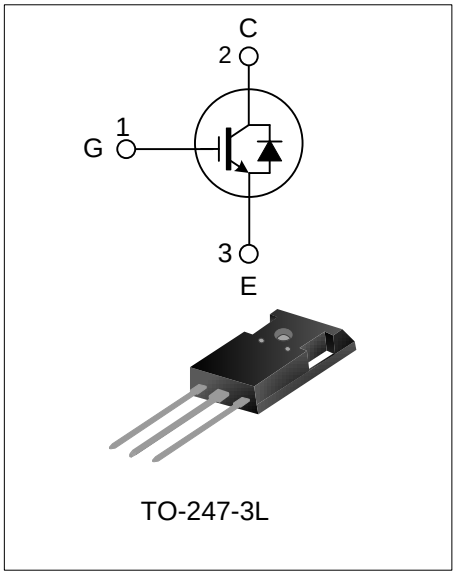
30A, 600V FIELD STOP IGBT

DESCRIPTION

SGT30T60SDM1P7 adopts Field Stop III IGBT technology, offer the optimum performance for induction Heating, UPS, SMPS and PFC application.



TO-247-3L

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 M 1 P7

IGBT series

Current, 70: 70A

N : N Channel
NE : N-channel planar gate with ESD
T : Field Stop 3/4
U : Field Stop 4+
V : Field Stop 5
W: Field Stop 6
X : Field Stop 7

Voltage, 65: 650V
120: 1200V

Package
P7 : TO-247-3L
F: TO-220F-3L

1,2,3··· : Version No.

Blank: Standard diode
M : Standard Diode, full range
R : Rapid Diode
B : Rapid Diode, full range
S : Soft Diode, full range

D : Packaged with fast recovery diode
R : RC IGBT

L : Ultra low switching，recommended frequency ~2KHz
Q : Low switching，recommended frequency2~20KHz
S : Standard frequency ，recommended frequency5~40KHz
F : Fast switching，recommended frequency10~60KHz
UF : Ultra fast switching，recommended frequency 40KHz~

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT30T60SDM1P7	TO-247-3L	30T60SDM1	Pb free	Tube

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

Characteristics		Symbol	Ratings	Units
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 Current	T_C=25°C	I_F	60	A
	T_C=100°C		30	
Short-circuit time(V_{GE}=15V, V_{CC}=300V)		Tsc	10	μs
Maximum Power Dissipation (T_C=25°C)		P_D	278	W
Operating Junction Temperature		T_J	-40～+175	°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)	$R_{\theta JC}$	--	--	--	0.54	°C/W
Thermal Resistance, Junction to Case (FRD)	$R_{\theta JC}$	--	--	--	1.2	°C/W
Thermal Resistance, Junction to Ambient (IGBT)	$R_{\theta JA}$	--	--	--	40	°C/W
Soldering Temperature (in line)	T_{sold}	15^{+2}_{-0} sec, 1time	--	--	260	°C

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

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV_{CE}	V_{GE}=0V, I_C=250μA	600	--	--	V
C-E Leakage Current	I_{CES}	V_{CE}=600V, V_{GE}=0V	--	--	200	μA
G-E Leakage Current	I_{GES}	V_{GE}=20V, V_{CE}=0V	--	--	±400	nA
G-E Threshold Voltage	$V_{GE(th)}$	I_C=250μA, V_{CE}=V_{GE}	4.0	5.0	6.5	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=30A, V_{GE}=15V, T_C=25°C	--	1.65	--	V
		I_C=30A, V_{GE}=15V, T_C=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	--	30	--	ns
Rise Time	T_r		--	105	--	
Turn-Off Delay Time	$T_{d(off)}$		--	67	--	
Fall Time	T_f		--	100	--	
Turn-On Switching Loss	E_{on}		--	1.85	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.45	--	
Total Switching Loss	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_C =25°C, UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V_{FM}	I_F=30A, T_C=25°C	--	1.8	--	V
		I_F=30A, T_C=125°C	--	1.5	--	
Diode Reverse Recovery Time	T_{rr}	I_{EC}=30A, dI_{EC}/dt=200A/μs	--	37	--	ns
Diode Reverse Recovery Charge	Q_{rr}	I_{EC}=30A, dI_{EC}/dt=200A/μs	--	80	--	nC

