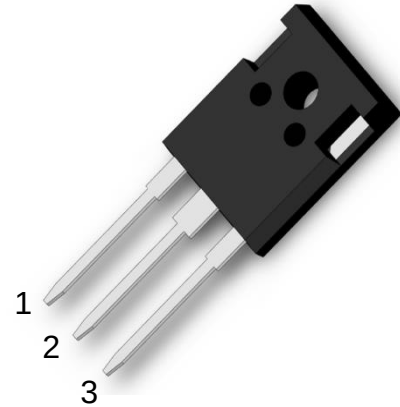


PRODUCT FEATURES

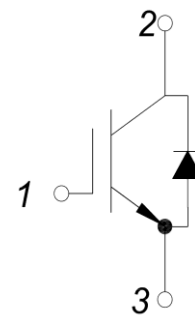
- ☐ IGBT chip in trench FS-technology
- ☐ Low switching losses
- ☐ $V_{CE(sat)}$ with positive temperature coefficient
- ☐ Fast switching and short tail current
- ☐ Free wheeling diodes with fast and soft reverse recovery



APPLICATIONS

- ☐ High frequency switching application
- ☐ Medical applications
- ☐ Motion/servo control
- ☐ UPS systems

1.Gate
2.Collector
3.Emitter



Type	V_{CES}	I_C	$V_{CE(sat)}$ $T_J=25^{\circ}C$	T_{Jmax}	Marking	Package
SPT40N120F1A1T8TL-CN	1200V	40A	1.9V	$175^{\circ}C$	CI40T120D	TO-247

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J=25^{\circ}C$	1200	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}C$	65	A
		$T_C=110^{\circ}C$	40	
I_{Cpuls}	Pulsed collector current,tp limited by T_{Jmax}		160	
P_{tot}	Power Dissipation Per IGBT		395	W
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}C$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^{\circ}C$	40	A
		$T_C=110^{\circ}C$	20	
I_{Fpuls}	Diode pulsed current,tp limited by T_{Jmax}		80	
T_{Jmax}	Max. Junction Temperature		175	$^{\circ}C$
T_{Jop}	Operating Temperature		-40~175	
T_{stg}	Storage Temperature		-55~150	
Torque	to heatsink	Recommended (M3)	1.1	Nm
Weight			8	g

IGBT

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V _{GE(th)}	Gate Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =1.6mA	5.2	5.8	6.5	V
V _{CE(sat)}	Collector Emitter Saturation Voltage	I _C =40A, V _{GE} =15V, T _J =25℃		1.9	2.35	
		I _C =40A, V _{GE} =15V, T _J =125℃		2.3		
		I _C =40A, V _{GE} =15V, T _J =150℃		2.4		
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25℃			100	μA
		V _{CE} =1200V, V _{GE} =0V, T _J =150℃			10	mA
I _{GES}	Gate Leakage Current	V _{CE} =0V,V _{GE} =±20V, T _J =25℃	-400		400	nA
Q _g	Gate Charge	V _{CE} =600V, I _C =40A , V _{GE} =15V		0.19		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		2.5		nF
C _{res}	Reverse Transfer Capacitance			110		pF
t _{d(on)}	Turn on Delay Time	V _{CC} =600V,I _C =40A R _G =15Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		30	ns
			T _J =125℃		35	ns
			T _J =150℃		40	ns
t _r	Rise Time		T _J =25℃		25	ns
			T _J =125℃		30	ns
			T _J =150℃		30	ns
t _{d(off)}	Turn off Delay Time		T _J =25℃		190	ns
			T _J =125℃		230	ns
			T _J =150℃		250	ns
t _f	Fall Time	T _J =25℃		80	ns	
		T _J =125℃		100	ns	
		T _J =150℃		110	ns	
E _{on}	Turn on Energy	V _{CC} =600V,I _C =40A R _G =15Ω, V _{GE} =±15V, Inductive Load	T _J =125℃		2.6	mJ
			T _J =150℃		2.95	mJ
E _{off}	Turn off Energy		T _J =125℃		2	mJ
			T _J =150℃		2.2	mJ
I _{SC}	Short Circuit Current	tpsc≤10μS , V _{GE} =15V T _J =125℃,V _{CC} =600V		260		A
R _{thJC}	Junction to Case Thermal Resistance （ Per IGBT ）				0.38	K /W

