Halogen free

D.U.T.: STP75NF20
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	STripFET™ II
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	5060 x 6850 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ver 1 Opt D/M PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 15mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

ST24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STGP10NC60KD
PACKAGE: TO-220
Wafer fab information

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	IGBT Planar
Die finishing front side (passivation)	IGBT: SiN (Nitride) // DIODE: Probimide
Die finishing back side	IGBT: Cr/Ni/Ag // DIODE: Ti/Ni/Au
Die area (Stepping die size)	IGBT: 2870 x 2410 μm^2 // DIODE: 1100 x 1100 μm^2
Metal levels/Materials	1 / AISi

Assembly information

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Leadframe/Substrate	FRAME TO220 Mon Ve1 OpD/H/L 20u PINi/NiP
Die attach material	PREFORM Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 7mils
Molding compound	Halogen free

D.U.T.: STGP30M65DF2
PACKAGE: TO-220
Wafer fab information

Wafer fab information	
Wafer fab manufacturing location	CT8" (Catania)
Wafer diameter (inches)	8"
Silicon process technology	IGBT, Trench gate field-stop
Die finishing front side (passivation)	IGBT: SiN (Nitride) // DIODE: Al+Probimide
Die finishing back side	IGBT: Al/Ti/NiV/Ag// DIODE: Ti/Ni/Au
Die area (Stepping die size)	IGBT: 2870 x 2410 μm^2 // DIODE: 2850 x 2700 μm^2
Metal levels/Materials	AlCu/W

Assembly information

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Leadframe/Substrate	FRAME TO220 Mon Ver 1 Opt D/M PINi/NiP
Die attach material	PREFORM Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 15mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

ST24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STGP3HF60HD
PACKAGE: TO-220
Wafer fab information

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	IGBT Planar
Die finishing front side (passivation)	IGBT: TEOS+SiN (Nitride) // DIODE: Al+Probimide
Die finishing back side	IGBT: Cr/Ni/Ag // DIODE: Ti/Ni/Au
Die area (Stepping die size)	IGBT: 1670 x 1760 μm^2 // DIODE: 1100 x 1100 μm^2
Metal levels/Materials	1 / AISi

Assembly information

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-220
Leadframe/Substrate	FRAME TO220 Mon Cu OpH/N 20u BARE COPPER
Die attach material	PREFORM Pb/Ag/Sn
Wires bonding materials/diameters	Gate / Source Cu 2mils
Molding compound	Halogen free

D.U.T.: STGW39NC60VD
PACKAGE: TO-247
Wafer fab information

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	IGBT Planar
Die finishing front side (passivation)	IGBT: SiN (Nitride) // DIODE: Al
Die finishing back side	IGBT: Cr/Ni/Au // DIODE: Ti/Ni/Au
Die area (Stepping die size)	IGBT: 5300 x 6850 μm^2 // DIODE: 3300 x 3300 μm^2
Metal levels/Materials	1 / AISi

Assembly information

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-247
Leadframe/Substrate	FRAME TO247 3L Mon Ve6 OpA/Q SeINi/NiP
Die attach material	PREFORM Pb/Ag/Sn
Wires bonding materials/diameters	Gate: AlMg 5mils / Source Al 15mils
Molding compound	Halogen free

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STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STGW80H65DFB
PACKAGE: TO-247
Wafer fab information

Wafer fab information	
Wafer fab manufacturing location	SG8" (Singapore)
Wafer diameter (inches)	8"
Silicon process technology	IGBT, Trench gate field-stop
Die finishing front side (passivation)	IGBT: SiN (Nitride) // DIODE: Durimide
Die finishing back side	IGBT: Al/Ti/NiV/Ag // DIODE: Ti/Ni/Au
Die area (Stepping die size)	IGBT: 6500 x 6300 μm^2 // DIODE: 6800 x 3400 μm^2
Metal levels/Materials	1 / AlCu

Assembly information

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-247
Leadframe/Substrate	FRAME TO247 3L Mon Ve6 OpA/Q SeNi/NiP
Die attach material	PREFORM Pb/Ag/Sn
Wires bonding materials/diameters	Gate: AlMg 5mils / Source Al 15mils
Molding compound	Halogen free

