

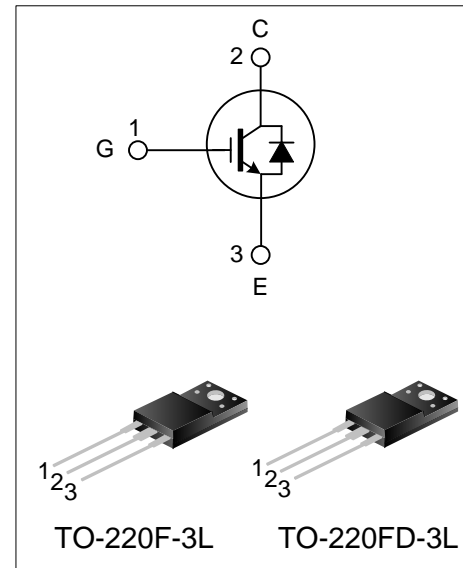
30A, 600V FIELD STOP IGBT

DESCRIPTION

The SGT30T60SD1F(FD) field stop IGBT adopts Silan Field Stop III technology, features low conduction loss and switching loss, is applicable to UPS, SMPS and PFC fields.

FEATURES

- 30A, 600V, $V_{CE(sat)}(typ.)=1.65V@I_C=30A$
- Low conduction loss
- Fast switching
- High input impedance



NOMENCLATURE

SGT 30 T 60 S D 1 F		
IGBT series	SGT	Package F: TO-220F-3L
Current, 30: 30A	30	1,2,3... : Version No.
N : N-channel	T	Blank: Standard diode
NE : N-channel planner gate with ESD	60	M : Standard Diode, full range
T : Field Stop 3/4	S	R : Rapid Diode
U : Field Stop 4+	D	B : Rapid Diode, full range
V : Field Stop 5	1	S : Soft Diode, full range
W : Field Stop 5+	F	D : packaged with fast recovery diode
Y : Field Stop5++		R : RC IGBT
A : Field Stop 6		Blank: single IGBT
Voltage, 60: 600V		C : Sic
120: 1200V		L : Ultra low switching, recommended frequency ~2KHz
		Q : Low switching, recommended frequency 2~20KHz
		S : Standard frequency, recommended frequency 5~40KHz
		F : Fast switching, recommended frequency 10~60KHz
		UF : Ultra fast switching, recommended frequency 40KHz~
		I: Igniter

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT30T60SD1F	TO-220F-3L	30T60SD1F	Pb free	Tube
SGT30T60SD1FD	TO-220FD-3L	30T60SD1FD	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS (T_C=25°C UNLESS OTHERWISE NOTED)

Characteristics		Symbol	Ratings	Unit
Collector to Emitter Voltage		V _{CE}	600	V
Gate to Emitter Voltage		V _{GE}	±20	V
Collector Current	T _C =25°C	I _C	60	A
	T _C =100°C		30	
Pulsed Collector Current		I _{CM}	90	A
Diode Forward Current	T _C =25°C	I _F	30	A
	T _C =100°C		15	A
Diode Pulse Current		I _{FM}	45	A
Power Dissipation (T _C =25°C)		P _{tot}	230	W
Operating Junction Temperature		T _J	-55~+150	°C
Storage Temperature Range		T _{stg}	-55~+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case (IGBT)	R _{th(j-c)}	--	--	--	2.3	°C/W
Thermal Resistance, Junction to Case (FRD)	R _{th(j-c)}	--	--	--	2.6	°C/W
Thermal Resistance, Junction to Ambient (IGBT)	R _{th(j-a)}	--	--	--	62.5	°C/W
Soldering Temperature (in line)	T _{sold}	15 ⁺² ₋₀ sec, 1time	--	--	260	°C

