

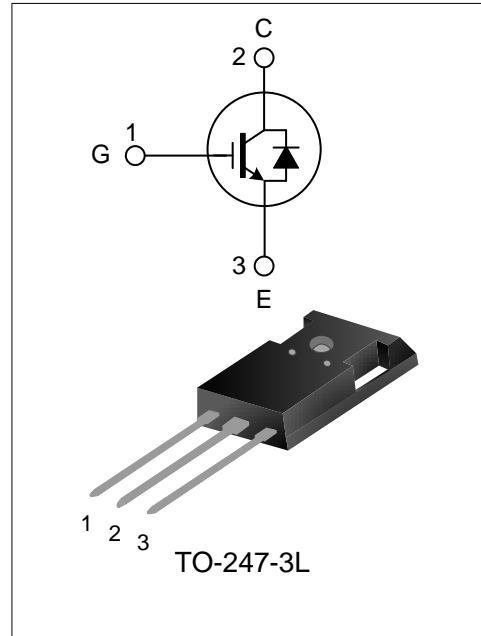
75A, 650V FIELD STOP IGBT

DESCRIPTION

SGT75T65SDM1P7 adopts Field Stop III IGBT technology, offer the optimum performance for induction Heating, UPS, SMPS and PFC application.

FEATURES

- 75A, 650V, $V_{CE(sat)}(typ.)=1.65V@I_C=75A$
- Low conduction loss
- Fast switching
- High input impedance



NOMENCLATURE

SGT 75 T 65 S D M 1 P7		
IGBT series	75	Package P7 : TO-247-3L
Current, 70: 70A	T	1,2,3... : Version No.
N : N Channel	65	Blank: Standard diode
NE : N-channel planar gate with ESD	S	M : Standard Diode, full range
T : Field Stop 3/4	D	R : Rapid Diode
U : Field Stop 4+	M	B : Rapid Diode, full range
V : Field Stop 5	1	S : Soft Diode, full range
W : Field Stop 6	P	D : Packaged with fast recovery diode
X : Field Stop 7	7	R : RC IGBT
Voltage, 65: 650V		L : Ultra low switching, recommended frequency ~2KHz
120: 1200V		Q : Low switching, recommended frequency 2~20K
		S : Standard frequency, recommended frequency 5~40K
		F : Fast switching, recommended frequency 10~60K
		UF : Ultra fast switching, recommended frequency 40K~

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT75T65SDM1P7	TO-247-3L	75T65SDM1	Pb free	Tube

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

Characteristics	Symbol	Ratings	Units
Collector to Emitter Voltage	V _{CE}	650	V
Gate to Emitter Voltage	V _{GE}	±20	V
Transient Gate to Emitter Voltage (t _p ≤10μs, D<0.010)	V _{GE}	±30	V
Collector Current	T _C =25°C	150	A
	T _C =100°C	75	
Pulsed Collector Current	I _{CM}	300	A
Diode Current	T _C =25°C	150	A
	T _C =100°C	75	
Diode forward peak surge current	I _{FSM}	300	A
Short-circuit time (V _{GE} =15V, V _{CC} =300V)	T _{SC}	10	μs
Maximum Power Dissipation (T _C =25°C)	P _D	416	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.	Units
Thermal Resistance, Junction to Case (IGBT)	R _{θJC}	--	--	--	0.30	°C/W
Thermal Resistance, Junction to Case (FRD)	R _{θJC}	--	--	--	0.65	°C/W
Thermal Resistance, Junction to Ambient (IGBT)	R _{θJA}	--	--	--	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	650	--	--	V
C-E Leakage Current	I _{CES}	V _{CE} =650V, 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	7	V
Collector to Emitter Saturation Voltage	V _{CE(sat)}	I _C =75A, V _{GE} =15V, T _C =25°C	--	1.65	--	V
		I _C =75A, V _{GE} =15V, T _C =125°C	--	1.90	--	V
Input Capacitance	C _{ies}	V _{CE} =30V	--	4200	--	pF
Output Capacitance	C _{oes}	V _{GE} =0V	--	300	--	
Reverse Transfer Capacitance	C _{res}	f=1MHz	--	83	--	
Turn-On Delay Time	T _{d(on)}	V _{CE} =400V I _C =75A R _g =10Ω V _{GE} =15V Inductive load T _C =25°C	--	55	--	ns
Rise Time	T _r		--	42	--	
Turn-Off Delay Time	T _{d(off)}		--	210	--	
Fall Time	T _f		--	90	--	
Turn-On Switching Loss	E _{on}		--	1.07	--	mJ
Turn-Off Switching Loss	E _{off}		--	1.70	--	
Total Switching Loss	E _{st}		--	2.77	--	
Turn-On Delay Time	T _{d(on)}	V _{CE} =400V I _C =37.5A R _g =10Ω V _{GE} =15V inductive load T _C =25°C	--	43	--	ns
Rise Time	T _r		--	24	--	
Turn-Off Delay Time	T _{d(off)}		--	230	--	
Fall Time	T _f		--	48	--	
Turn-On Switching Loss	E _{on}		--	0.40	--	mJ
Turn-Off Switching Loss	E _{off}		--	0.88	--	
Total Switching Loss	E _{st}		--	1.28	--	
Total Gate Charge	Q _g	V _{CE} =400V, I _C =75A, V _{GE} =15V	--	180	--	nC
Gate to Emitter Charge	Q _{ge}		--	40	--	
Gate to Collector Charge	Q _{gc}		--	80	--	

