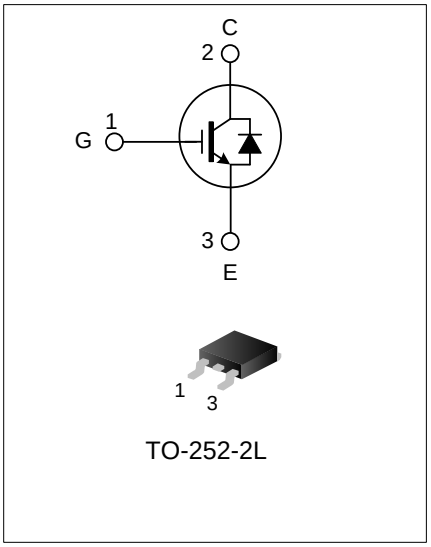
10A, 600V FIELD STOP IGBT

DESCRIPTION

The SGT10U60SDM2D field stop IGBT adopts Silan Field Stop IV+ technology, features low conduction loss and switching loss, is applicable to UPS, SMPS, motor application and PFC fields.



FEATURES

- 10A, 600V, $V_{CE(sat)(typ.)}$=1.65V@I_C=10A
- Low conduction loss
- Fast switching
- High input impedance

NOMENCLATURE

SGT 10 U 60 S D M 2 D

- IGBT series
- Current, 10: 10A
- 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
- L :Ultra low saturation voltage, f<2KHz
  Q : Low saturation voltage, f=2~20KHz
  S : Standard, f=5~40KHz
  F : Fast switching, f=10~60KHz
  UF : Ultra fast switching, f>40KHz
- D : Packaged with fast recovery diode
  R : RC IGBT
- Blank: Standard diode
  M : Standard Diode, full range
  R : Rapid Diode
  B : Rapid Diode, full range
  S : Soft Diode, full range
- 1,2,3··· : Version No.
- Package
  D: TO-252-3L

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT10U60SDM2DTR	TO-252-2L	10U60SD2	Halogen free	Tape & reel

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

Parameter		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	20	A
	T_C=100°C		10	
Pulsed Collector Current		I_{CM}	30	A
Diode current	T_C=25°C	I_F	20	A
	T_C=100°C		10	
Pulsed Diode Current		I_{FM}	30	A
Power Dissipation (T_C=25°C)		P_D	48	W
Operating Junction Temperature		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C

THERMAL CHARACTERISTICS

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case (IGBT)	$R_{\theta JC}$	--	--	--	2.6	°C/W
Thermal Resistance, Junction to Case (FRD)	$R_{\theta JC}$	--	--	--	3.6	°C/W
Thermal Resistance, Junction to Ambient (IGBT)	$R_{\theta JA}$	--	--	--	72	°C/W
Soldering Temperature(SMD)	T_{sold}	Reflow soldering: 10±1 sec, 3times	--	--	260	°C

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

Parameter	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}	3.5	5.5	6.5	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=10A, V_{GE}=15V	--	1.65	2.2	V
		I_C=10A, V_{GE}=15V, T_C=150°C	--	1.85	--	V
Input Capacitance	C_{ies}	V_{CE}=30V V_{GE}=0V f=1MHz	--	853	--	pF
Output Capacitance	C_{oes}		--	22	--	
Reverse Transfer Capacitance	C_{res}		--	10	--	
Turn-On Delay Time	$T_{d(on)}$	V_{CE}=400V I_C=10A R_g=10Ω V_{GE}=15V Inductive load T_C=25°C	--	10	--	ns
Rise Time	T_r		--	18	--	
Turn-Off Delay Time	$T_{d(off)}$		--	50	--	
Fall Time	T_f		--	100	--	
Turn-On Switching Loss	E_{on}		--	0.44	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.13	--	
Total Switching Loss	E_{st}		--	0.57	--	
Turn-On Delay Time	$T_{d(on)}$	V_{CE}=400V I_C=5.0A R_g=10Ω V_{GE}=15V Inductive load T_C=25°C	--	8.0	--	ns
Rise Time	T_r		--	8.0	--	
Turn-Off Delay Time	$T_{d(off)}$		--	44	--	
Fall Time	T_f		--	154	--	
Turn-On Switching Loss	E_{on}		--	0.20	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.05	--	
Total Switching Loss	E_{st}		--	0.25	--	
Total Gate Charge	Q_g	V_{CE} = 400V, I_C=10A, V_{GE}=15V	--	49	--	nC
Gate to Emitter Charge	Q_{ge}		--	9.0	--	
Gate to Collector Charge	Q_{gc}		--	23	--	