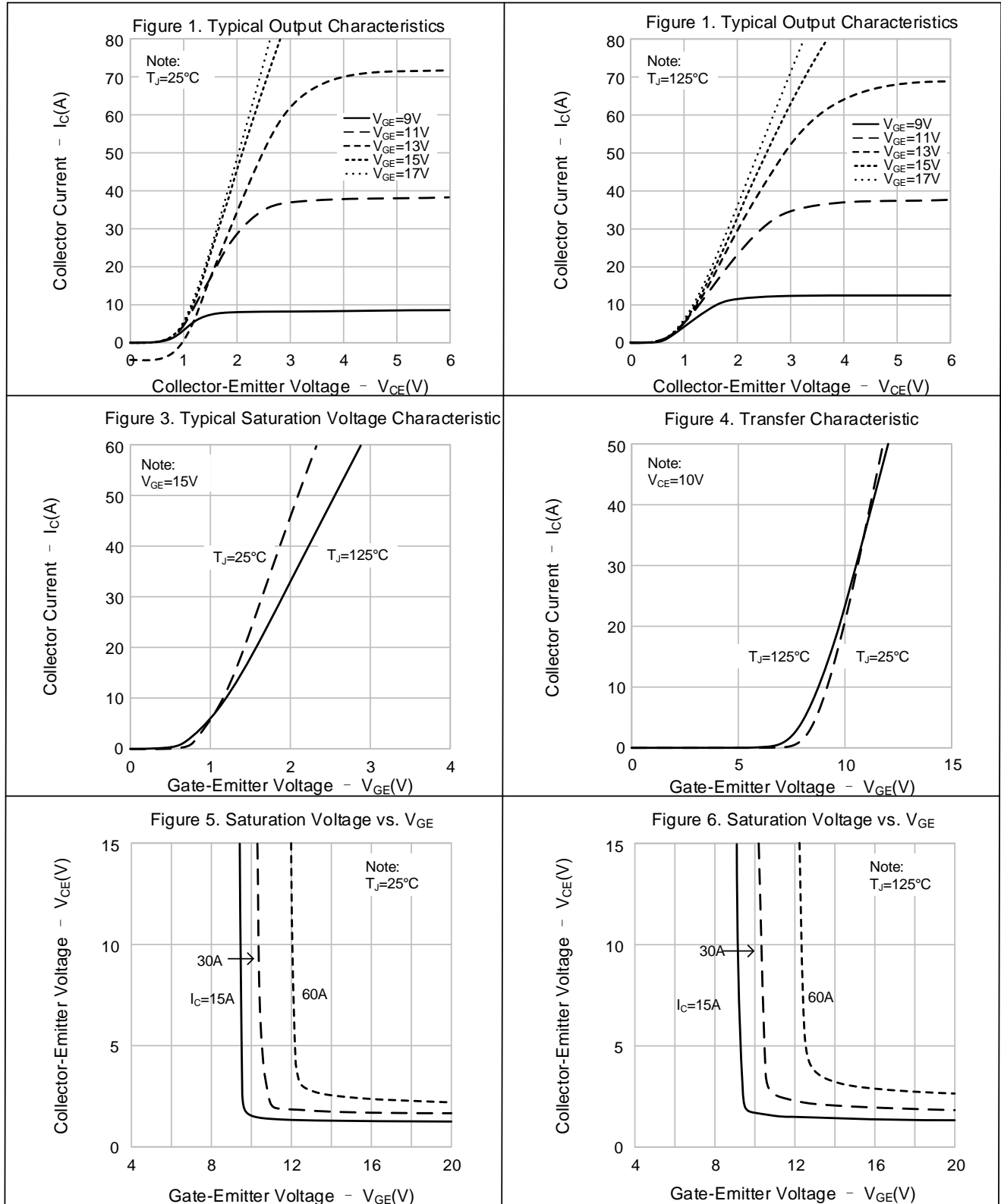
ELECTRICAL CHARACTERISTICS OF IGBT (T_J=25°C, UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Collector- emitter Breakdown Voltage	V _{(BR)CES}	V _{GE} =0V, I _C =250uA	600	--	--	V
Zero Gate Voltage Collector Current	I _{CES}	V _{CE} =600V, V _{GE} =0V	--	--	200	uA
Gate-emitter Leakage Current	I _{GES}	V _{GE} =20V, V _{CE} =0V	--	--	±400	nA
Gate-emitter Threshold Voltage	V _{GE(th)}	I _C =250uA, V _{CE} =V _{GE}	4.0	5.0	6.5	V
Collector-emitter Saturation Voltage	V _{CEsat}	I _C =30A, V _{GE} =15V, T _J =25°C	--	1.65		V
		I _C =30A, V _{GE} =15V, T _J =125°C	--	1.9	--	V
Input Capacitance	C _{ies}	V _{CE} =30V	--	1650	--	pF
Output Capacitance	C _{oes}	V _{GE} =0V	--	130	--	
Reverse Transfer Capacitance	C _{res}	f=1MHz	--	35	--	
Turn-On Delay Time	T _{d(on)}	V _{CE} =400V I _C =30A R _g =10Ω V _{GE} =15V Inductive load T _J =25°C	--	30	--	ns
Rise Time	T _r		--	105	--	
Turn-Off Delay Time	T _{d(off)}		--	67	--	
Fall Time	T _f		--	100	--	
Turn-On Switching Energy	E _{on}	Inductive load T _J =25°C	--	1.85	--	mJ
Turn-Off Switching Energy	E _{off}		--	0.45	--	
Total Switching Energy	E _{st}		--	2.3	--	
Total Gate Charge	Q _g	V _{CE} =400V, I _C =30A, V _{GE} =15V	--	76	--	nC
Gate to Emitter Charge	Q _{ge}		--	20	--	
Gate to Collector Charge	Q _{gc}		--	38	--	