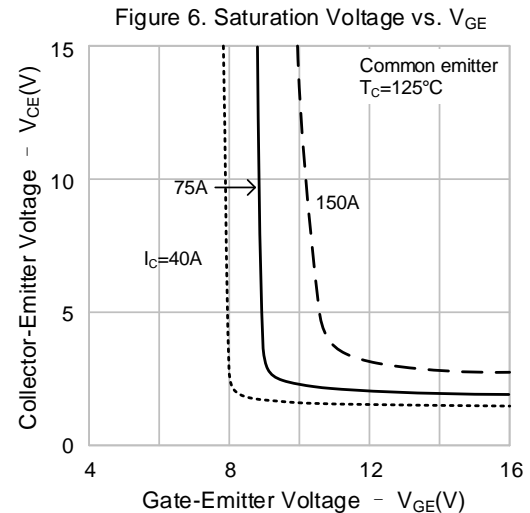
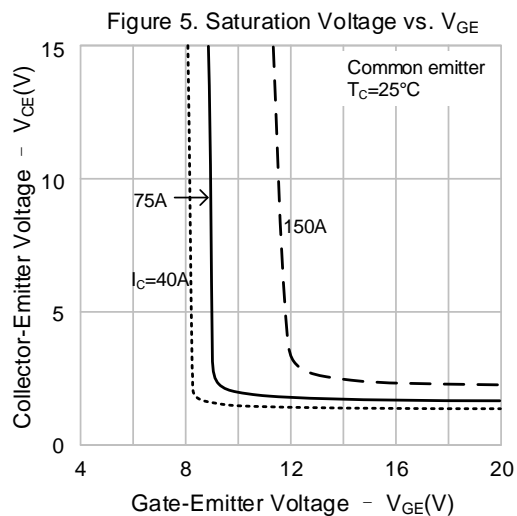
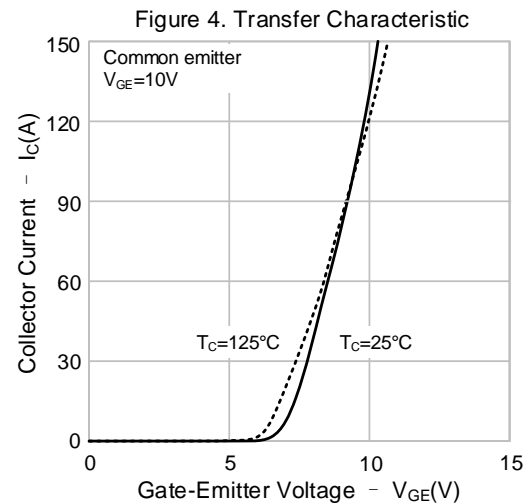
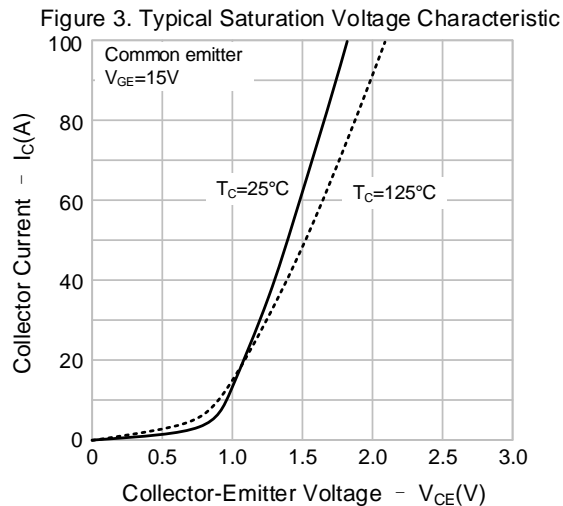
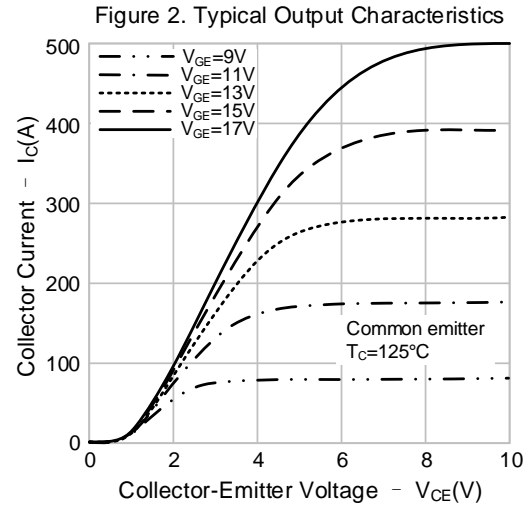
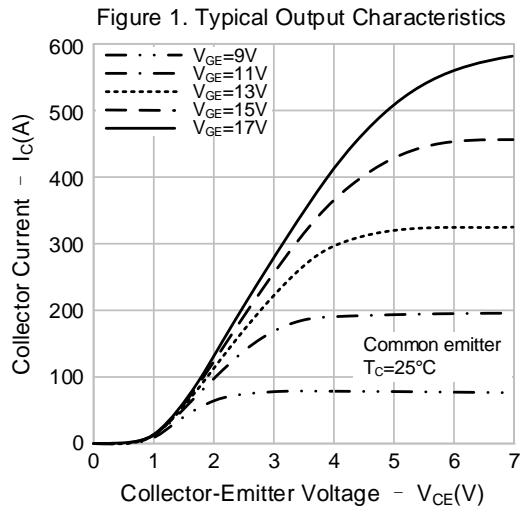
ELECTRICAL CHARACTERISTICS OF FRD (T_C=25°C UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V _{FM}	I _F =75A, T _C =25°C	--	1.82	2.3	V
		I _F =75A, T _C =125°C	--	1.52	--	
Diode Reverse Recovery Time	T _{rr}	I _{EC} =75A, dI _{EC} /dt=200A/μs	--	45	--	ns
Diode Reverse Recovery Charge	Q _{rr}	I _{EC} =75A, dI _{EC} /dt=200A/μs	--	135	--	nC