Anti-Parallel Diode

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V _F	Forward Voltage	I _F =40A , V _{GE} =0V, T _J =25℃		2.05	2.55	V
		I _F =40A , V _{GE} =0V, T _J =125℃		1.9		
		I _F =40A , V _{GE} =0V, T _J =150℃		1.85		
t _{rr}	Reverse Recovery Time	I _F =40A , V _R =600V di _F /dt=-1700A/μs T _J =150℃		110		ns
I _{RRM}	Max. Reverse Recovery Current			65		A
Q _{RR}	Reverse Recovery Charge			6.6		μC
E _{rec}	Reverse Recovery Energy			2.5		mJ
R _{thJCD}	Junction to Case Thermal Resistance （ Per Diode ）				1.0	K /W

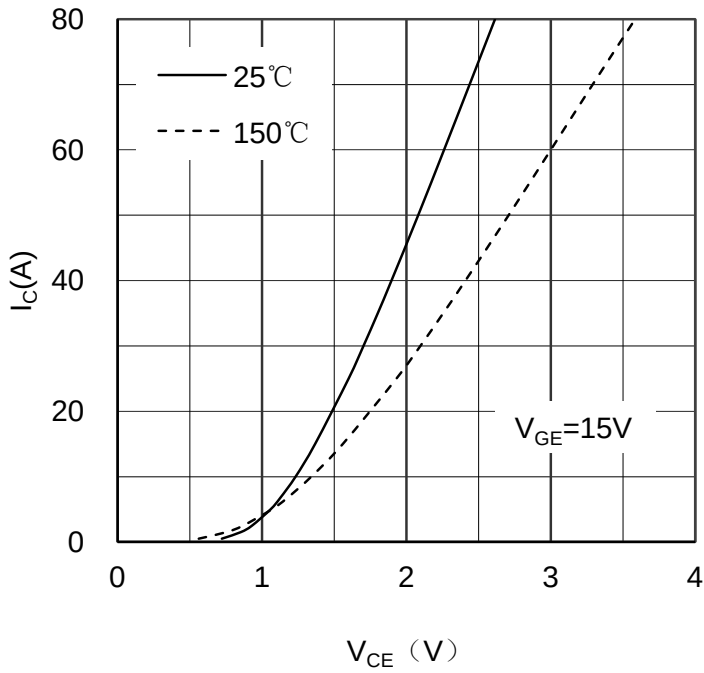


Figure 1. Typical Output Characteristics IGBT