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

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V_{FM}	I_F=10A, T_C=25°C	--	2.0	2.5	V
		I_F=10A, T_C=150°C	--	1.7	--	
Diode Reverse Recovery Time	T_{rr}	I_{ES}=10A, dI_{ES}/dt=200A/μs	--	22	--	ns
Diode Reverse Recovery Charge	Q_{rr}		--	42	--	nC

TYPICAL CHARACTERISTICS CURVE

Figure 1. Typical Output Characteristics

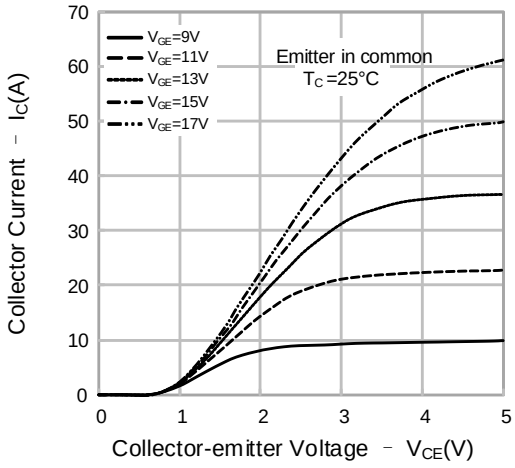


Figure 2. Typical Output Characteristics

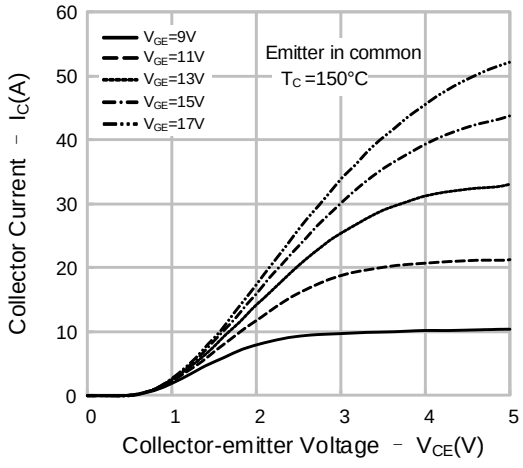


Figure 3. Typical Saturation Voltage Characteristics

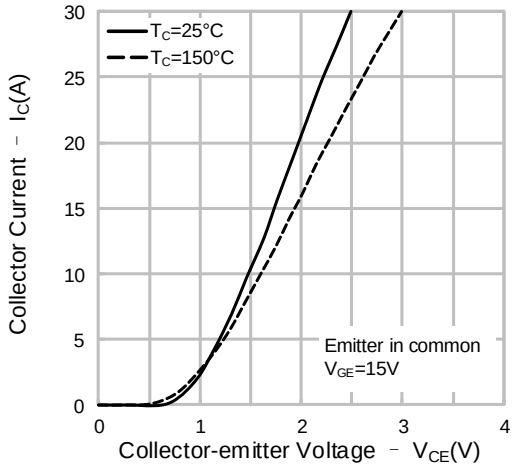


Figure 4. Transmission Characteristics

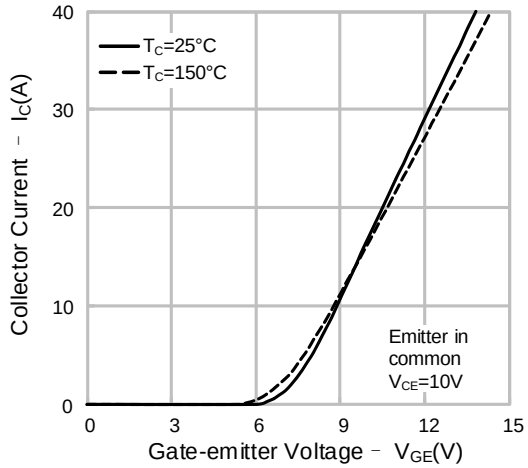


Figure 5. Saturation Voltage vs. V_{GE}

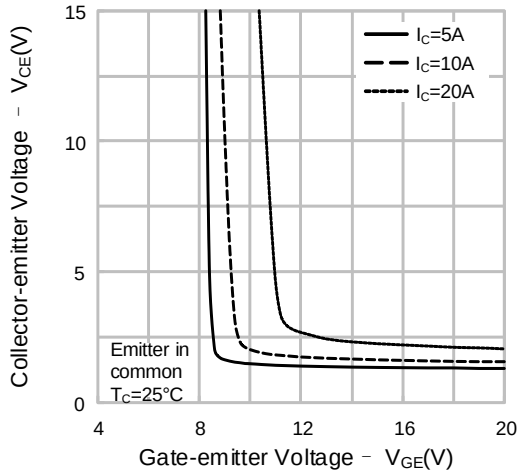
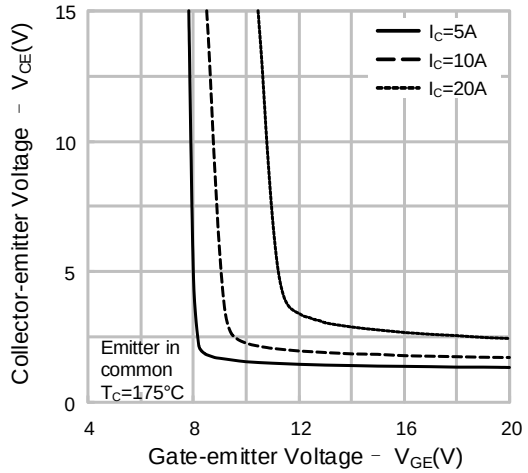


Figure 6. Saturation Voltage vs. V_{GE}



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 7. Saturation Voltage vs. Temperature