ELECTRICAL CHARACTERISTICS OF IGBT (T_C=125°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Turn-On Delay Time	T _{d(on)}	V _{CE} =400V I _C =75A R _g =10Ω V _{GE} =15V inductive load T _C =125°C	--	49	--	ns
Rise Time	T _r		--	43	--	
Turn-Off Delay Time	T _{d(off)}		--	232	--	
Fall Time	T _f		--	117	--	
Turn-On Switching Loss	E _{on}	inductive load T _C =125°C	--	1.28	--	mJ
Turn-Off Switching Loss	E _{off}		--	2.45	--	
Total Switching Loss	E _{st}		--	3.73	--	
Turn-On Delay Time	T _{d(on)}	V _{CE} =400V I _C =37.5A R _g =10Ω V _{GE} =15V inductive load T _C =125°C	--	51	--	ns
Rise Time	T _r		--	28	--	
Turn-Off Delay Time	T _{d(off)}		--	264	--	
Fall Time	T _f		--	125	--	
Turn-On Switching Loss	E _{on}	inductive load T _C =125°C	--	0.47	--	mJ
Turn-Off Switching Loss	E _{off}		--	1.47	--	
Total Switching Loss	E _{st}		--	1.94	--	

TYPICAL CHARACTERISTICS CURVE



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 7. Saturation Voltage Drop vs. Temperature

