

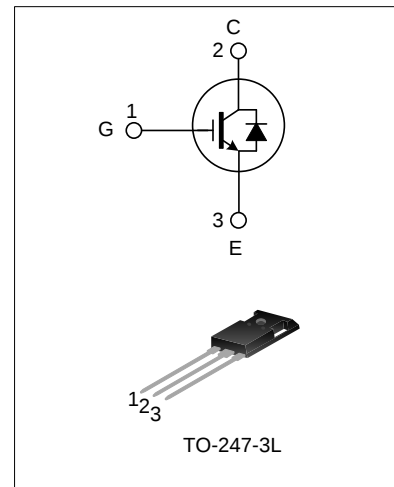
070A, 650V FIELD STOP IGBT

DESCRIPTION

SGT70N65FD1P7 using Field Stop IGBT technology, offers the optimum performance for induction Heating, UPS, SMPS and PFC application.

FEATURES

- 70A, 650V, $V_{CE(sat)(typ.)}=2.3V@I_C=70A$
- Low conduction loss
- Fast switching
- High input impedance



NOMENCLATURE

SGT 70 N 65 F D X 1 P7		
IGBT series		Package
Current, 70: 70A		P7 : TO-247-3L
		F : TO-220F-3L etc.
N : N Channel		1,2,3... : Version No.
NE : N-channel planar gate with ESD		Blank: Standard diode
T : Field Stop 3/4		M : Standard Diode, full range
U : Field Stop 4+		R : Rapid Diode
V : Field Stop 5		B : Rapid Diode, full range
W : Field Stop 6		S : Soft Diode, full range
X : Field Stop 7		
Voltage, 65: 650V		D : Packaged with fast recovery diode
120: 1200V		R : RC IGBT
		L : Low saturation voltage, $f<2KHz$
		Q : Low saturation voltage, $f=2\sim20KHz$
		S : Standard, $f=20\sim30KHz$
		F : Super fast switching, $f=30\sim100KHz$
		UF : Ultra fast switching, $f>100KHz$

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT70N65FD1P7	TO-247-3L	70N65FD1P7	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Units
Collector to Emitter Voltage	V_{CE}	650	V
Gate to Emitter Voltage	V_{GE}	± 20	V
Collector Current	I_C	$T_C=25^{\circ}\text{C}$ 140	A
		$T_C=100^{\circ}\text{C}$ 70	
Pulsed Collector Current	I_{CM}	210	A
Power Dissipation($T_C=25^{\circ}\text{C}$)	P_D	321	W
Operating Junction Temperature Range	T_J	$-55\sim+150$	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	$-55\sim+150$	$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Parameter	Symbol	Ratings	Units
Thermal Resistance, Junction to Case (IGBT)	$R_{\theta JC}$	0.39	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Case (FRD)	$R_{\theta JC}$	1.10	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS OF IGBT ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV_{CE}	$V_{GE}=0V, I_C=250\mu A$	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	$V_{GE(th)}$	$I_C=250\mu A, V_{CE}=V_{GE}$	4.0	5.0	6.5	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=70A, V_{GE}=15V$	--	2.3	2.7	V
		$I_C=70A, V_{GE}=15V, T_C=125^\circ\text{C}$	--	2.6	--	V
Input Capacitance	C_{ies}	$V_{CE}=30V$	--	2850	--	pF
Output Capacitance	C_{oes}	$V_{GE}=0V$	--	390	--	
Reverse Transfer Capacitance	C_{res}	$f=1\text{MHz}$	--	85	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=400V$ $I_C=70A$ $R_g=10\Omega$	--	40	--	ns
Rise Time	T_r		--	171	--	
Turn-Off Delay Time	$T_{d(off)}$		--	211	--	
Fall Time	T_f		--	141	--	
Turn-On Switching Loss	E_{on}	$V_{GE}=15V$ Inductive Load	--	4.9	--	mJ
Turn-Off Switching Loss	E_{off}		--	2.5	--	
Total Switching Loss	E_{st}		--	7.4	--	
Total Gate Charge	Q_g	$V_{CE} = 400V, I_C=70A,$ $V_{GE} = 15V$	--	189	--	nC
Gate to Emitter Charge	Q_{ge}		--	28	--	
Gate to Collector Charge	Q_{gc}		--	107	--	