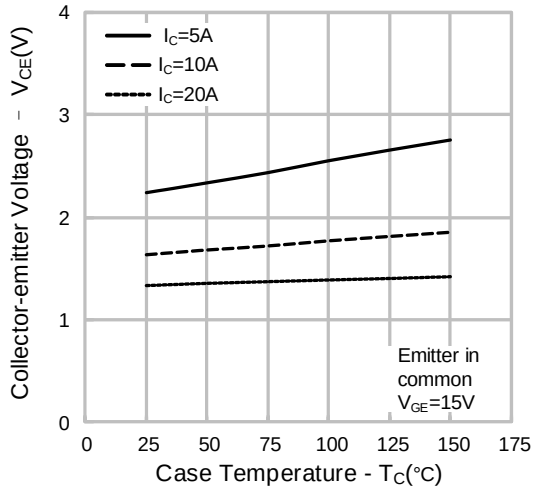


Figure 8. Capacitance Characteristics

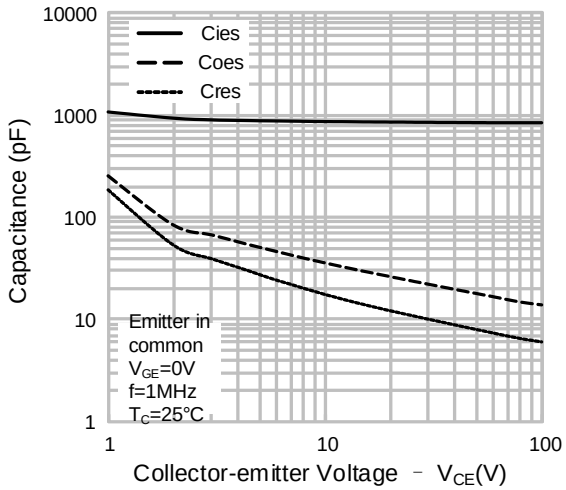


Figure 9. Gate Charge Characteristics

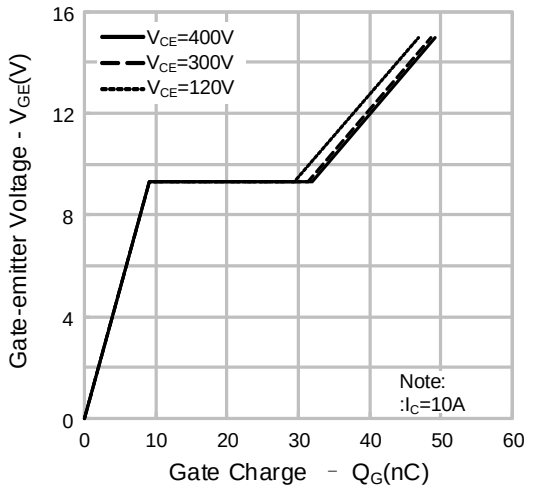


Figure 10. Turn-on Characteristics vs. Gate Resistance

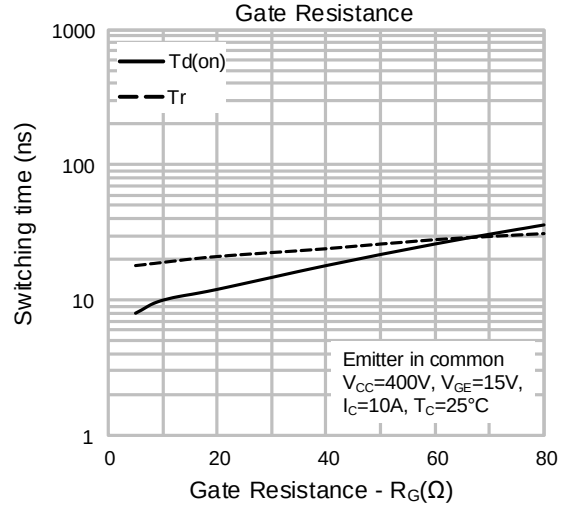


Figure 11. Turn-off Characteristics vs. Gate Resistance

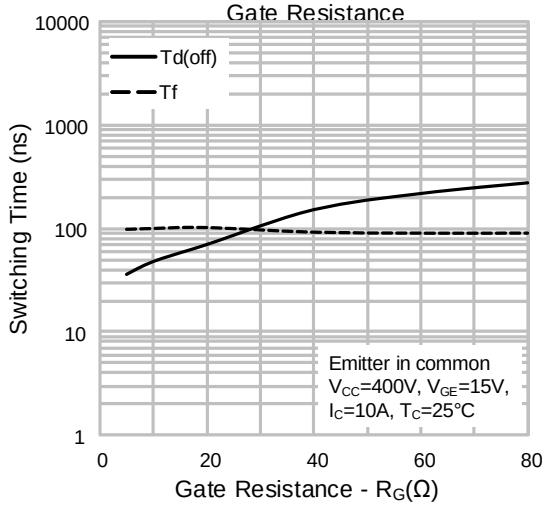
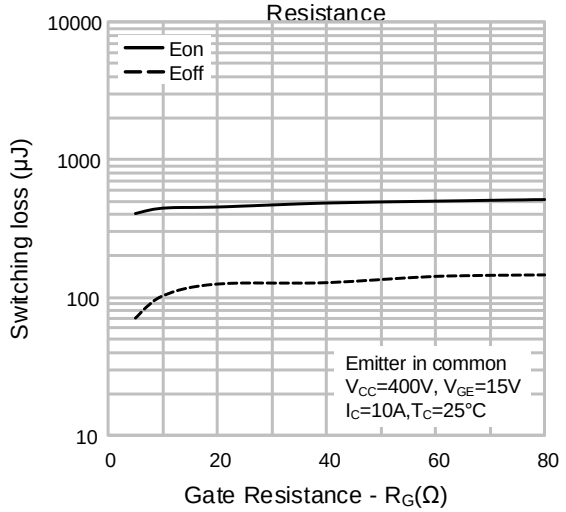