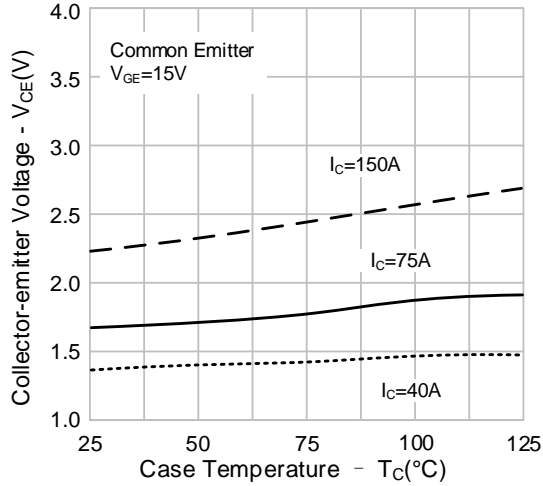


Figure 8. Capacitance Characteristic

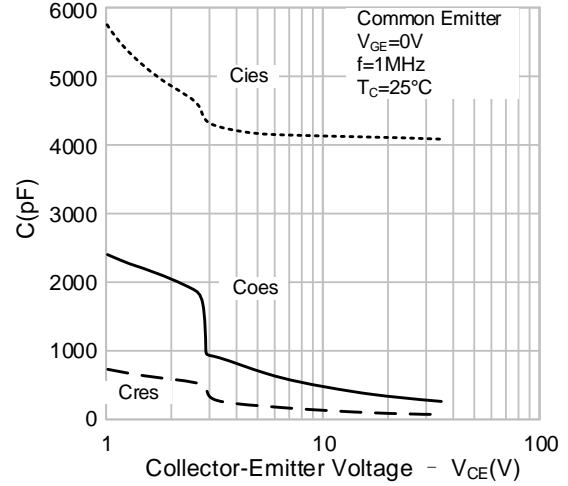


Figure 9. Gate Charge Characteristic

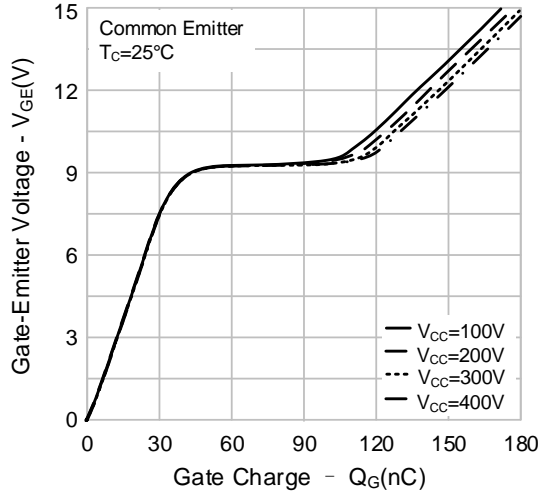


Figure 10. Forward Characteristics

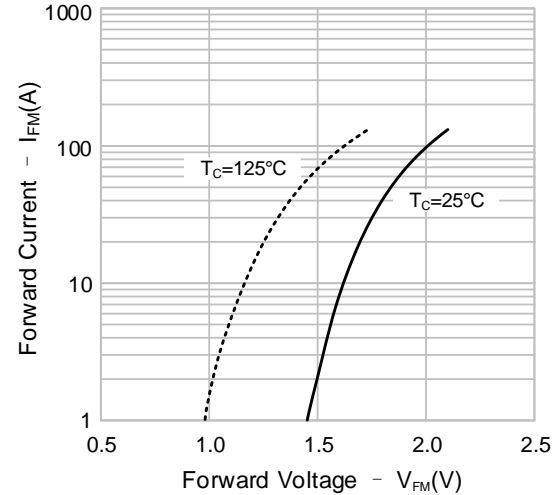


Figure 11. Turn-On Characteristic vs. Gate Resistance