ELECTRICAL CHARACTERISTICS OF FRD ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V_{FM}	$I_F=75A, T_C=25^\circ\text{C}$	--	1.4	2	V
		$I_F=75A, T_C=125^\circ\text{C}$	--	1.305	--	
Diode Reverse Recovery Time	T_{rr}	$I_{ES}=75A, dI_{ES}/dt=200A/\mu s$	--	79	--	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_{ES}=75A, dI_{ES}/dt=200A/\mu s$	--	350	--	nC

TYPICAL CHARACTERISTIC CURVES

Figure 1. Typical Output Characteristics

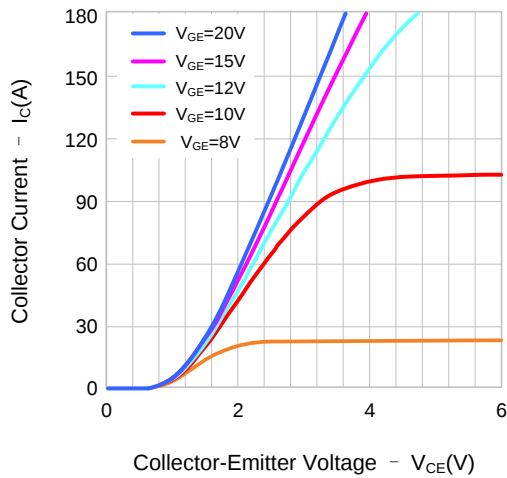