D.U.T.: TIP31C
PACKAGE: TO-220
Wafer fab information

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	Power BIPOLAR
Die finishing front side (passivation)	PSG
Die finishing back side	AuAs/Cr/Ni/Au
Die area (Stepping die size)	1340x1340 μm^2
Metal levels/Materials	AlSi

Assembly information

Assembly Information	
Assembly plant location	STS Shenzhen (China)
Package code description	TO-247
Leadframe/Substrate	FRAME TO220 Mon Ve1 OpD/H/L 20u PINi/NiP
Die attach material	PREFORM Pb/Ag/Sn
Wires bonding materials/diameters	Gate: AlMg 5mils

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ST24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

Molding compound	Halogen free
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D.U.T.: STP5NK52ZD
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	SuperFREDmesh™
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	3190 x 2660 μm ²
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	Bouskoura (Morocco)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ver 1 Opt D/H/L/N PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 7mils
Molding compound	Halogen free

D.U.T.: STP6N95K5
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	MDmesh™ K5
Die finishing front side (passivation)	TEOS + SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	3950 x 2910 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	Bouskoura (Morocco)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ver 1 Opt D/H/L/N PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 10mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

ST24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STP55NF06
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	STripFET™ II
Die finishing front side (passivation)	No passivation
Die finishing back side	Ti/NiV/Au
Die area (Stepping die size)	2500 x 3550 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	Bouskoura (Morocco)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ver 1 Opt D/H/L/N PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 15mils
Molding compound	Halogen free

D.U.T.: STP10P6F6
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	STripFET™ F6 P-Channel
Die finishing front side (passivation)	No passivation
Die finishing back side	Cr/Ni/Au
Die area (Stepping die size)	1520 x 930 μm ²
Metal levels/Materials	1 / AlSiCu

Assembly Information	
Assembly plant location	Bouskoura (Morocco)
Package code description	TO-220
Lead frame/Substrate	FRAME TO220 Mon Ve1 OpD/H/L/N PINi/NiP
Die attach material	Preform Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al/Mg 5mils / Source: Al 10mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STU7NM62N-H
PACKAGE: IPAK

Wafer fab information	
Wafer fab manufacturing location	SG8" (Singapore)
Wafer diameter (inches)	8"
Silicon process technology	MDmesh™ II
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	2410 x 2400 μm ²
Metal levels/Materials	AlSi

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	IPAK
Lead frame/Substrate	FRAME TO-251-3A(IL Ni), DWG#:TO-LFM-HL034
Die attach material	Solder paste Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils / Source: Al 7mils
Molding compound	Halogen free

D.U.T.: STY139N65M5
PACKAGE: Max247™

Wafer fab information	
Wafer fab manufacturing location	CT8" (Catania)
Wafer diameter (inches)	8"
Silicon process technology	MDmesh™ M5
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	9630 x 12780 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	Max247™
Lead frame/Substrate	MAX247 -3F(IL-Ni/NiP)-DWG TO-LFM-SD027
Die attach material	Solder paste Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils / Source RIBBON Al 80x10mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: APP762NF1
PACKAGE: Short IPAK

Wafer fab information	
Wafer fab manufacturing location	CT8" Catania (Italy)
Wafer diameter (inches)	8"
Silicon process technology	MDmesh™ II
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	2410 x 2400 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	Short IPAK
Lead frame/Substrate	FRAME TO-251-3B(IL Ni), DWG#: TO-LFM-HL037
Die attach material	Solder paste Pb/Ag/Sn
Wires bonding materials/diameters	Gate / Source Al 5mils
Molding compound	Halogen free

D.U.T.:STP26NM60N
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG8" (Singapore)
Wafer diameter (inches)	8"
Silicon process technology	MDmesh™ II
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	4980 x 4600 μm ²
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	TO-220
Lead frame/Substrate	FRAME CP-LFM-HL033 (IL Ni)
Die attach material	Solder paste Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils / Source: Al 10mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STW40N60M2
PACKAGE: TO-247