Figure 12. Switching Loss vs. Gate Resistance



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 13. Turn-on Characteristics vs. Collector Current

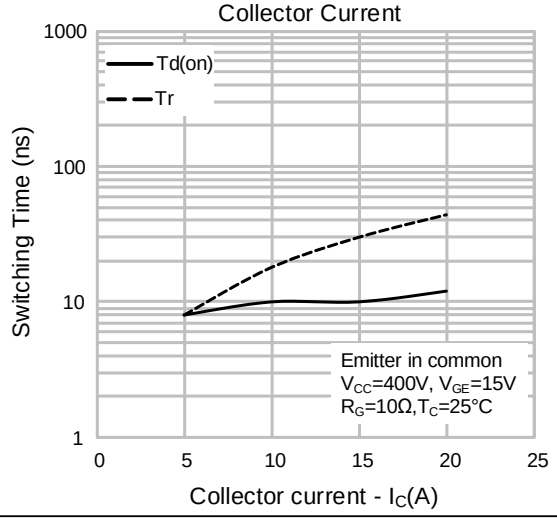


Figure 14. Turn-off Characteristics vs. Collector Current

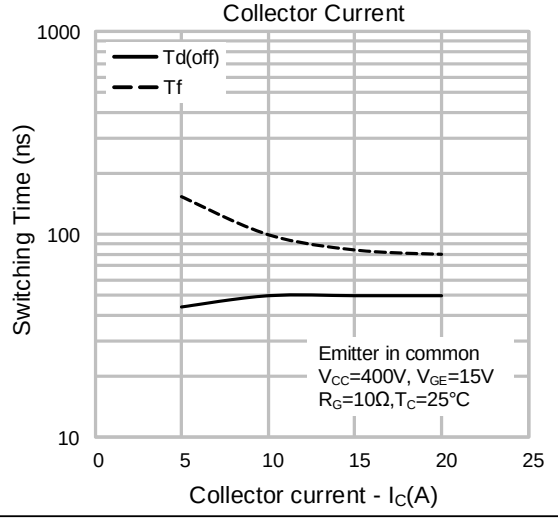


Figure 15. Switching Loss vs. Collector Current

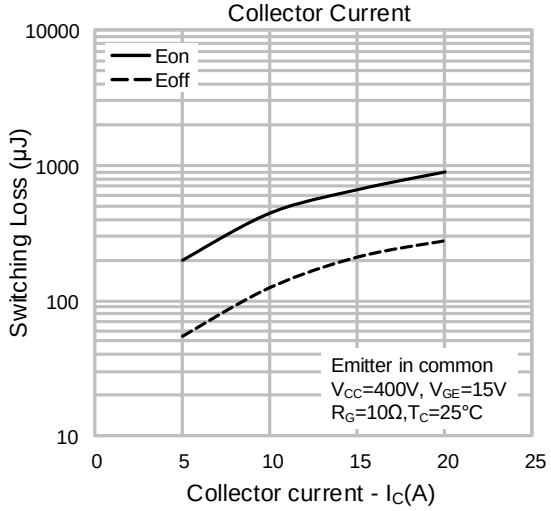