Figure 2. Transmission Characteristics

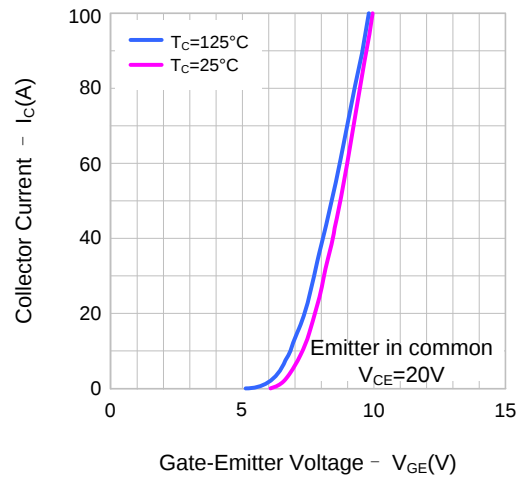


Figure 3. Typical Saturation Voltage Characteristics

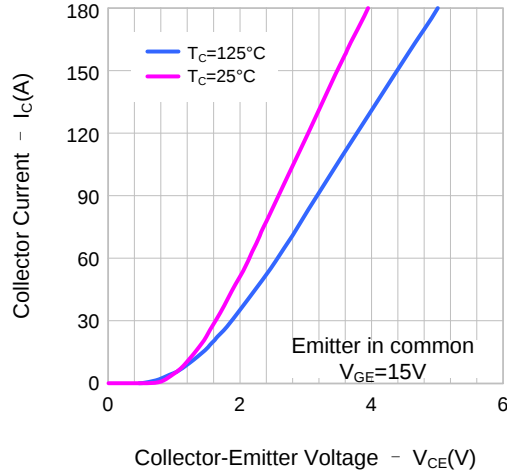


Figure 4. Saturation Voltage vs. Gate-emitter Voltage

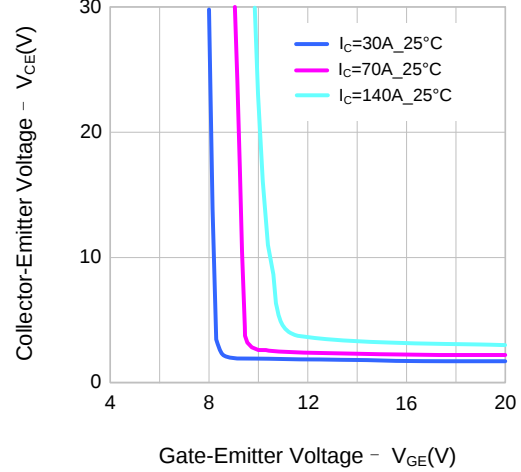


Figure 5. Saturation Voltage vs. Gate-emitter Voltage

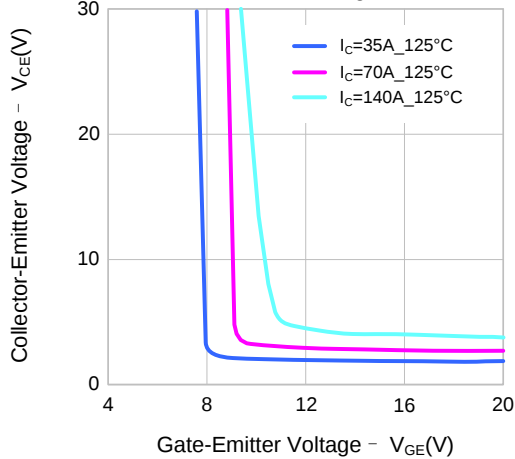
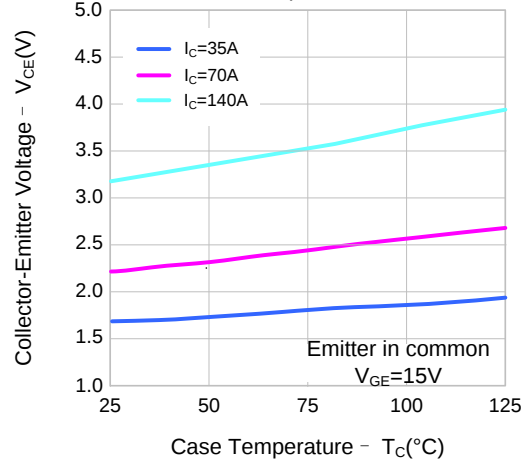


Figure 6. Saturation Voltage vs. Case Temperature



TYPICAL CHARACTERISTIC CURVES(continued)