TYPICAL CHARACTERISTICS CURVE

Figure 1. Typical Output Characteristics

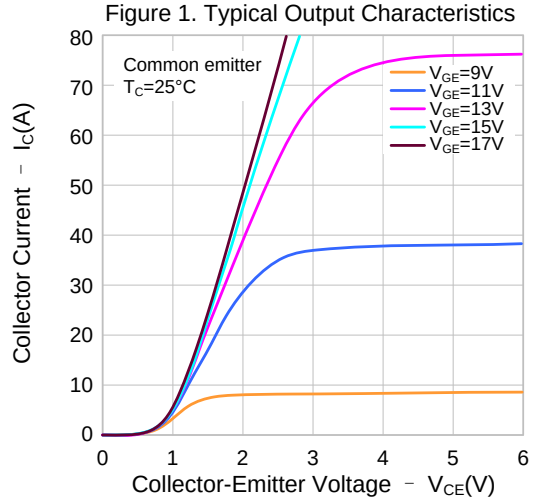


Figure 2. Typical Output Characteristics

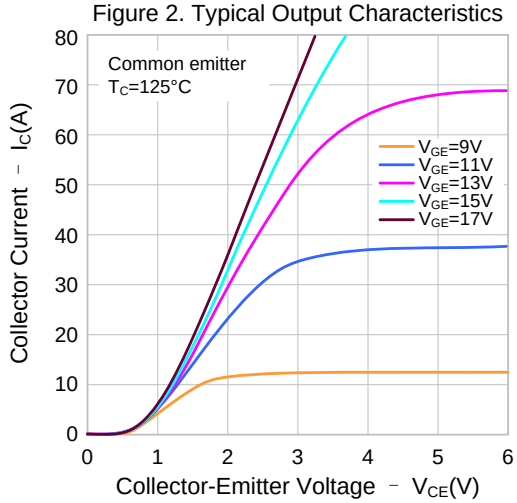


Figure 3. Typical Saturation Voltage Characteristic

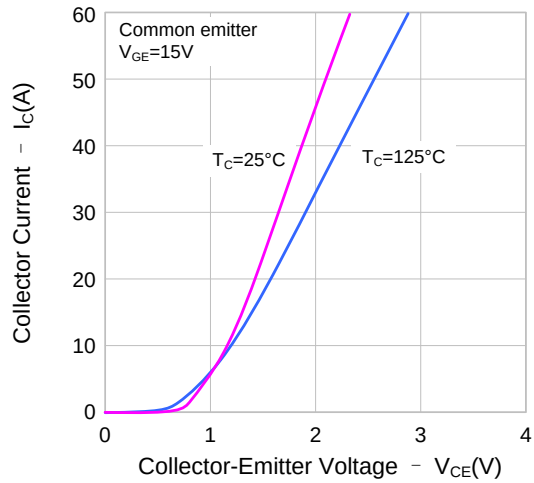


Figure 4. Transfer Characteristic