ELECTRICAL CHARACTERISTICS OF FRD (T_J=25°C UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V _F	I _F =15A, T _J =25°C	--	1.8	--	V
		I _F =15A, T _J =125°C	--	1.5	--	
Diode Reverse Recovery Time	T _{rr}	I _{EC} =15A, dI _{EC} /dt=200A/μs	--	28	--	ns
Diode Reverse Recovery Charge	Q _{rr}	I _{EC} =15A, dI _{EC} /dt=200A/μs	--	47	--	nC

TYPICAL CHARACTERISTICS CURVE



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 7. Saturation Voltage Drop vs. Temperature

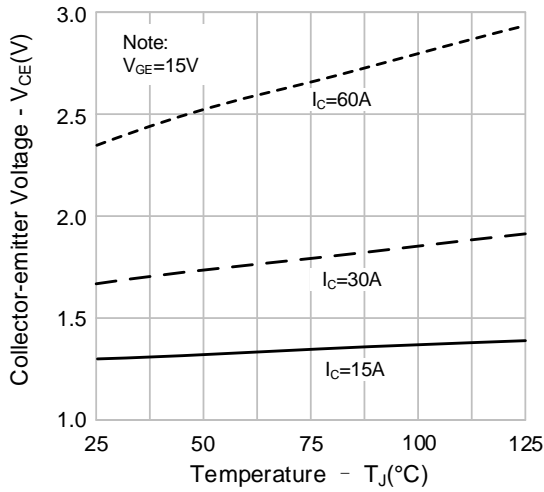


Figure 8. Capacitance Characteristic

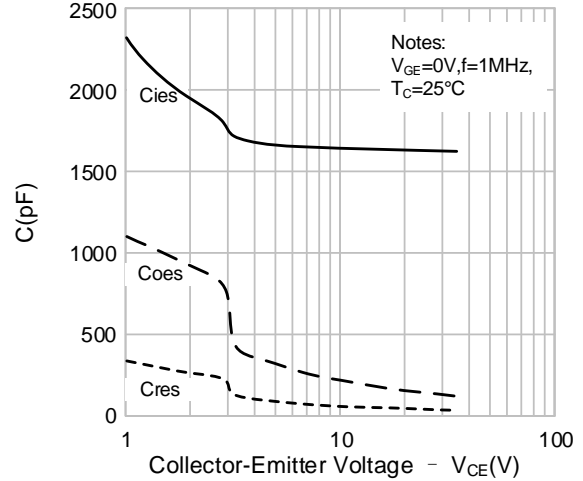


Figure 9. Gate Charge Characteristic

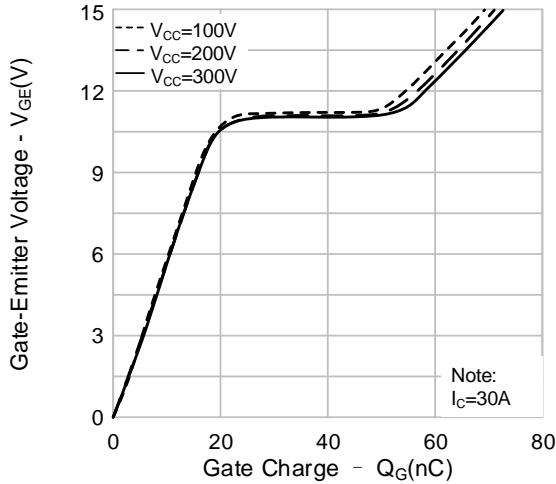


Figure 10. Turn-on Characteristic vs. Gate Resistance

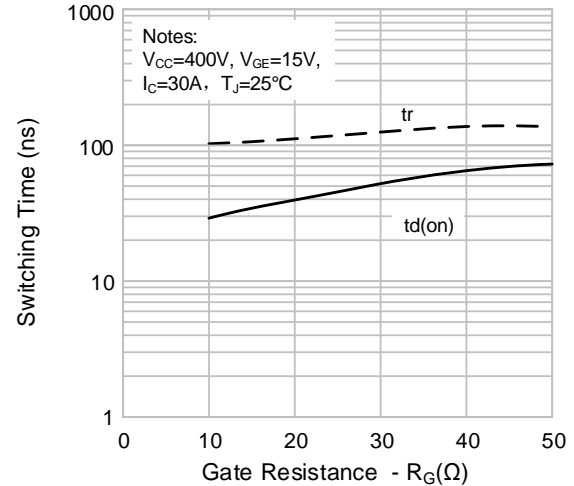


Figure 11. Turn-off Characteristic vs. Gate Resistance

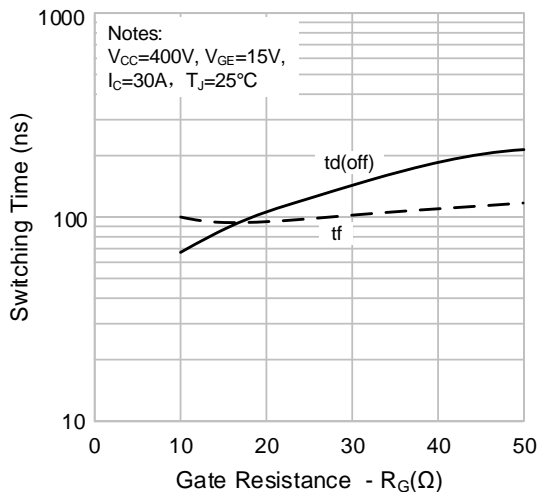
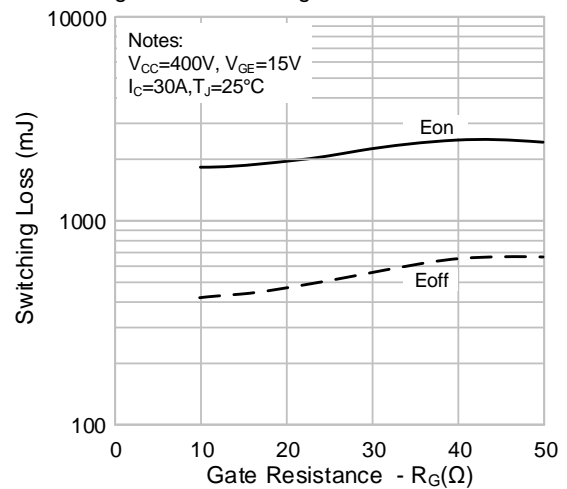


Figure 12. Switching Loss vs. Gate Resistance



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 13. Turn-on Characteristic vs. Collector Current