Figure 16.Forward Characteristic

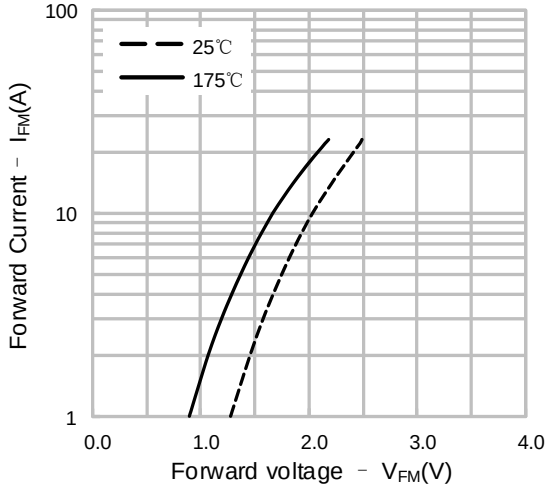


Figure 17. Reverse Recovery Time vs. Forward Current

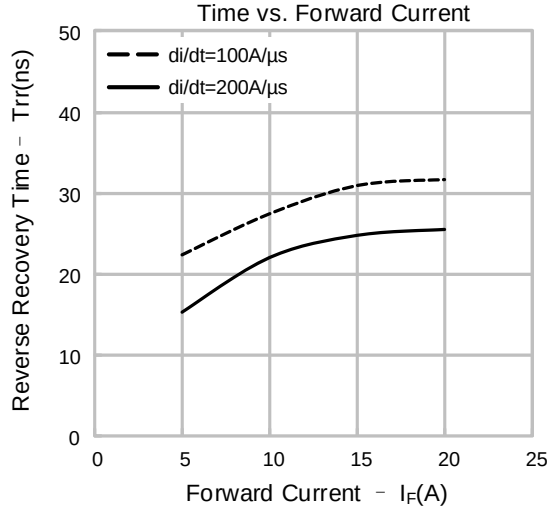
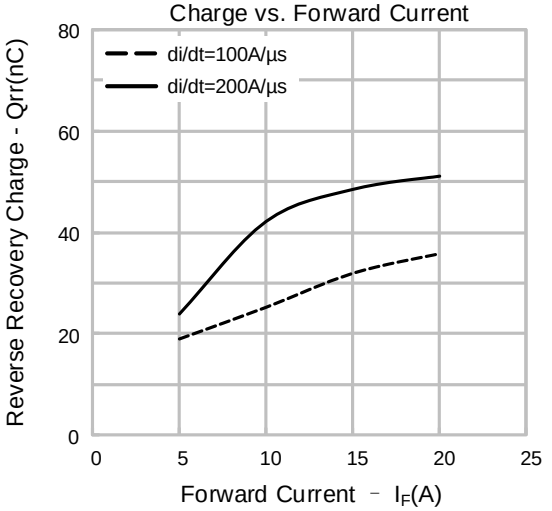


Figure 18. Reverse Recovery Charge vs. Forward Current



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 19. Peak Reverse Recovery Current vs. Forward Current