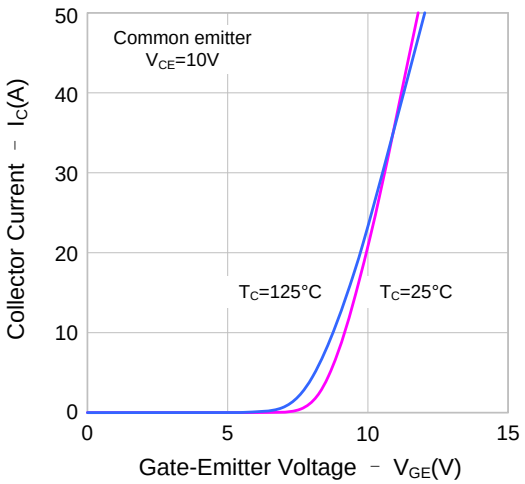


Figure 5. Saturation Voltage vs. V_{GE}

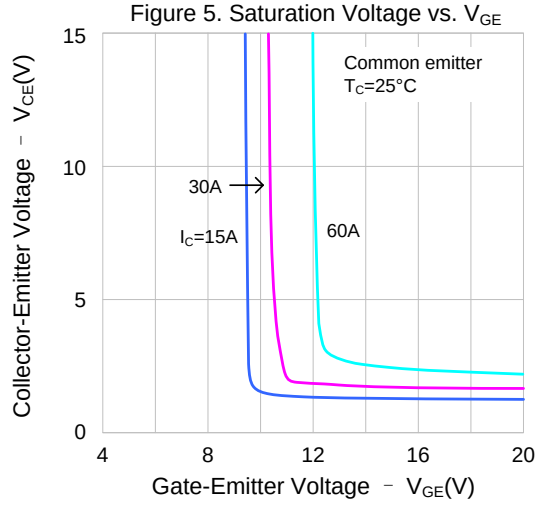
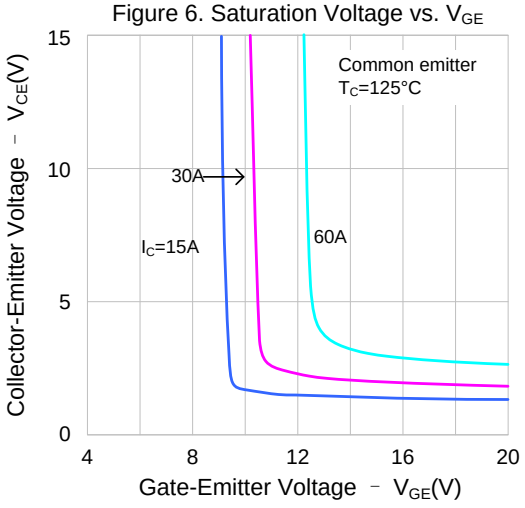


Figure 6. Saturation Voltage vs. V_{GE}



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 7. Saturation Voltage Drop vs. Temperature