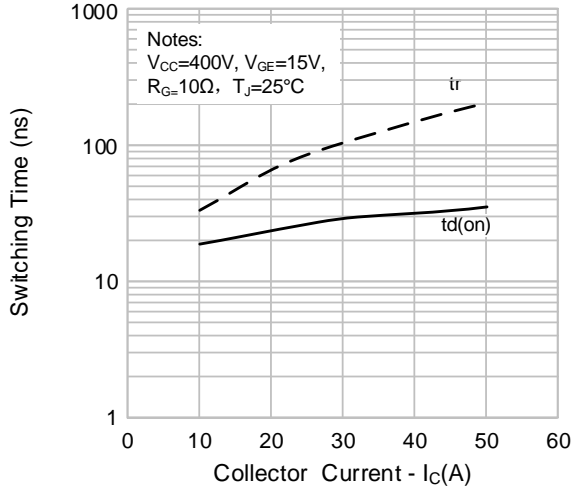


Figure 14. Turn-off Characteristic vs. Collector current

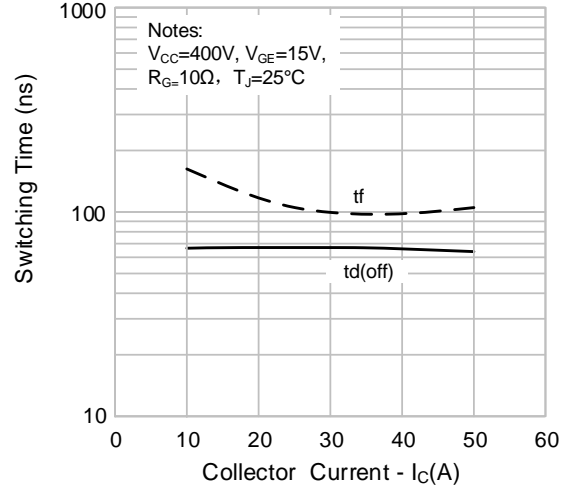


Figure 15. Switching Loss vs. Collector current

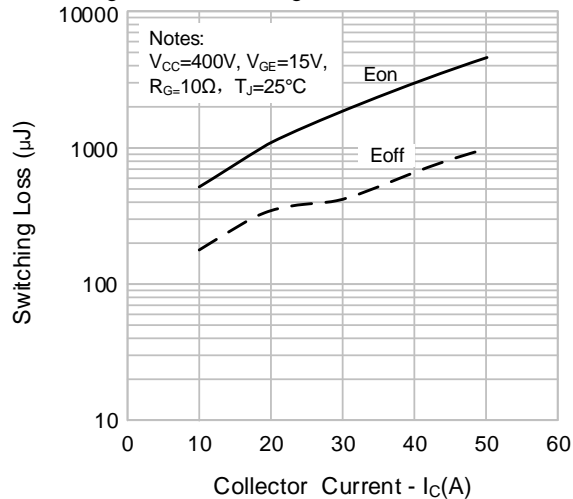