Wafer fab information	
Wafer fab manufacturing location	SG8" (Singapore)
Wafer diameter (inches)	8"
Silicon process technology	MDmesh™ M2
Die finishing front side (passivation)	SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	6840 x 5050 μm ²
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	TO-247
Lead frame/Substrate	FRAME TO-247-3H(IL-Ni/NiP)-Dwg TO-LFM-SD029
Die attach material	Solder paste Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils / Source: Al 10mils
Molding compound	Halogen free

D.U.T.: STW48N60DM2
PACKAGE: TO-247

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	MDmesh™ DM2
Die finishing front side (passivation)	TEOS+SiN (Nitride)
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	7510 x 5760 μm ²
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	TO-247
Lead frame/Substrate	FRAME TO-247-3H(IL-Ni/NiP)-Dwg TO-LFM-SD029
Die attach material	Solder paste Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils / Source: Al 15mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: STD12NF06L-1
PACKAGE: IPAK

Wafer fab information	
Wafer fab manufacturing location	CT6" (Catania)
Wafer diameter (inches)	6"
Silicon process technology	STripFET™ II
Die finishing front side (passivation)	No Passivation
Die finishing back side	Ti/NiV/Ag
Die area (Stepping die size)	1700 x 1360 μm ²
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	IPAK
Lead frame/Substrate	FRAME TO-251-3A(IL Ni), DWG#:TO-LFM-HL034
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils / Source: Al 10mils
Molding compound	Halogen free

D.U.T.: STP110N8F6
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	HHGrace Subcontractor
Wafer diameter (inches)	8"
Silicon process technology	STripFET™ F6
Die finishing front side (passivation)	No Passivation
Die finishing back side	Ti/NiV/Ag
Die area (Stepping die size)	3980 x 2920 μm ²
Metal levels/Materials	1 / AlCu

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	TO-220
Lead frame/Substrate	FRAME CP-LFM-HL033 (IL Ni)
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 5mils / Source: Al 15mils
Molding compound	Halogen free

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

D.U.T.: BULD118D-1
PACKAGE: IPAK

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	Power BIPOLAR
Die finishing front side (passivation)	PSG
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	2380 x 1550 μm^2
Metal levels/Materials	1 / AISi

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	IPAK
Lead frame/Substrate	FRAME TO-251-3A(IL Ni), DWG#:TO-LFM-HL034
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate / Source Al 5mils
Molding compound	Halogen free

D.U.T.: TIP102
PACKAGE: TO-220

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	Power BIPOLAR
Die finishing front side (passivation)	PSG
Die finishing back side	AuAs/Cr/Ni/Au
Die area (Stepping die size)	2490 x 2220 μm^2
Metal levels/Materials	1 / AISi

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	TO-220
Lead frame/Substrate	FRAME CP-LFM-HL033 (IL Ni)
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 7mils / Source: Al 10mils

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

Molding compound	Halogen free
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D.U.T.: TIP35C
PACKAGE: TO-247

Wafer fab information	
Wafer fab manufacturing location	SG6" (Singapore)
Wafer diameter (inches)	6"
Silicon process technology	Power BIPOLAR
Die finishing front side (passivation)	PSG
Die finishing back side	Ti/Ni/Ag
Die area (Stepping die size)	4030 x 3680 μm^2
Metal levels/Materials	1 / AlSi

Assembly Information	
Assembly plant location	Tongfu Microelectronics
Package code description	TO-247
Lead frame/Substrate	FRAME TO-247-3H(IL-Ni/NiP)-Dwg TO-LFM-SD029
Die attach material	Soft Solder Pb/Ag/Sn
Wires bonding materials/diameters	Gate Al 7mils / Source Al 15mils
Molding compound	Halogen free

Reliability Testing Information	
Reliability laboratory location	Catania (Italy)
Electrical testing location	Catania (Italy)