Figure 7. Capacitance Characteristics

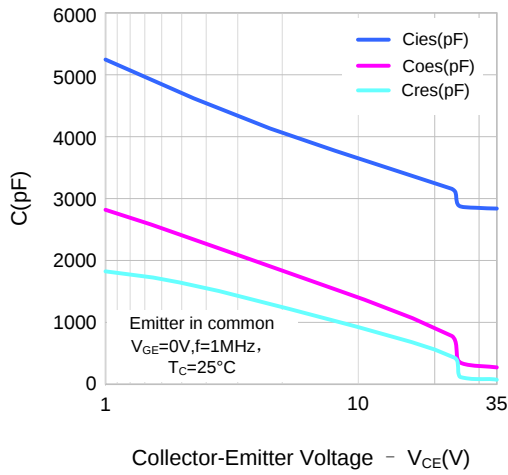


Figure 8. Gate Charge Characteristics

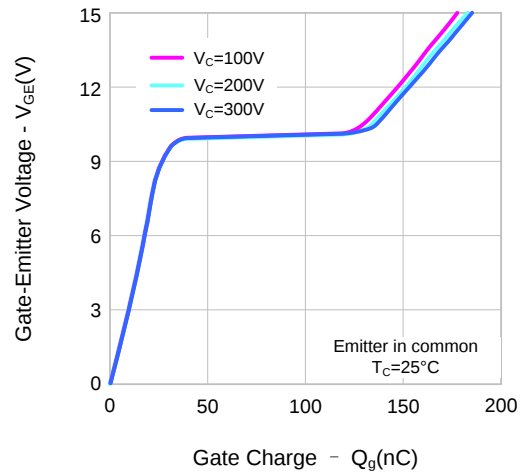


Figure 9. Turn-on Characteristics vs. Gate Resistance

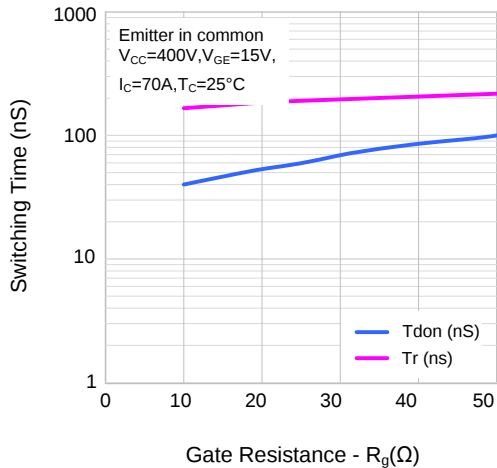


Figure 10. Turn-off Characteristics vs. Gate Resistance

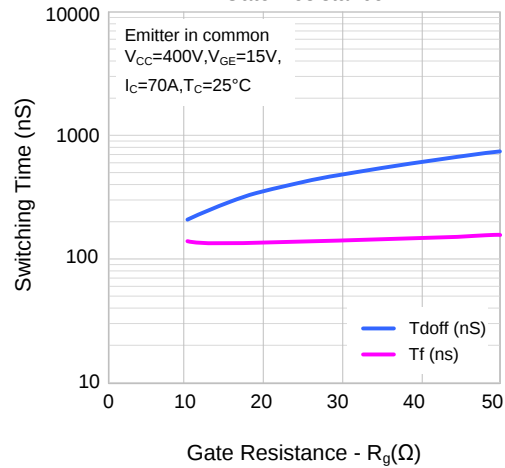


Figure 11. Switching Loss vs. Gate Resistance

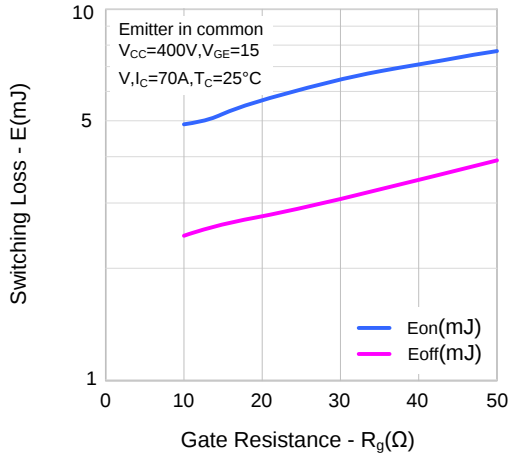
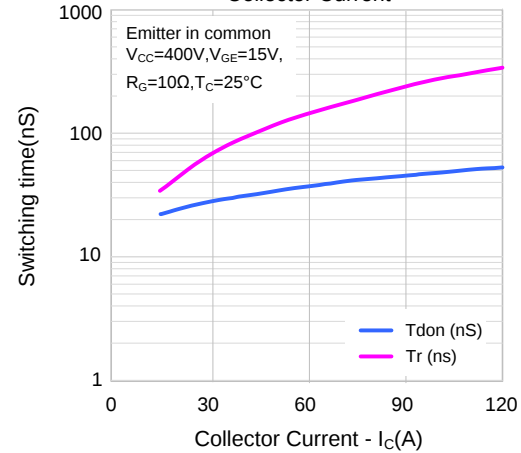


Figure 12. Turn-on Characteristics vs. Collector Current



TYPICAL CHARACTERISTIC CURVES(continued)