Figure 16. Forward Characteristics

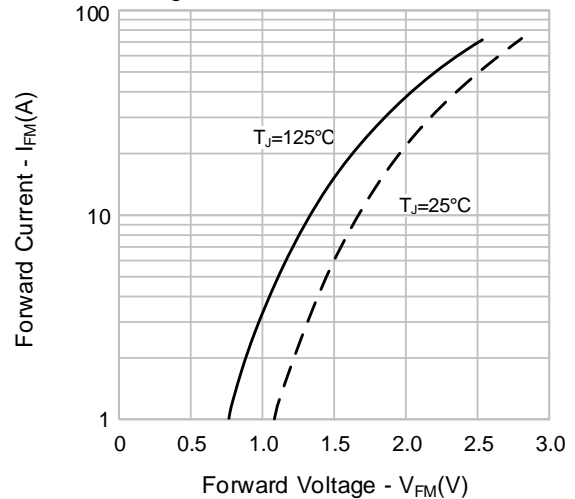


Figure 17. Reverse Recovery Time vs. Forward Current

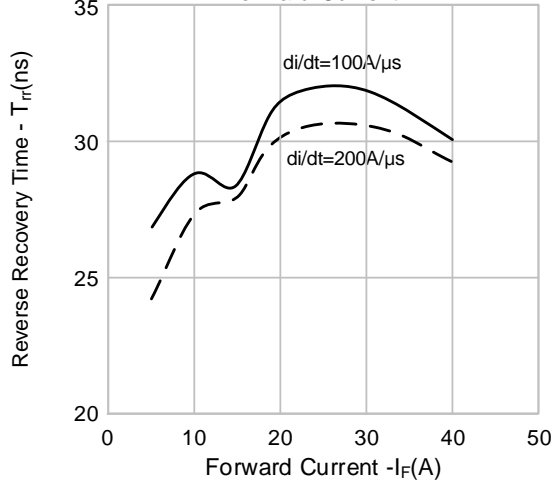
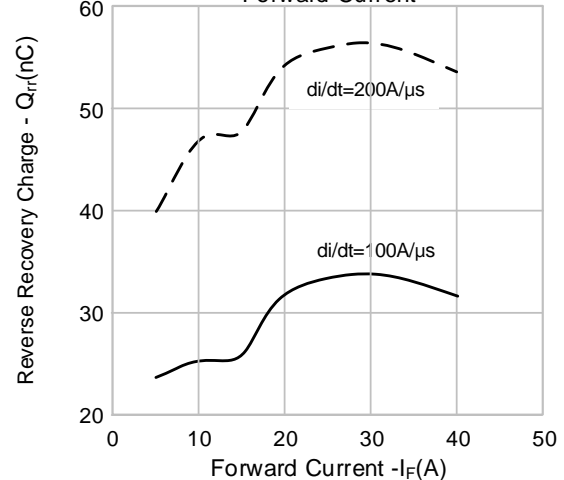
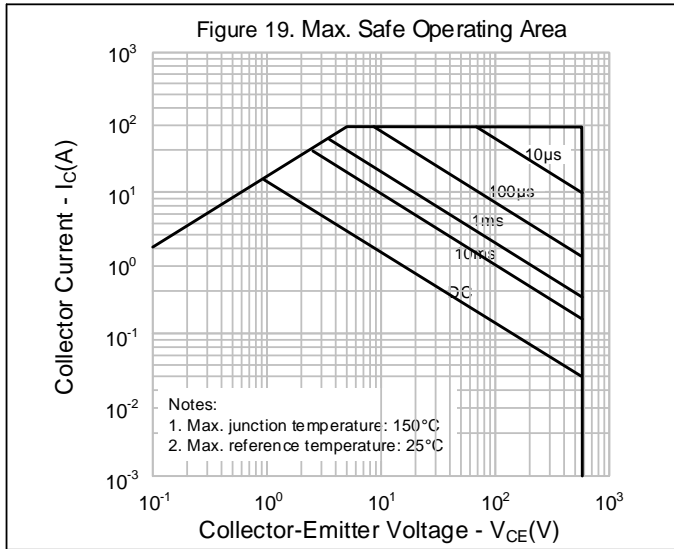