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

3. TESTS RESULTS SUMMARY

3.1 Lot Information

High Voltage Test Vehicles						
Lot #	Commercial Product	Silicon line	Package	Technology	Assembly plant	Note
1	STI24N60M2	MQ6H	I2PAK	MDmesh™ M2	Shenzhen	
2	STU7NM62N-H	M2A0	IPAK	MDmesh™ II	Tongfu Microelectronics	
3						
4						
5	STY139N65M5	M5FN	Max247™	MDmesh™ M5	Tongfu Microelectronics	
6						
7	APP762NF1	M2A0	Short IPAK	MDmesh™ II	Tongfu Microelectronics	
8						
9						
10	STP13NM60ND	F263	TO-220	FDmesh™ II	Shenzhen	
11	STP26NM60N	M266	TO-220	MDmesh™ II	Tongfu Microelectronics	
12	STP4N80K5	VJ81	TO-220	MDmesh™ K5	Shenzhen	
13	STP5NK52ZD	FZ52	TO-220	SuperFREDmesh™	Bouskoura	
14	STP6N120K3	VPN6	TO-220	MDmesh™ K3	Shenzhen	
15	STP6N95K5	VJL3	TO-220	MDmesh™ K5	Bouskoura	
16	STW40N60M2	MQ6L	TO-247	MDmesh™ M2	Tongfu Microelectronics	
17	STW48N60DM2	FQ6I	TO-247	MDmesh™ DM2	Tongfu Microelectronics	
18						
Low Voltage Test Vehicles						
1	STD12NF06L-1	AL6A	IPAK	STripFET™ II	Tongfu Microelectronics	
2	STP105N3LL	7L3P	TO-220	STripFET™ F6	Shenzhen	
3	STP110N8F6	7D8G	TO-220	STripFET™ F6	Tongfu Microelectronics	
4	STP180N10F3	4D0K	TO-220	STripFET™ F3	Shenzhen	
5	STP270N8F7	OD8L	TO-220	STripFET™ F7	Shenzhen	
6	STP55NF06	ED6E	TO-220	STripFET™ II	Bouskoura	
7	STP10P6F6	6P6A	TO-220	STripFET™ F6 P-Channel	Bouskoura	
8						
9						
10	STP75NF20	MM2L	TO-220	STripFET™ II	Shenzhen	
IGBT and Power BIPOLAR Test Vehicles						
1	STGP10NC60KD	KV63	TO-220	IGBT Planar	Shenzhen	
2	STGP30M65DF2	KLF5	TO-220	IGBT, Trench gate field-stop	Shenzhen	
3	STGP3HF60HD	CW61	TO-220	IGBT Planar	Shenzhen	
4	STGW39NC60VD	IV68	TO-247	IGBT Planar	Shenzhen	
5	STGW80H65DFB	EWFR	TO-247	IGBT, Trench gate field-stop	Shenzhen	
6	BULD118D-1	BV76	IPAK	Power BIPOLAR	Tongfu Microelectronics	
7	TIP102	BB03	TO-220	Power BIPOLAR	Tongfu Microelectronics	
8	TIP31C	BA12	TO-220	Power BIPOLAR	Shenzhen	
9	TIP35C	BA21	TO-247	Power BIPOLAR	Tongfu Microelectronics	

Q&R – ADG Automotive/Standard Discrete

ST24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

3.2 Test results summary

High Voltage results:

Test	Std ref.	Conditions	SS	Steps	Lot	Lot	Lot	Lot	Lot	Lot	Lot	Lot	Lot	Lot	
					1	2	3	4	5	6	7	8	9	10	
TEST	User specification	All qualification parts tested per the requirements of the appropriate device specification.			25	190	190	190	190	75	75	25	25	25	
External visual	JESD22 B-101	All devices submitted for testing			25	190	190	190	190	75	75	25	25	25	
HTRB	JESD22 A-108	Tj = 150°C, BIAS = 416V	-	168 h	-	-	-	-	-	-	-	-	-	-	
				500 h	-	-	-	-	-	-	-	-	-	-	
				1000 h	-	-	-	-	-	-	-	-	-	-	
		Tj = 150°C, BIAS = 480V	180	168 h	-	0/45	0/45	0/45	-	-	-	-	-	-	-
				500 h	-	0/45	0/45	0/45	-	-	-	-	-	-	-
				1000 h	-	0/45	0/45	0/45	-	-	-	-	-	-	-
		Tj = 150°C, BIAS = 520V	25	168 h	-	-	-	-	-	-	-	-	-	-	-
				500 h	-	-	-	-	-	-	-	-	-	-	-
				1000 h	-	-	-	-	Wk41	-	-	-	-	-	-
		Tj = 150°C, BIAS = 640V	-	168 h	-	-	-	-	-	-	-	-	-	-	-
				500 h	-	-	-	-	-	-	-	-	-	-	-
				1000 h	-	-	-	-	-	-	-	-	-	-	-
		Tj = 150°C, BIAS = 760V	-	168 h	-	-	-	-	-	-	-	-	-	-	-
				500 h	-	-	-	-	-	-	-	-	-	-	-
				1000 h	-	-	-	-	-	-	-	-	-	-	-
		Tj = 150°C, BIAS = 960V	-	168 h	-	-	-	-	-	-	-	-	-	-	-
				500 h	-	-	-	-	-	-	-	-	-	-	-
				1000 h	-	-	-	-	-	-	-	-	-	-	-
HTGB	JESD22 A-108	Tj = 150°C, BIAS = 30V	270	168 h	-	0/45	0/45	0/45	-	-	-	-	-	-	
				500 h	-	0/45	0/45	0/45	-	-	-	-	-	-	
				1000 h	-	0/45	0/45	0/45	-	-	-	-	-	-	
		Tj = 150°C, BIAS = 25V	25	168 h	-	-	-	-	-	-	-	-	-	-	
				500 h	-	-	-	-	-	-	-	-	-	-	
				1000 h	-	-	-	-	Wk41	-	-	-	-	-	
TC	JESD22 A-104	TA=-65°C TO 150°C	325	100cy	0/25	0/25	0/25	0/25	-	-	-	0/25	0/25	0/25	
				200cy	0/25	0/25	0/25	0/25	-	-	-	0/25	0/25	0/25	
				500cy	Wk37	0/25	0/25	0/25	Wk41	Wk41	Wk41	0/25	0/25	0/25	
AC	JESD22 A-102	TA=121°C ; PA=2ATM	225	96h	-	0/25	0/25	0/25	Wk38	Wk38	Wk38	-	-	-	
H3TRB	JESD22 A-101	TA=85°C ; RH=85% BIAS= 100V	150	168 h	-	0/25	0/25	0/25	-	-	-	-	-	-	
				500 h	-	0/25	0/25	0/25	-	-	-	-	-	-	
				1000 h	-	0/25	0/25	0/25	Wk41	Wk41	Wk41	-	-	-	
IOL	MIL-STD-750 Method 1037	ΔTj ≥100°C	225	10Kcy	-	0/25	0/25	0/25	Wk39	Wk39	Wk39	-	-	-	
ESD	ESDA-JEDEC JES-001 ANSI – ESD S5.3.1	CDM / HBM	30		Wk41	Wk41	-	-	Wk41	-	-	-	-	-	