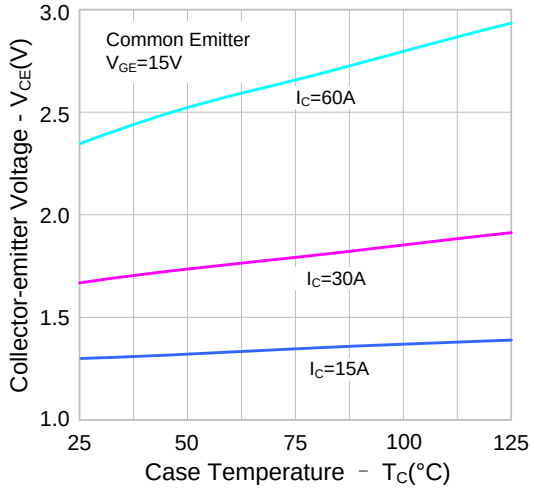


Figure 8. Capacitance Characteristic

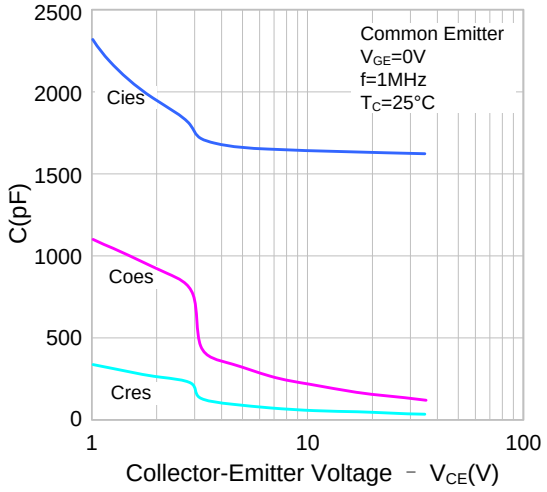


Figure 9. Gate Charge Characteristic

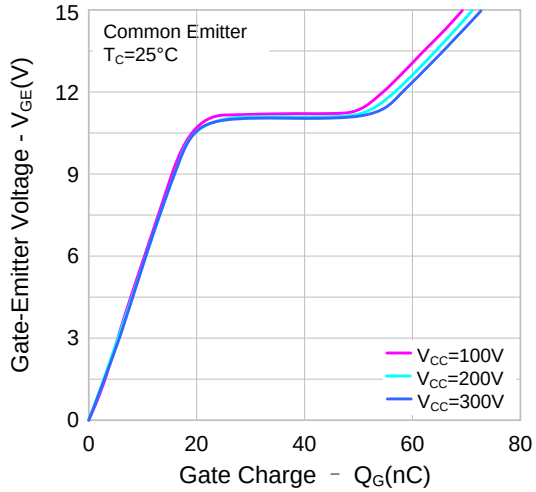


Figure 10. Turn-on Characteristic vs. Gate Resistance

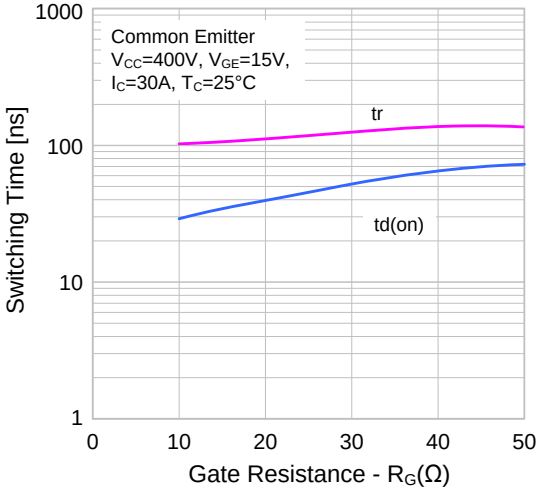


Figure 11. Turn-off Characteristic vs. Gate Resistance

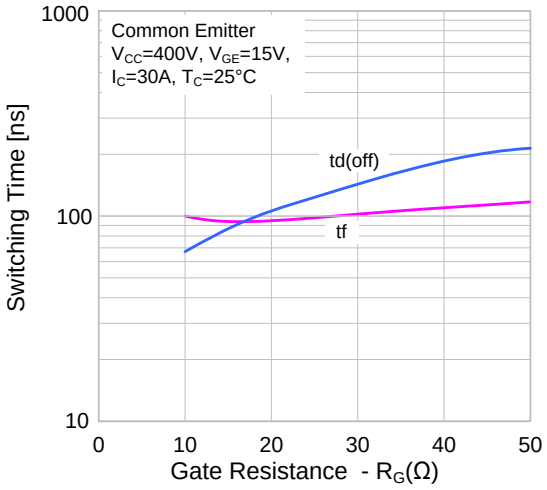
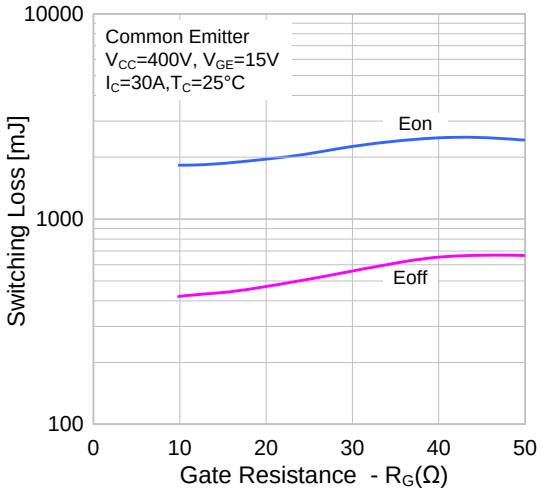


Figure 12. Switching Loss vs. Gate Resistance



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 13. Turn-on Characteristic vs. Collector Current