Figure 18. Reverse Recovery Charge vs. Forward Current



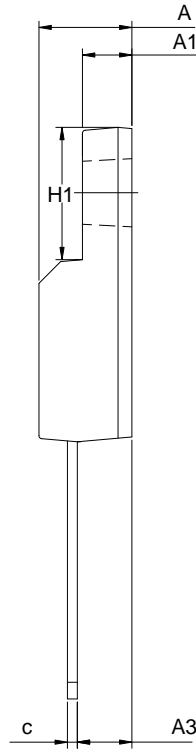
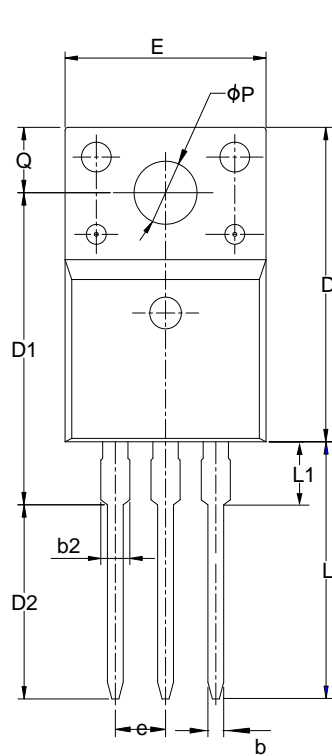
TYPICAL CHARACTERISTICS CURVE (CONTINUED)



PACKAGE OUTLINE

TO-220F-3L

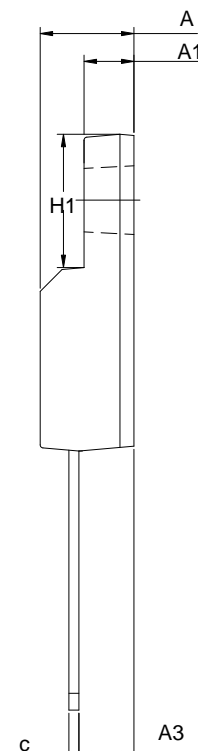
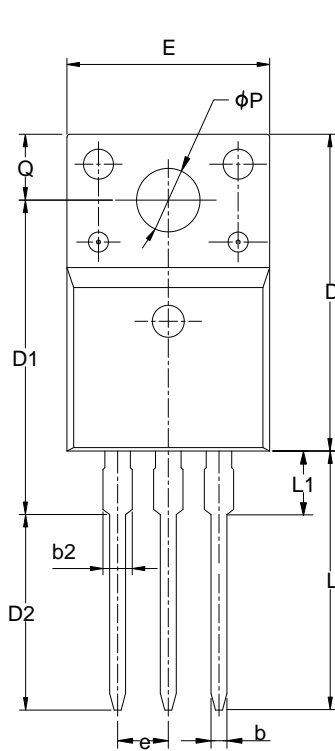
UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.70	0.80	0.90
b2	—	—	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BSC		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	3.50
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55

TO-220FD-3L

UNIT: mm



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	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
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D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BSC		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	3.50
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55



IGBT DEVICES OPERATE NOTES:

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the IGBT electric circuit as a result of the damage which is caused by discharge:

- The operator must put on wrist strap which should be earthed to against electrostatic.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- IGBT devices should be packed in antistatic/conductive containers for transportation.

Important notice :

1. Silan reserves the right to make changes of this instruction without notice.
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Rev.: 1.1

Revision History:

1. Update nomenclature and parameter name
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Rev.: 1.0

Revision History:

1. First release
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