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

Test	Std ref.	Conditions	SS	Steps	Failure/SS									
					Lot 11	Lot 12	Lot 13	Lot 14	Lot 15	Lot 16	Lot 17	Lot 18		
TEST	User specification	All qualification parts tested per the requirements of the appropriate device specification.			90	190	190	190	45	190	190	190		
External visual	JESD22 B-101	All devices submitted for testing			90	190	190	190	45	190	190	190		
Silicon oriented Tests														
HTRB	JESD22 A-108	Tj = 150°C, BIAS = 400V	90	168 h	-	-	-	-	-	-	-	-		
				500 h	-	-	-	-	-	-	-			
				1000 h	-	-	-	-	-	-	-			
		Tj = 150°C, BIAS = 416V	90	168 h	-	-	-	0/45	0/45	-	-	-		
				500 h	-	-	-	Wk36	0/45	-	-			
				1000 h	-	-	-	Wk39	0/45	-	-			
		Tj = 150°C, BIAS = 480V	180	168 h	0/45	-	-	-	-	-	-	-		
				500 h	0/45	-	-	-	-	-	-			
				1000 h	0/45	Wk42	-	-	-	-	Wk42	Wk42		
		Tj = 150°C, BIAS = 520V		168 h	-	-	-	-	-	-	-	-		
				500 h	-	-	-	-	-	-	-			
				1000 h	-	-	-	-	-	-	-			
		Tj = 150°C, BIAS = 640V	45	168 h	-	-	0/45	-	-	-	-	-		
				500 h	-	-	0/45	-	-	-	-			
				1000 h	-	-	0/45	-	-	-	-			
		Tj = 150°C, BIAS = 760V	45	168 h	-	-	-	-	-	0/45	-	-		
				500 h	-	-	-	-	-	Wk36	-			
				1000 h	-	-	-	-	-	Wk39	-			
		Tj = 150°C, BIAS = 960V	-	168 h	-	-	-	-	-	-	-	-		
				500 h	-	-	-	-	-	-	-			
				1000 h	-	-	-	-	-	-	-			
		HTGB	JESD22 A-108	Tj = 150°C, BIAS = 30V	225	168 h	-	Wk37	0/45	0/45	-	0/45	-	-
						500 h	-	Wk39	0/45	Wk36	-	Wk36	-	
						1000 h	-	Wk42	0/45	Wk39	-	Wk39	-	Wk42
Tj = 150°C, BIAS = 25V	45			168 h	0/45	-	-	-	-	-	-			
				500 h	0/45	-	-	-	-	-	-			
				1000 h	0/45	-	-	-	-	-	-			
Package oriented Tests														
TC	JESD22 A-104	TA=-65°C TO 150°C	150	100cy	-	Wk38	0/25	0/25	-	0/25	-	-		
				200cy	-	Wk39	0/25	0/25	-	0/25	-			
				500cy	-	Wk42	0/25	Wk38	-	Wk38	Wk42	Wk42		
AC	JESD22 A-102	TA=121°C ; PA=2ATM	150	96h	-	Wk38	0/25	0/25	-	0/25	Wk38	Wk38		
H3TRB	JESD22 A-101	TA=85°C ; RH=85% BIAS= 100V	150	168 h	-	Wk37	0/25	0/25	-	0/25	-	Wk37		
				500 h	-	Wk39	0/25	Wk36	-	Wk36	-	Wk39		
				1000 h	-	Wk42	0/25	Wk39	-	Wk39	-	Wk42		
IOL	MIL-STD-750 Method 1037	ΔTj ≥100°C	150	10Kcy	-	0/25	0/25	0/25	-	0/25	0/25	0/25		
ESD	ESDA-JEDEC JES-001 ANSI – ESD S5.3.1	CDM / HBM	48		-	Wk42	Wk42	Wk42	.	Wk42	-	Wk42		

Q&R – ADG Automotive/Standard Discrete

ST24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

Low Voltage results:

Test	Std ref.	Conditions	SS	Steps	Failure/SS										
					Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6	Lot 7	Lot 8	Lot 9	Lot 10	
TEST	User specification	All qualification parts tested per the requirements of the appropriate device specification.			190	190	190	90	145	190	190	90	90	90	
External visual	JESD22 B-101	All devices submitted for testing			190	190	190	90	145	190	190	90	90	90	
Silicon oriented Tests															
HTRB	JESD22 A-108	Tj = 175°C, BIAS = 48V	225	168 h	0/45	-	-	-	-	0/45	0/45	0/45	0/45	-	
				500 h	0/45	-	-	-	-	Wk36	Wk36	Wk36	Wk36	-	
				1000 h	0/45	-	-	-	-	Wk39	Wk39	Wk39	Wk39	-	
		Tj = 175°C, BIAS = 24V	45	-	0/45	-	-	-	-	-	-	-	-	-	-
				-	0/45	-	-	-	-	-	-	-	-	-	
				-	0/45	-	-	-	-	-	-	-	-	-	
		Tj = 175°C, BIAS = 64V	90	-	-	-	-	0/45	-	-	-	-	-	-	-
				-	-	-	-	0/45	-	-	-	-	-	-	
				-	-	Wk42	-	0/45	-	-	-	-	-	-	
		Tj = 175°C, BIAS = 80V	45	-	-	-	0/45	-	-	-	-	-	-	-	-
				-	-	-	0/45	-	-	-	-	-	-	-	
				-	-	-	0/45	-	-	-	-	-	-	-	
Tj = 150°C, BIAS = 160V	45	-	-	-	-	-	-	-	-	-	-	-	0/45		
		-	-	-	-	-	-	-	-	-	-	-	0/45		
		-	-	-	-	-	-	-	-	-	-	-	0/45		
HTGB	JESD22 A-108	Tj = 175°C, BIAS = 16V	45	168 h	0/45	-	-	-	-	-	-	-	-	-	
				500 h	0/45	-	-	-	-	-	-	-	-	-	
				1000 h	0/45	-	-	-	-	-	-	-	-	-	
		Tj = 175°C, BIAS = 20V	360	168 h	-	0/45	Wk37	0/45	0/45	0/45	0/45	0/45	0/45	0/45	-
				500 h	-	0/45	Wk39	0/45	0/45	Wk36	Wk36	Wk36	Wk36	Wk36	-
				1000 h	-	0/45	Wk42	0/45	0/45	Wk39	Wk39	Wk39	Wk39	Wk39	-
		Tj = 150°C, BIAS = 20V	45	168 h	-	-	-	-	-	-	-	-	-	-	0/45
				500 h	-	-	-	-	-	-	-	-	-	-	0/45
				1000 h	-	-	-	-	-	-	-	-	-	-	0/45
Package oriented Tests															
TC	JESD22 A-104	TA=-65°C TO 150°C	125	100cy	0/25	0/25	-	-	0/25	0/25	-	-	-	-	
				200cy	0/25	0/25	-	-	0/25	Wk36	-	-	-	-	
				500cy	Wk37	0/25	Wk42	-	0/25	Wk39	-	-	-	-	
AC	JESD22 A-102	TA=121°C ; PA=2ATM	150	96h	0/25	0/25	Wk39	-	0/25	0/25	0/25	-	-	-	
H3TRB	JESD22 A-101	TA=85°C ; RH=85% BIAS= 48V	75	168 h	0/25	-	-	-	-	0/25	0/25	-	-	-	
				500 h	0/25	-	-	-	-	Wk36	Wk36	-	-	-	
				1000 h	0/25	-	-	-	-	Wk39	Wk39	-	-	-	
		TA=85°C ; RH=85% BIAS= 24V	25	168 h	-	0/25	-	-	-	-	-	-	-	-	-
				500 h	-	0/25	-	-	-	-	-	-	-	-	-
				1000 h	-	0/25	-	-	-	-	-	-	-	-	-
		TA=85°C ; RH=85% BIAS= 64V	50	168 h	-	-	-	-	0/25	-	-	-	-	-	-
				500 h	-	-	-	-	0/25	-	-	-	-	-	-
				1000 h	-	-	Wk42	-	0/25	-	-	-	-	-	-
		TA=85°C ; RH=85% BIAS= 80V		168 h	-	-	-	-	-	-	-	-	-	-	-
				500 h	-	-	-	-	-	-	-	-	-	-	-
				1000 h	-	-	-	-	-	-	-	-	-	-	-
TA=85°C ; RH=85% BIAS= 160V		168 h	-	-	-	-	-	-	-	-	-	-	-		
		500 h	-	-	-	-	-	-	-	-	-	-	-		
		1000 h	-	-	-	-	-	-	-	-	-	-	-		
IOL	MIL-STD-750 Method 1037	ΔTj ≥100°C	150	10Kcy	Wk37	0/25	Wk41	-	0/25	0/25	0/25	-	-	-	
ESD	ESDA-JEDEC JES-001 ANSI – ESD S5.3.1	CDM / HBM	48		Wk42	Wk42	Wk42	Wk42	Wk42	Wk42	Wk42	-	-	-	

Q&R – ADG Automotive/Standard Discrete

STI24N60M2, STP13NM60ND, STP4N80K5, STP6N120K3, STP105N3LL, STP180N10F3, STP270N8F7, STP75NF20, STGP10NC60KD, STGP30M65DF2, STGP3HF60HD, STGW39NC60VD, STGW80H65DFB, TIP31C, STP5NK52ZD, STP6N95K5, STP55NF06, STP10P6F6, STU7NM62N-H, STY139N65M5, APP762NF1, STP26NM60N, STW40N60M2, STW48N60DM2, STD12NF06L-1, STP110N8F6, BULD118D-1, TIP102, TIP35C