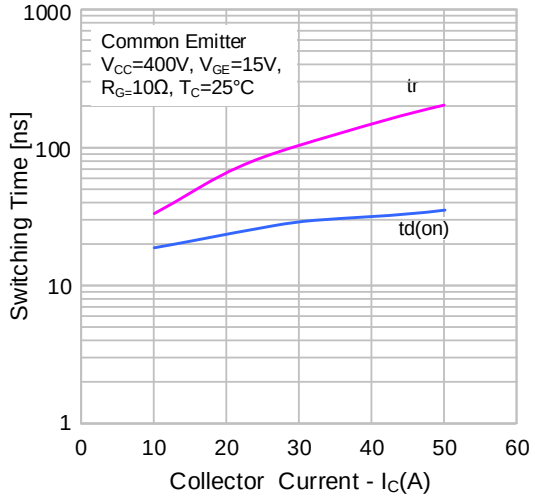


Figure 14. Turn-off Characteristic vs. Collector Current

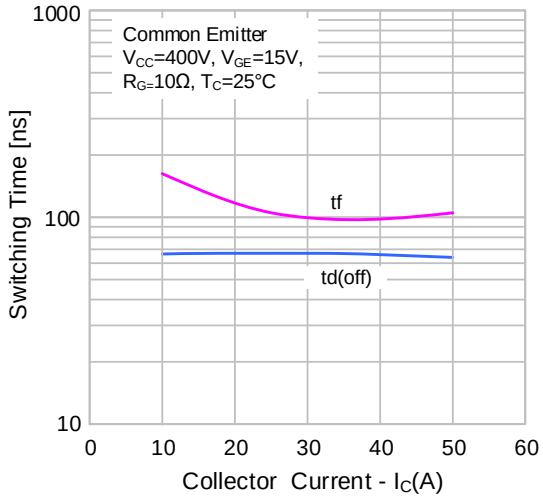


Figure 15. Switching Loss vs. Collector Current

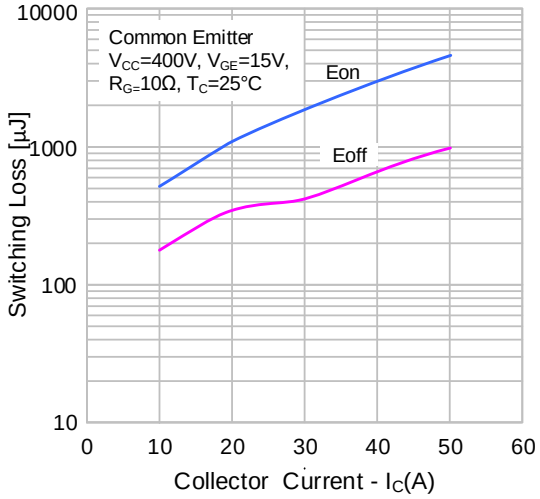


Figure 16. Forward Characteristic

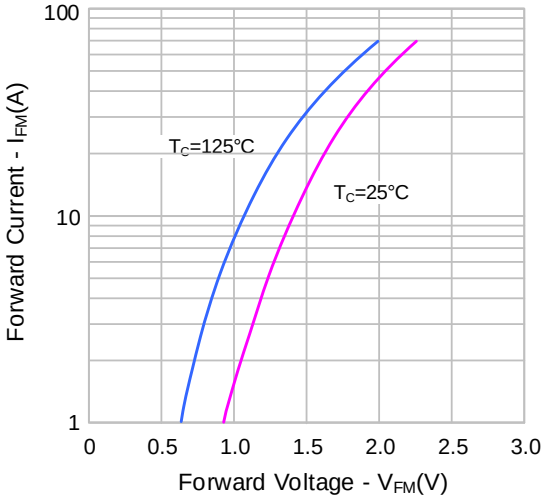


Figure 17. Reverse Recovery Time vs. Forward Current

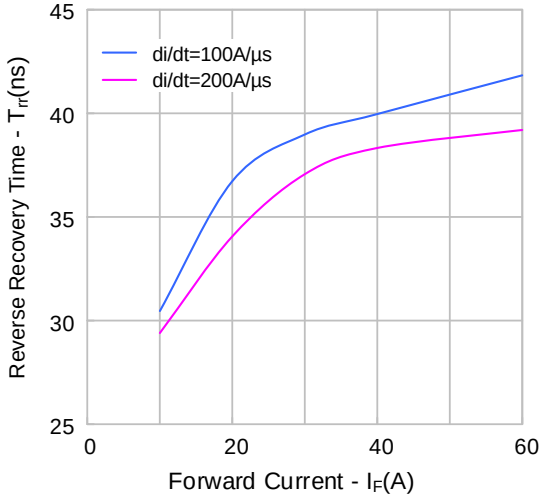
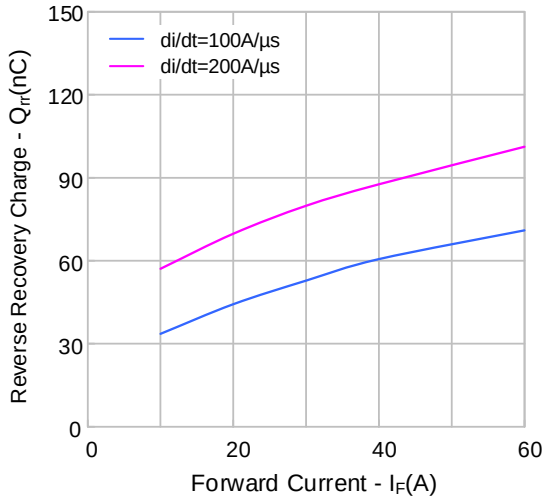