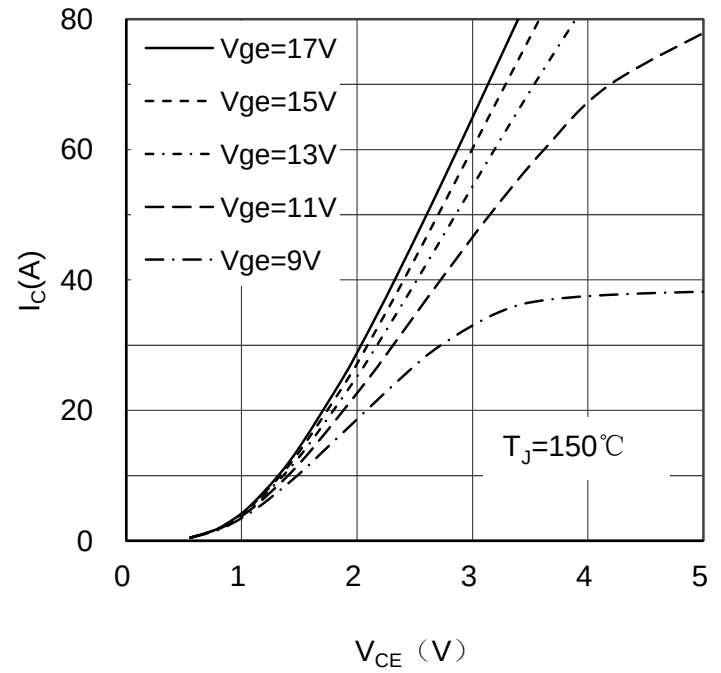


Figure 2. Typical Output Characteristics IGBT

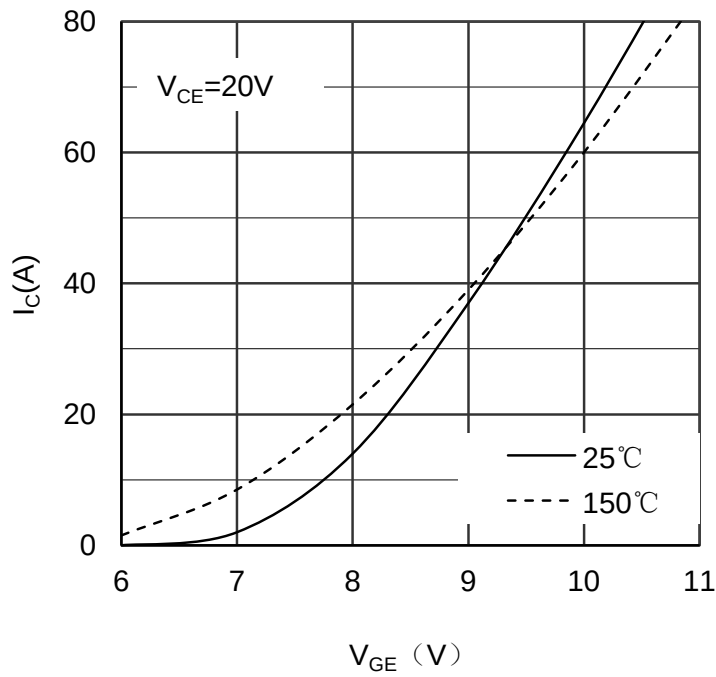


Figure 3. Typical Transfer characteristics IGBT

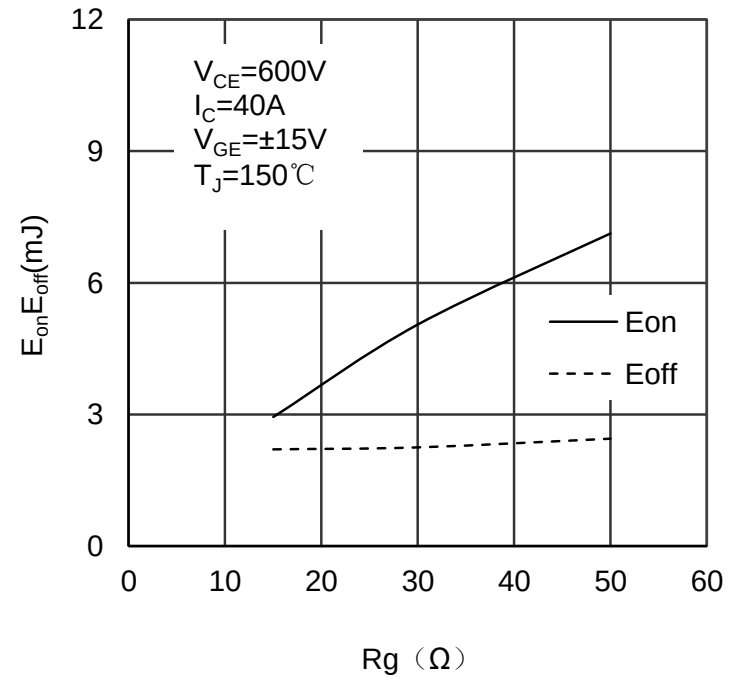


Figure 4. Switching Energy vs Gate Resistor IGBT

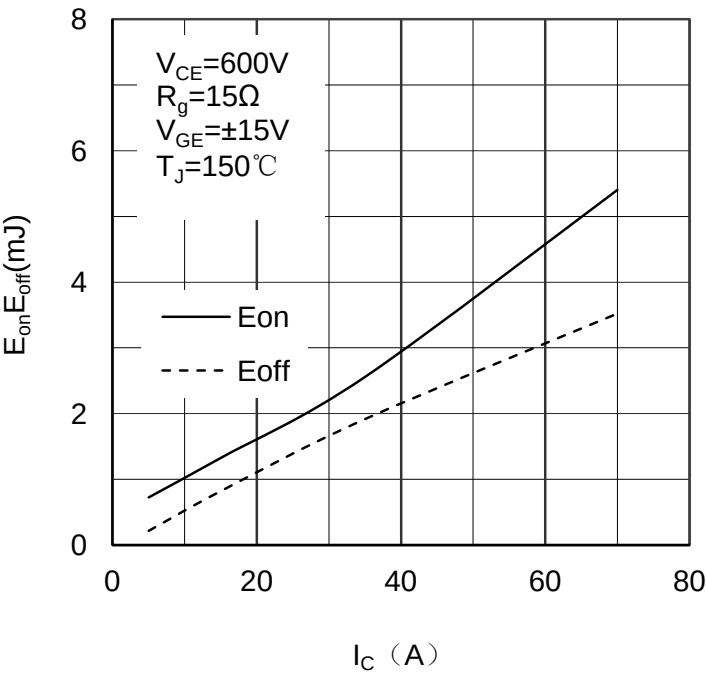