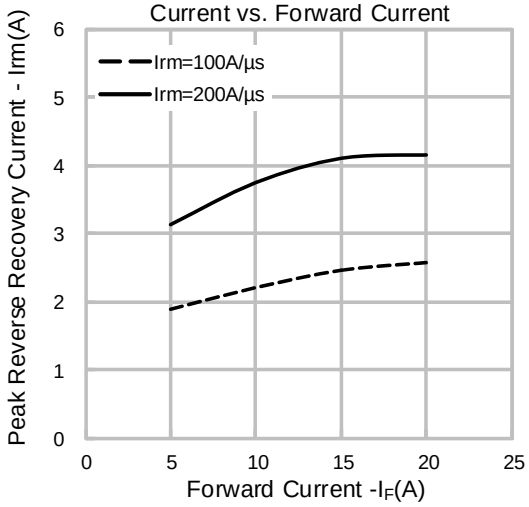


Figure 20. Tb Slope vs. Forward Current

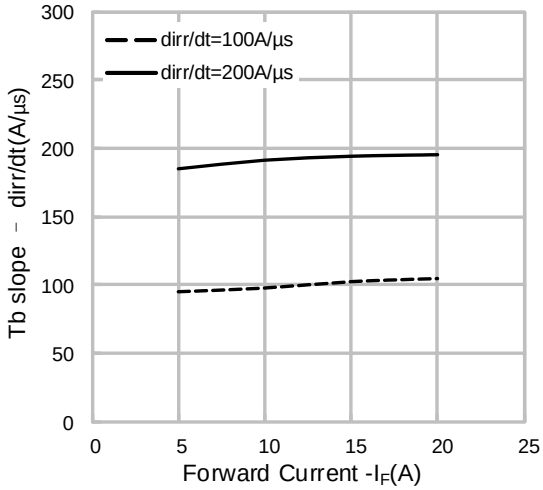


Figure 21. Max. Safe Operating Area

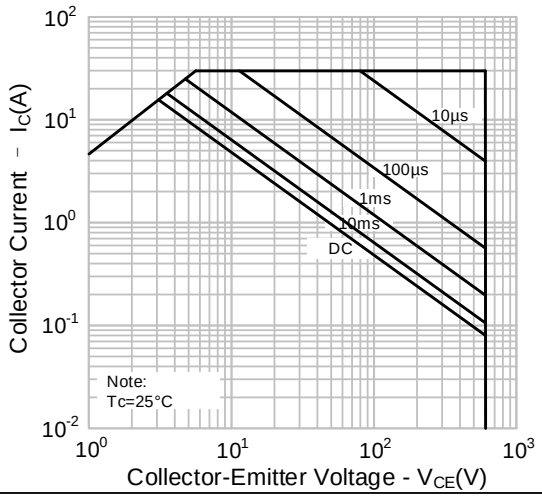