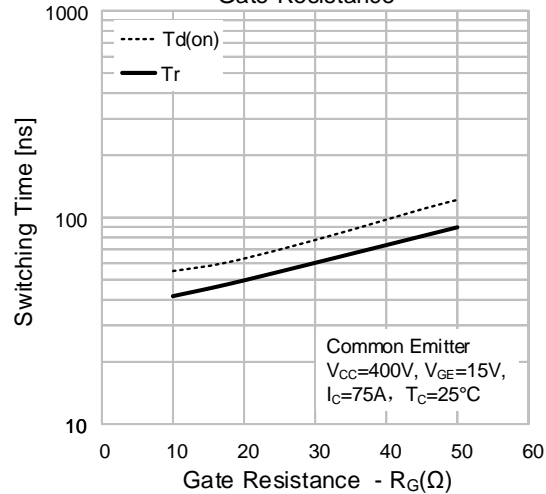
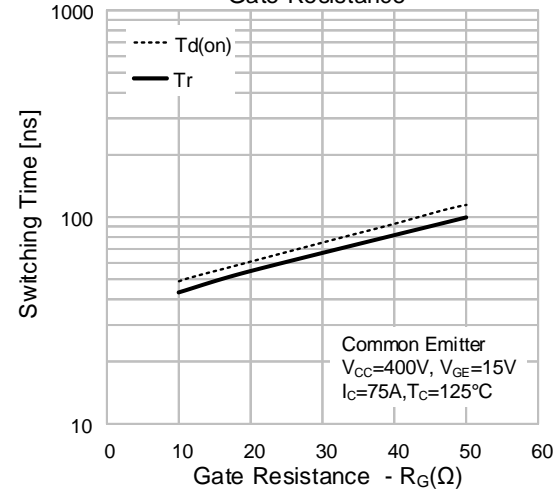
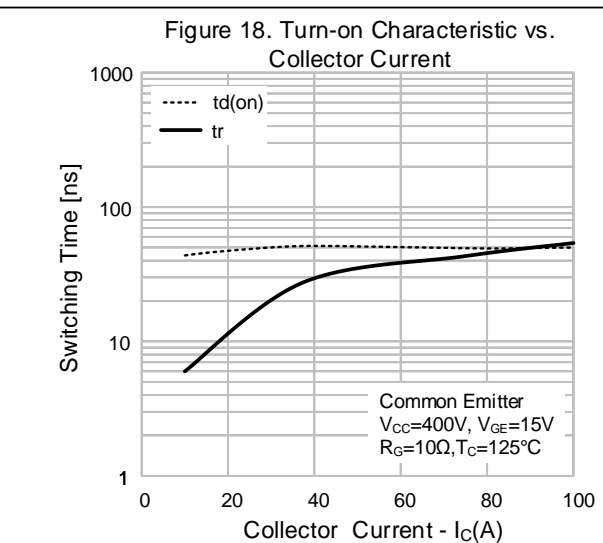
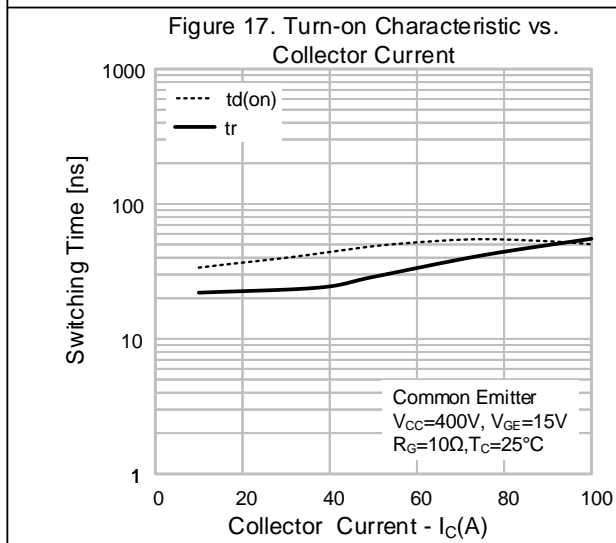
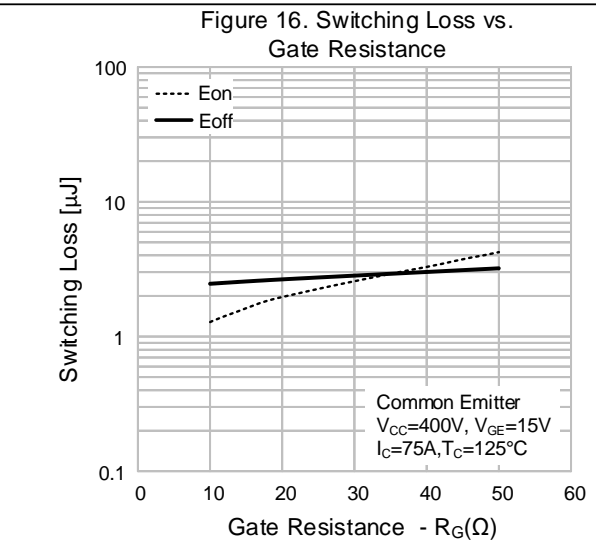
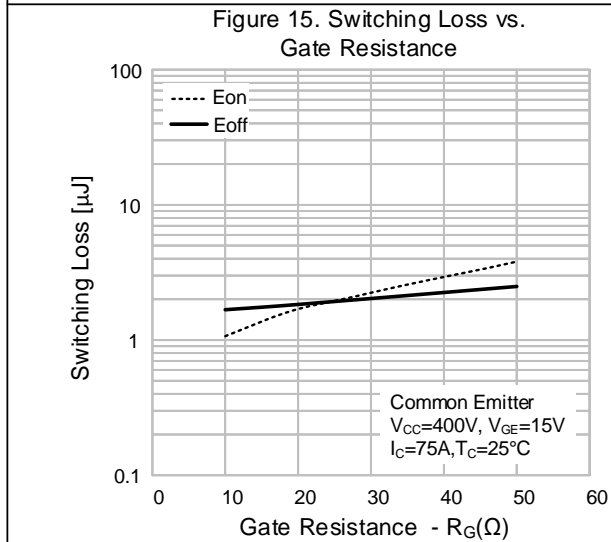
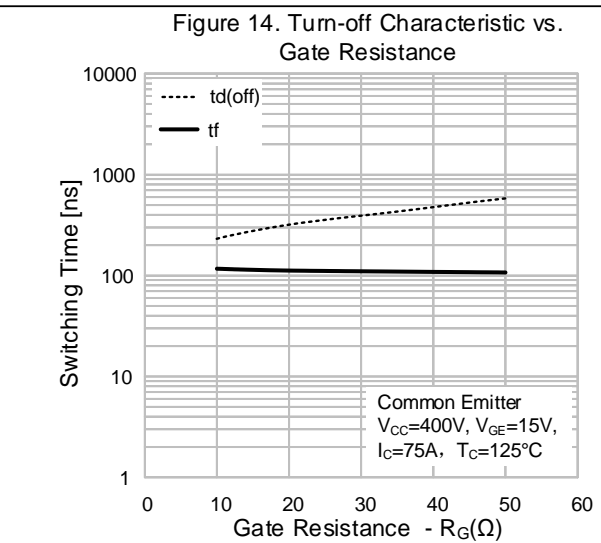
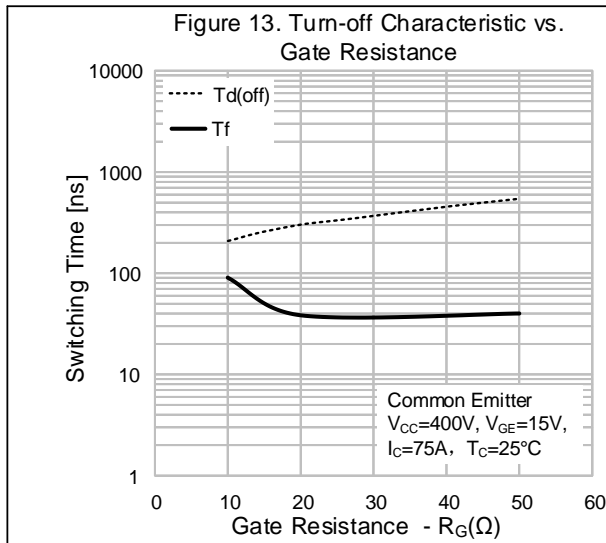