Figure 18. Reverse Recovery Charge vs. Forward Current



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 19. Peak Reverse Recovery Current vs. Forward Current

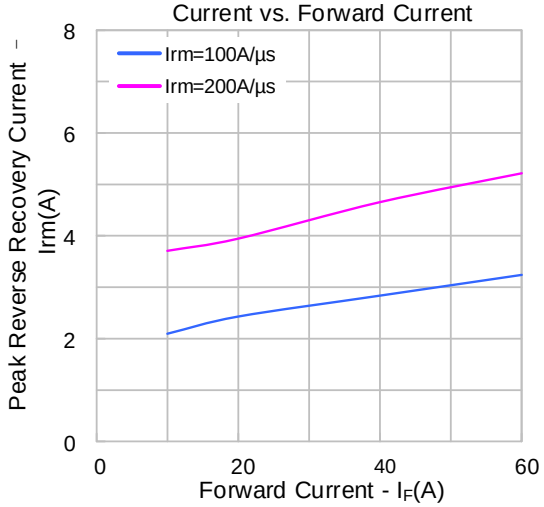


Figure 20. Tb Slope vs. Forward Current

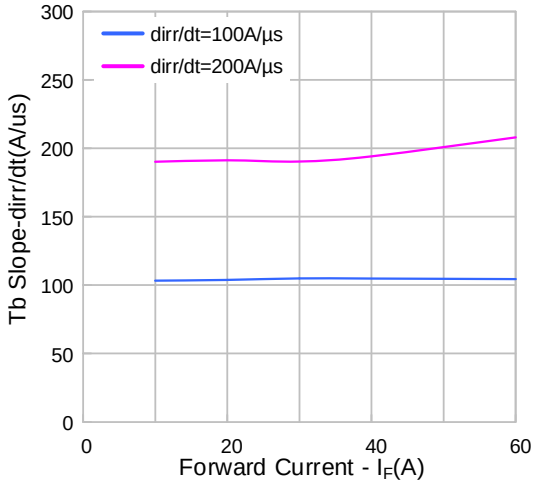


Figure 21. Max. Safe Operating Area

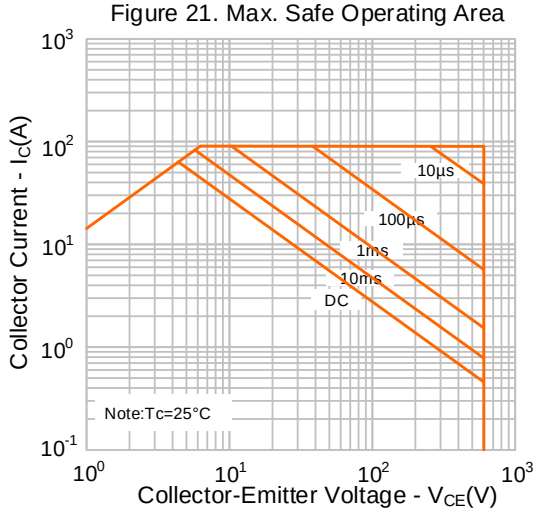


Figure 22. Square Wave Impedance Simulation For All Heating Data Folders(IGBT)