Figure 5. Switching Energy vs Collector Current IGBT

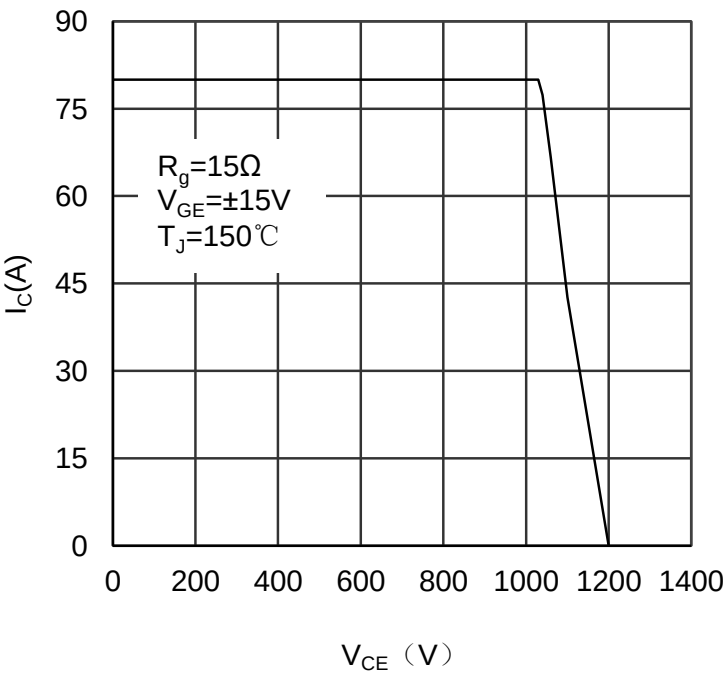


Figure 6. Reverse Biased Safe Operating Area IGBT

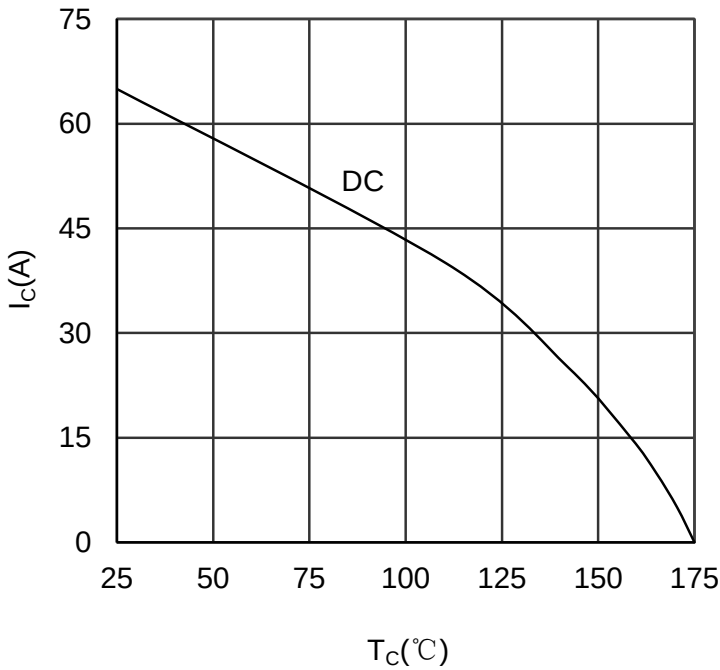


Figure 7. Collector Current vs Case temperature IGBT

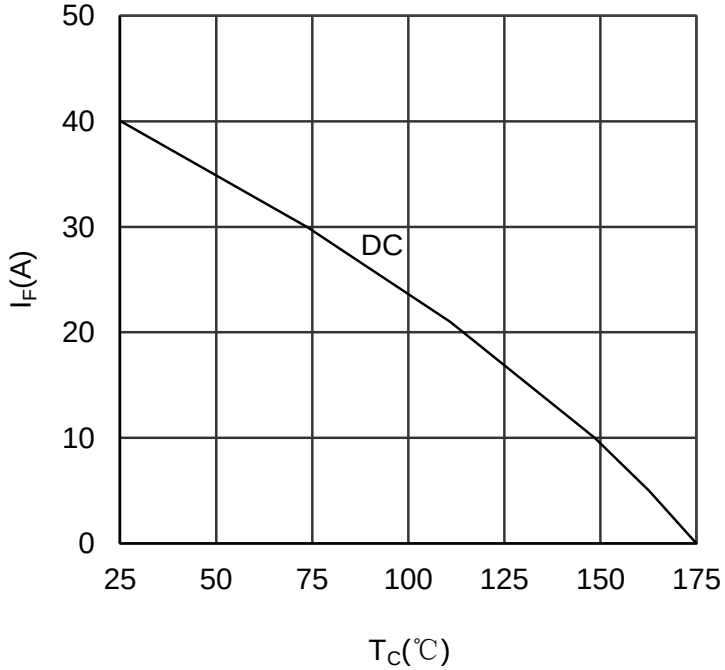