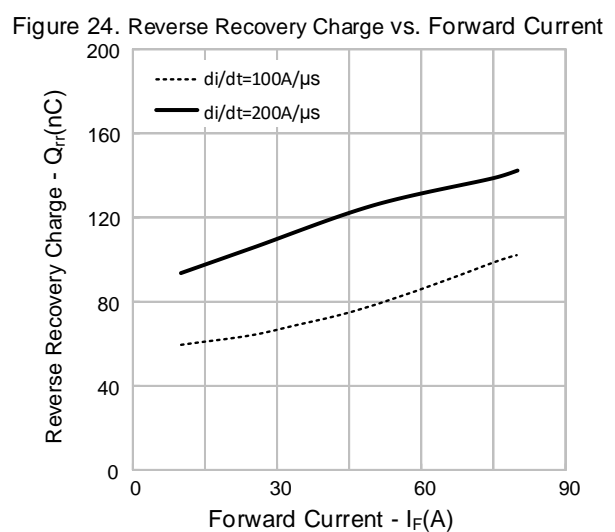
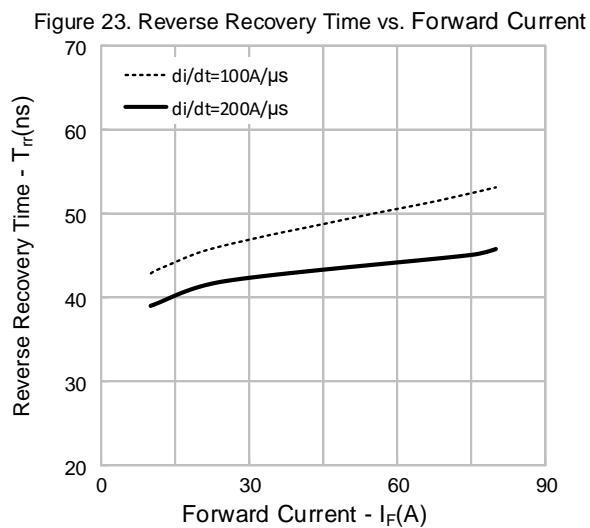
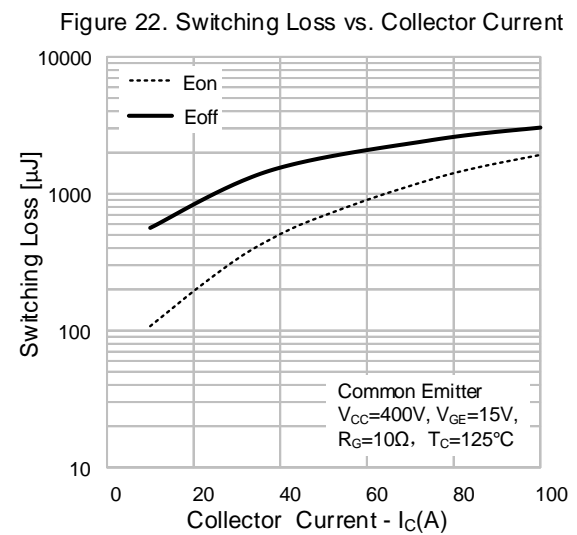
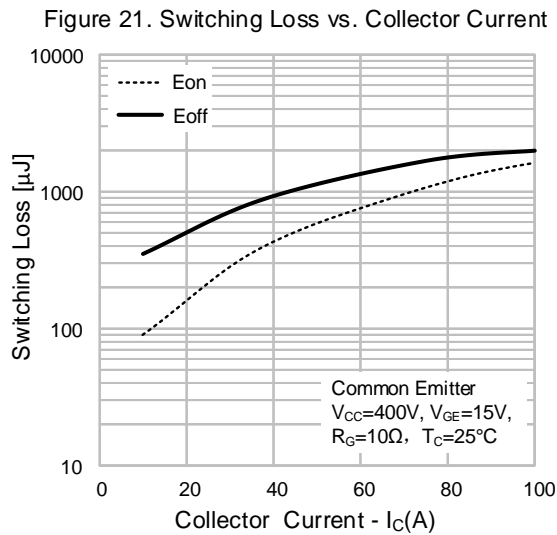
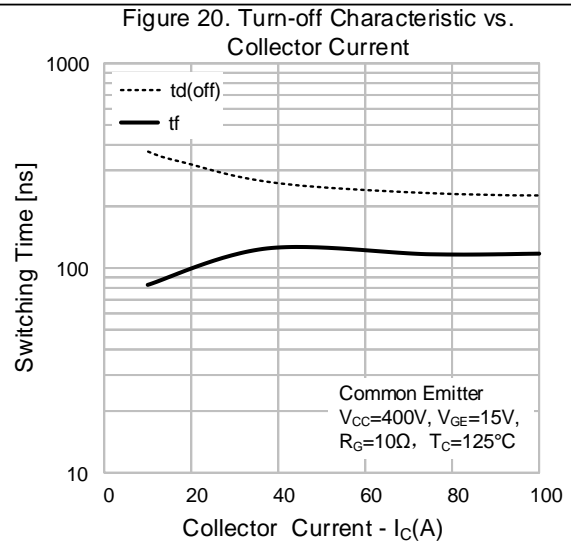
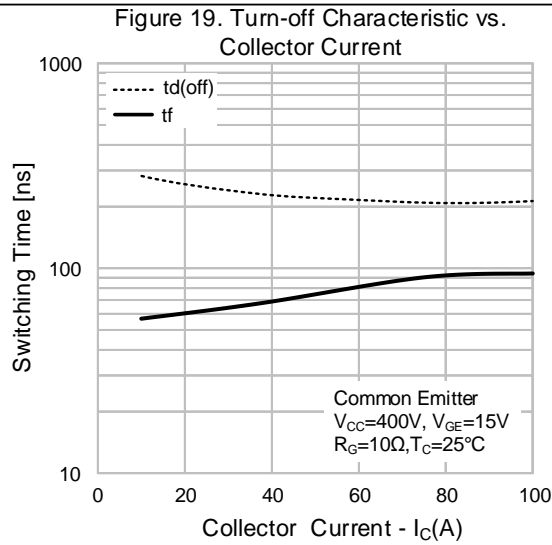
Figure 12. Turn-On Characteristic vs. Gate Resistance