Figure 22. Transient Thermal Impedance vs. On-pulse Duration (IGBT)

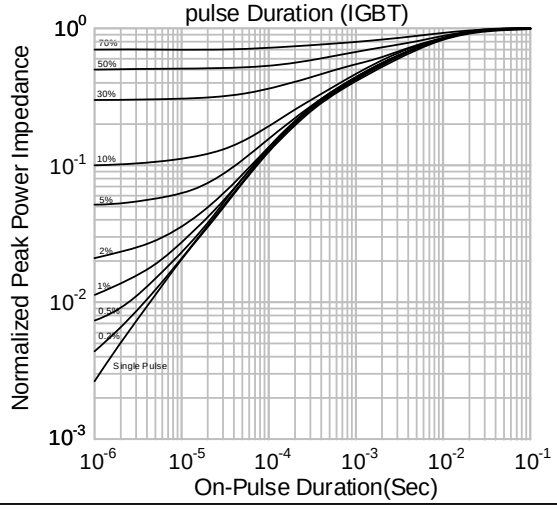
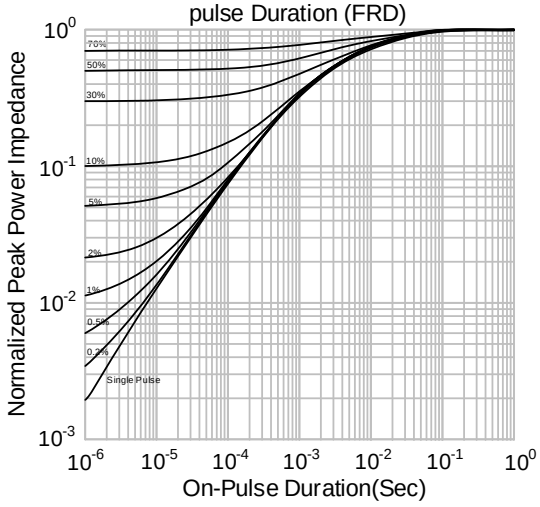
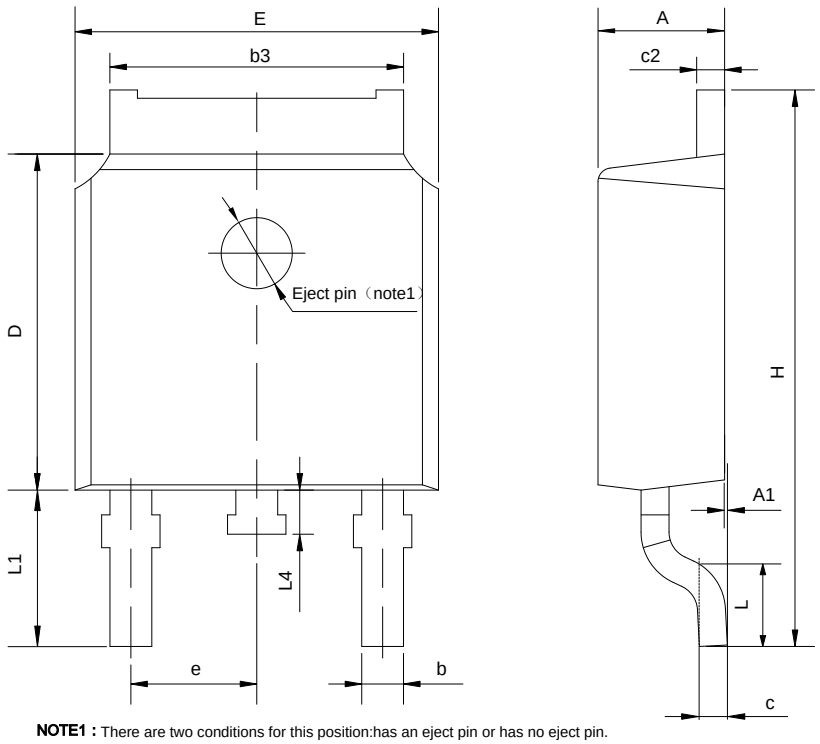