IGBT and Power BIPOLAR results:

Test	Std ref.	Conditions	SS	Steps	Lot	Lot	Lot	Lot	Lot	Lot	Lot	Lot	Lot		
					1	2	3	4	5	6	7	8	9		
TEST	User specification	All qualification parts tested per the requirements of the appropriate device specification.			190	-	-	-	-	95	-	-	-		
External visual	JESD22 B-101	All devices submitted for testing			190	-	-	-	-	95	-	-	-		
Silicon oriented Tests															
HTRB	JESD22 A-108	Tj = 150°C, BIAS = 480V	45	168 h	0/45	-	0/45	0/45	-	-	-	-	-		
				500 h	0/45	-	0/45	0/45	-	-	-	-	-		
				1000 h	0/45	-	0/45	0/45	-	-	-	-	-		
		Tj = 150°C, BIAS = 520V	90	168 h	-	0/45	-	-	0/45	-	-	-	-	-	
				500 h	-	0/45	-	-	0/45	-	-	-	-	-	
				1000 h	-	0/45	-	-	0/45	-	-	-	-	-	
		Tj = 150°C, BIAS = 560V	45	168 h	-	-	-	-	-	0/45	-	-	-	-	
				500 h	-	-	-	-	-	0/45	-	-	-	-	
				1000 h	-	-	-	-	-	Wk37	-	-	-	-	
		Tj = 150°C, BIAS = 160V	45	168 h	-	-	-	-	-	-	-	-	-	Wk37	
				500 h	-	-	-	-	-	-	-	-	-	Wk39	
				1000 h	-	-	-	-	-	-	-	-	-	Wk42	
Tj = 150°C, BIAS = 80V	90	168 h	-	-	-	-	-	-	Wk37	0/45	-	-			
		500 h	-	-	-	-	-	-	Wk39	0/45	-	-			
		1000 h	-	-	-	-	-	-	Wk42	0/45	-	-			
HTGB	JESD22 A-108	Tj = 150°C, BIAS = 30V	45	168 h	-	0/45	-	0/45	0/45	-	-	-	-		
				500 h	-	0/45	-	0/45	0/45	-	-	-	-	-	
				1000 h	-	0/45	-	0/45	0/45	-	-	-	-	-	
		Tj = 150°C, BIAS = 20V	135	168 h	0/45	-	0/45	-	-	-	-	-	-	-	
				500 h	0/45	-	0/45	-	-	-	-	-	-	-	-
				1000 h	0/45	-	0/45	-	-	-	-	-	-	-	-
Package oriented Tests															
TC	JESD22 A-104	TA=-65°C TO 150°C	1755	100cy	0/25	-	0/25	-	0/25	0/25	-	-	-		
				200cy	0/25	-	0/25	-	0/25	0/25	-	-	-		
				500cy	0/25	-	0/25	-	0/25	0/25	Wk42	-	Wk42		
AC	JESD22 A-102	TA=121°C ; PA=2ATM	150	96h	0/25	-	-	-	0/25	0/25	Wk38	-	Wk38		
H3TRB	JESD22 A-101	TA=85°C ; RH=85% BIAS= 100V	150	168 h	0/25	0/25	-	-	0/25	0/25	-	-	-		
				500 h	0/25	0/25	-	-	0/25	0/25	-	-	-		
				1000 h	0/25	0/25	-	-	0/25	0/25	-	-	Wk42		
		TA=85°C ; RH=85% BIAS= 64V	25	168 h	-	-	-	-	-	-	-	-	-	-	
500 h	-			-	-	-	-	-	-	-	-	-	-		
IOL	MIL-STD-750 Method 1037	ΔTj ≥100°C	150	10Kcy	0/25	-	-	-	0/25	0/25	0/25	-	0/25		
ESD	ESDA-JEDEC JES-001 ANSI – ESD S5.3.1	CDM / HBM	36		Wk42	-	-	-	Wk42	Wk42	Wk42	-	Wk42		