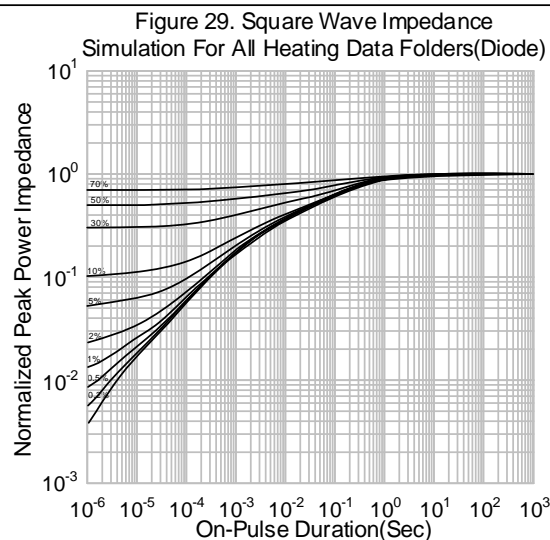
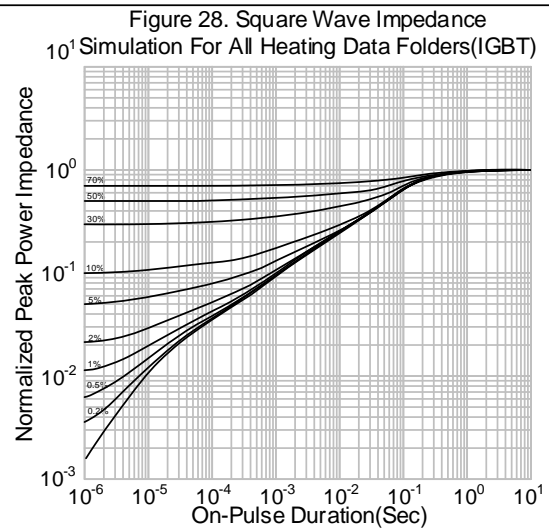
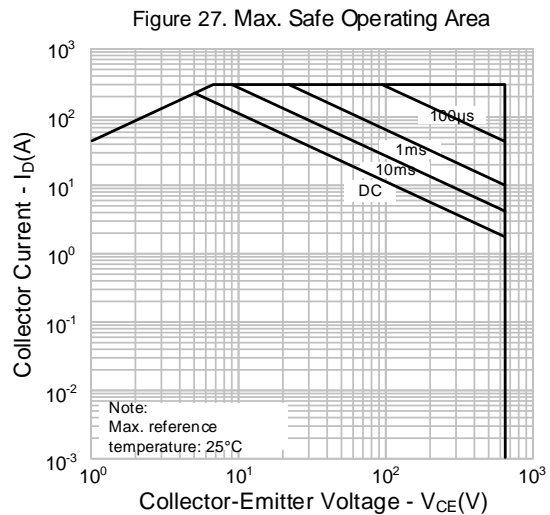
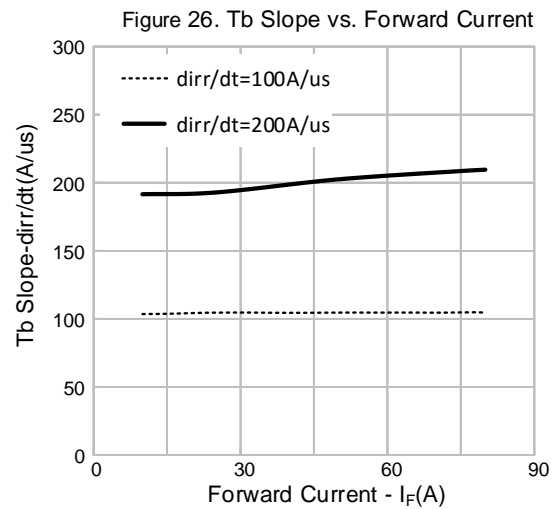
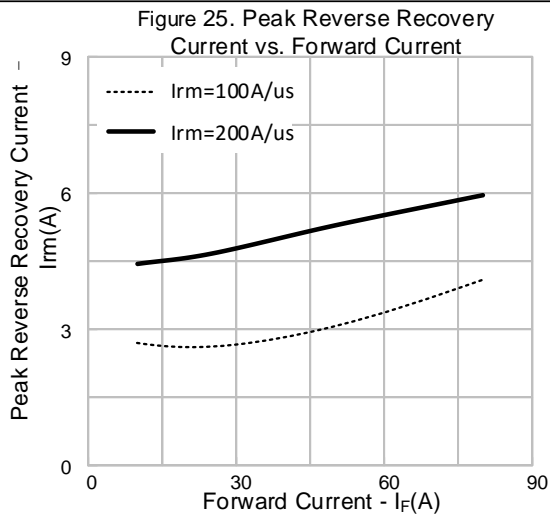
TYPICAL CHARACTERISTICS CURVE (CONTINUED)