Figure 23. Transient Thermal Impedance vs. On-pulse Duration (FRD)



PACKAGE OUTLINE

TO-252-2L **UNIT: mm**



NOTE1 : There are two conditions for this position:has an eject pin or has no eject pin.

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.10	2.30	2.50
A1	0	—	0.127
b	0.66	0.76	0.89
b3	5.10	5.33	5.46
c	0.45	—	0.65
c2	0.45	—	0.65
D	5.80	6.10	6.40
E	6.30	6.60	6.90
e	2.30TYP		
H	9.60	10.10	10.60
L	1.40	1.50	1.70
L1	2.90REF		
L4	0.60	0.80	1.00

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.

Important notice :

1. Silan reserves the right to make changes of this instruction without notice.
2. Customers should obtain the latest relevant information when purchasing and should verify whether such information is latest and complete. Please read this instruction and application manual and related materials carefully before using products, including the circuit operation precautions, etc.
3. The products belong to consumer electronic products. Silan does not give any warranties as to the suitability of the Silan's product for any specific use. The design intent, design definition and design of the product are not intended for application (the application stated in this instruction includes use, etc.) in transportation equipment, medical equipment, life-saving equipment, aerospace equipment, , non-civil equipment or non-civil use, etc. (the equipment stated in this instruction includes systems, devices, etc., all referred to as equipment).The product should not be used in any equipment or system whose manufacture, use or sale is prohibited under any applicable laws or regulations ("unintended use"). If the product is used for unintended use, therefore the full risks of such products application are borne by the customer and Silan assumes no liability for the product used for the unintended use. If the customer intends to use the Silan's product in a application where malfunction or failure can be reasonably be expected to result in personal injury, or serious property, or environment damage, the customer shall make adequate assessment, testing and verification, and Silan shall not be liable for such applications.
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7. Please use and apply product in compliance with all applicable laws and regulations, including but not limited to trade control regulations etc. The product is civil electronic product, please do not use it in non-civil fields.
8. Product promotion is endless, our company will wholeheartedly provide customers with better products!
9. Website: http: //www.silan.com.cn

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Rev.: 1.0

Revision History:

1. First release