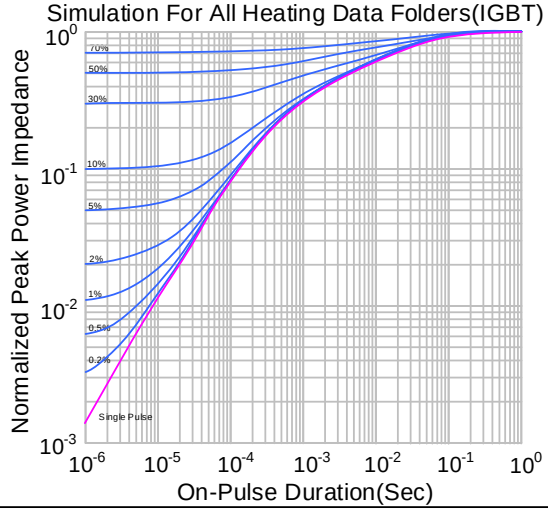
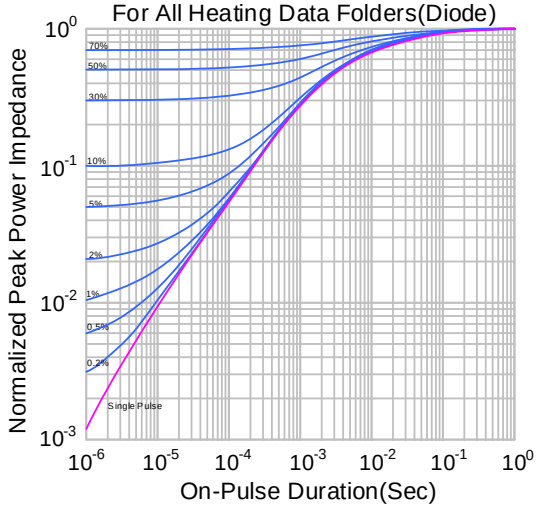
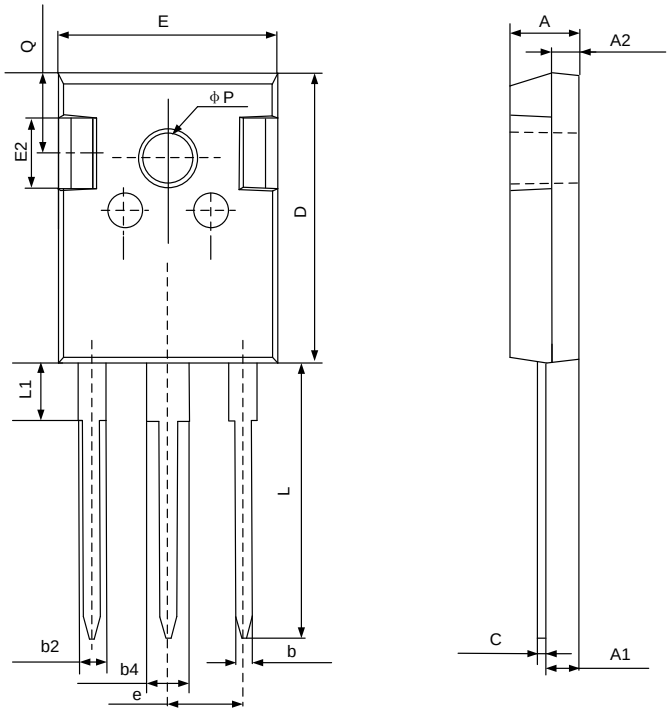


Figure 23. Square Wave Impedance Simulation For All Heating Data Folders(Diode)



PACKAGE OUTLINE

TO-247-3L **UNIT: mm**



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	–	1.36
b2	1.91	–	2.25
b4	2.91	–	3.25
c	0.51	–	0.75
D	20.80	21.00	21.30
E	15.50	15.80	16.10
E2	4.40	5.00	5.20
e	5.44 BSC		
L	19.72	19.92	20.22
L1	–	–	4.30
Q	5.60	5.80	6.00
P	3.40	—	3.80

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Rev.: 1.8

Revision History:

1. Update important notice

Rev.: 1.7

Revision History:

1. Modify operating junction temperature
2. Update P_D
3. Update figures 17, 18, 21 and add figures 19, 20 ,22, 23

Rev.: 1.6

Revision History:

1. Update SOA

Rev.: 1.5

Revision History:

1. Add high temperature IF current

Rev.: 1.4

Revision History:

1. Add short circuit protection time
2. Update the template of the datasheet

Rev.: 1.3

Revision History:

1. In figure 4, all transmission characteristics are changed to common emitter Vce=10V

Rev.: 1.2

Revision History:

1. Update NOMENCLATURE

Rev.: 1.1

Revision History:

1. Update SOA
2. Update the package outline

Rev.: 1.0

Revision History:

1. First release