Figure 13. Turn-off Characteristics vs. Collector Current

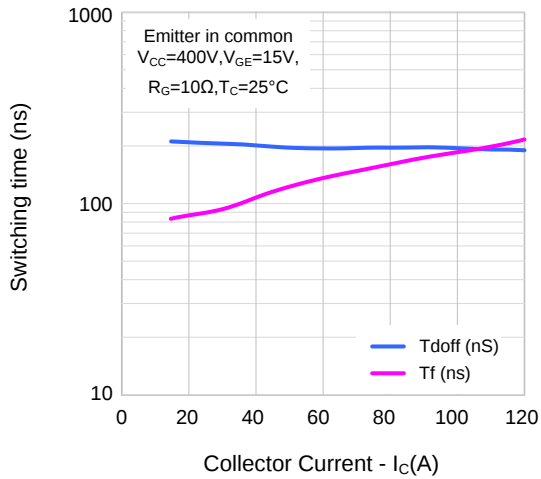


Figure 14. Switching Characteristics vs. Collector Current

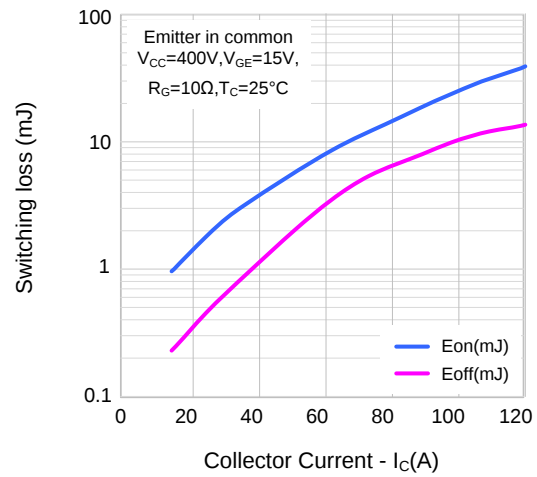


Figure 15. Forward Characteristics

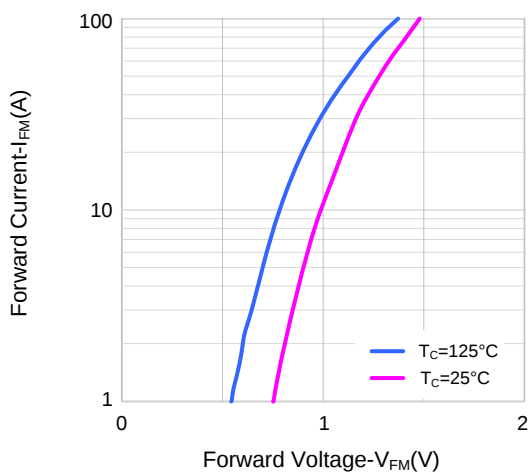


Figure 16. Reverse Recovery Time vs. Forward Current

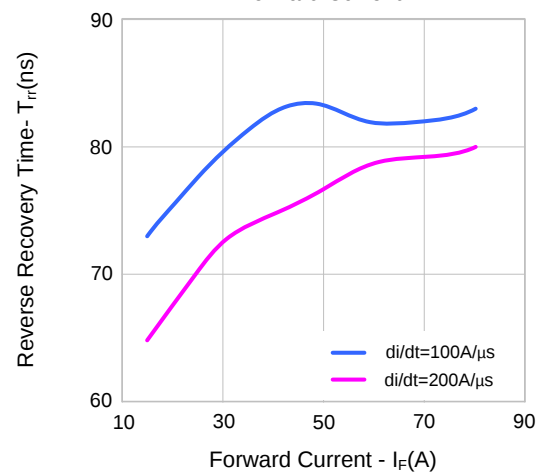


Figure 17. Reverse Recovery Charge vs. Forward Current

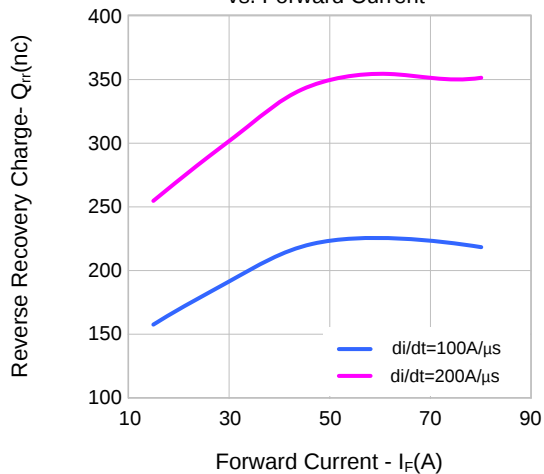
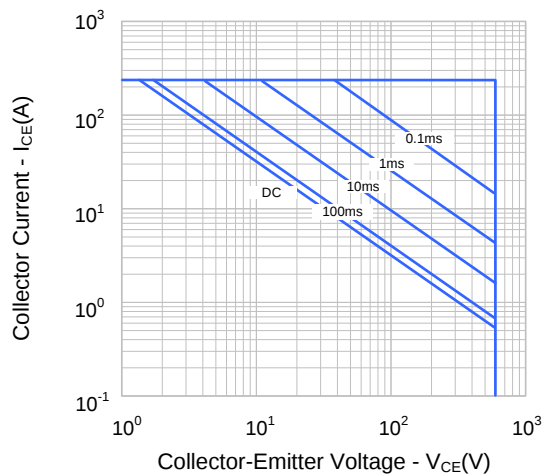