TYPICAL CHARACTERISTICS CURVE (CONTINUED)



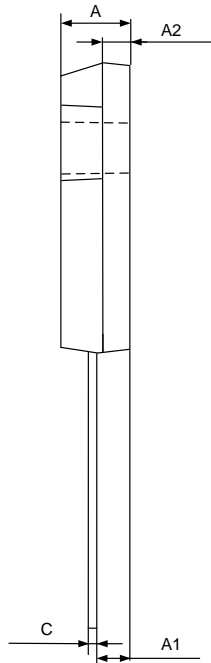
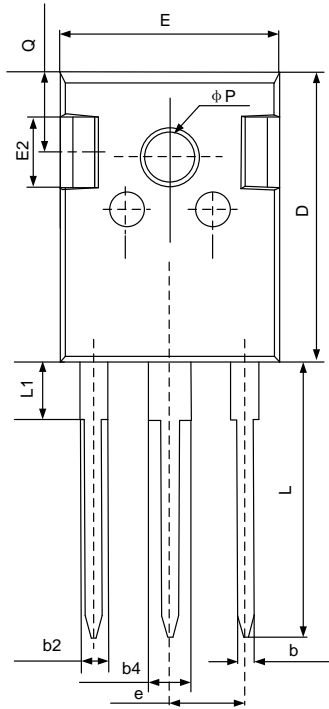
TYPICAL CHARACTERISTICS CURVE (CONTINUED)



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



MOS DEVICES OPERATE NOTES:

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the MOS 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.
- MOS devices should be packed in antistatic/conductive containers for transportation.

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Rev.: 1.8

Revision History:

1. Update curve
2. Update important notice

Rev.: 1.7

Revision History:

1. Add I_F when $T_C=25^{\circ}\text{C}$
2. Update figures 23 and 24, Add figures 25 and 26

Rev.: 1.6

Revision History:

1. Update switch time and loss
2. Add the switching time and loss parameter at 125°C
3. Update and Add TYPICAL CHARACTERISTICS CURVE

Rev.: 1.5

Revision History:

1. Increase the value of V_{GE}

Rev.: 1.4

Revision History:

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

Rev.: 1.3

Revision History:

1. Update the typical and maximum values of V_F at room temperature 75A according to big data
2. Update the typical V_F value at 125° 75A
3. Update T_{rr} and Q_{rr}
4. Modify the forward feature in Figure 16
5. Change the template

Rev.: 1.2

Revision History:

1. Update ELECTRICAL CHARACTERISTICS OF IGBT
2. Update all curves

Rev.: 1.1

Revision History:

1. Update the value of I_{CM}
2. Update SOA
3. Update the package outline



Rev.: 1.0

Revision History:

1. First release