Figure 18. Maximum Safety Operating Area



TYPICAL CHARACTERISTIC CURVES(continued)

Figure 19. Transient Thermal Resistance-Pulse Width (IGBT)

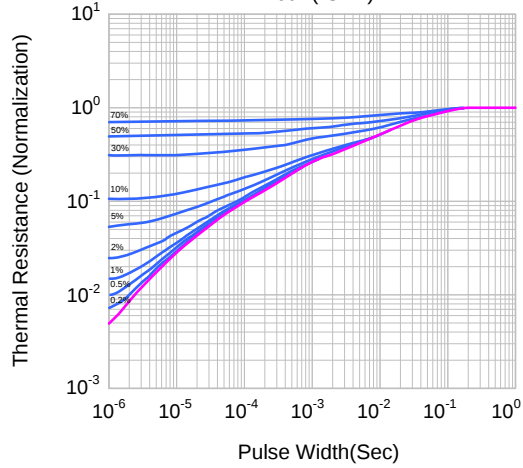
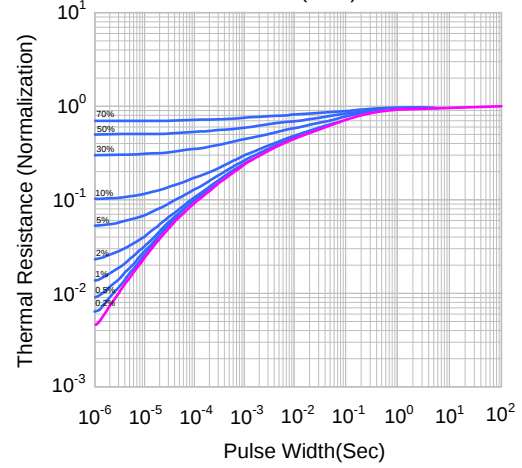


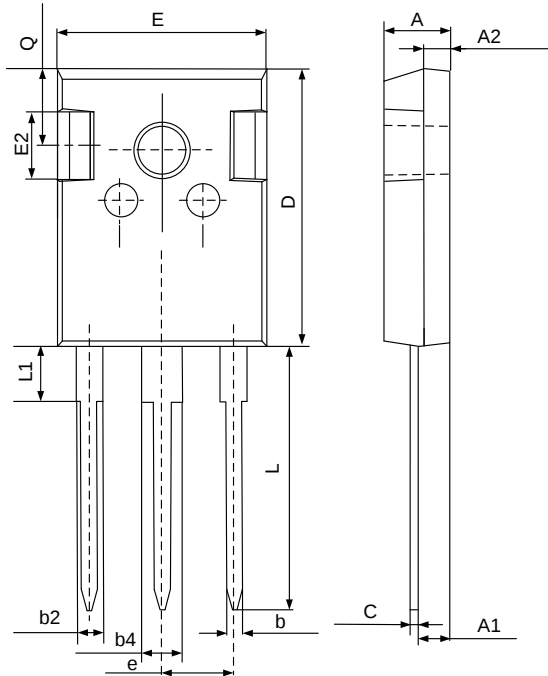
Figure 20. Transient Thermal Resistance-Pulse Width (FRD)



PACKAGE OUTLINE

TO-247-3L

UNIT: mm



SYMBOL	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

Important notice :

- The instructions are subject to change without notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.
- Our products are consumer electronic products, and / or civil electronic products.
- When using our products, please do not exceed the maximum rating of the products, otherwise the reliability of the whole machine will be affected. There is a certain possibility of failure or malfunction of any semiconductor product under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design, sample and whole machine manufacturing, so as to avoid potential failure risk that may cause personal injury or property loss.
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- Product promotion is endless, our company will wholeheartedly provide customers with better products!
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Rev.: 1.4

Revision History:

1. Modify the package outline of TO-247-3L
 2. Update important notice
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Rev.: 1.3

Revision History:

1. Modify NOMENCLATURE and the package outline of TO-247-3L
-

Rev.: 1.2

Revision History:

1. Modify ELECTRICAL CHARACTERISTICS OF FRD
-

Rev.: 1.1

Revision History:

1. Modify Typ. of C_{oes}
 2. Modify Marking
-

Rev.: 1.0

Revision History:

1. First release
-
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