Figure 8. Forward current vs Case temperature Diode

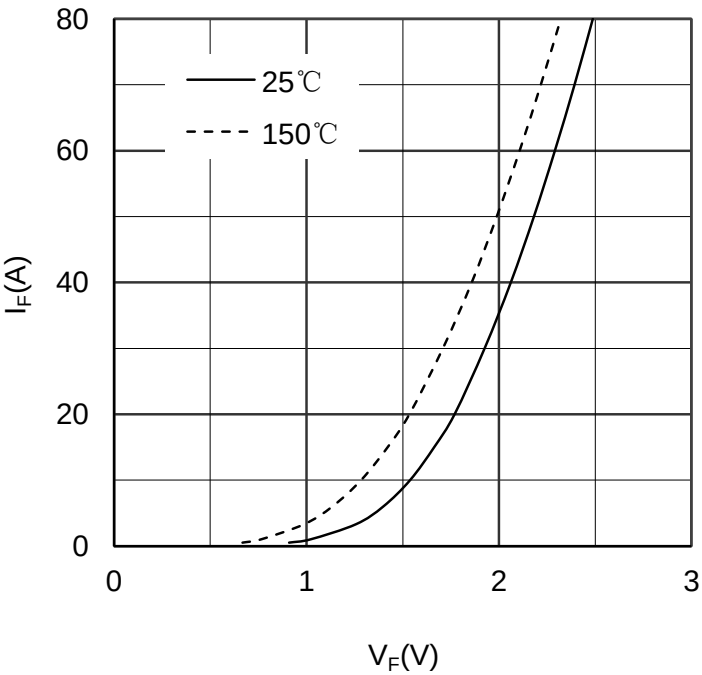


Figure 9. Diode Forward Characteristics Diode

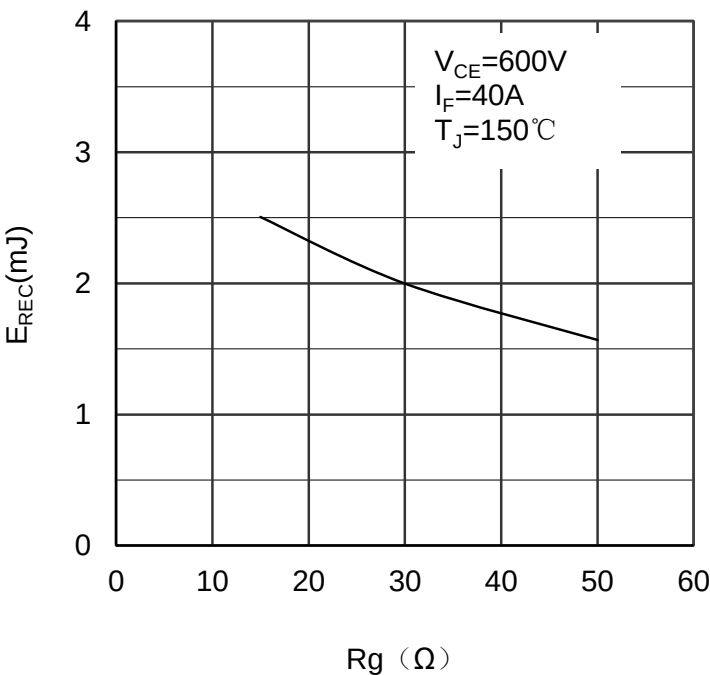


Figure 10. Switching Energy vs Gate Resistor Diode

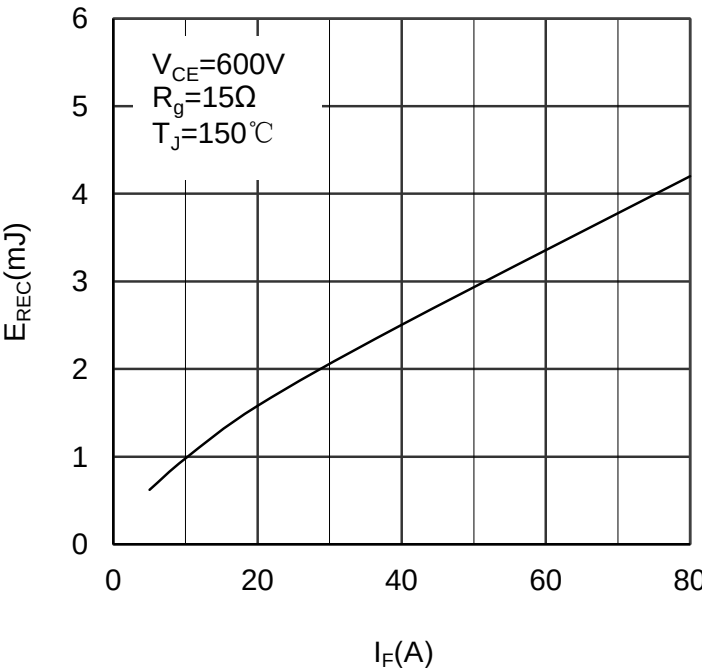


Figure 11. Switching Energy vs Forward Current Diode

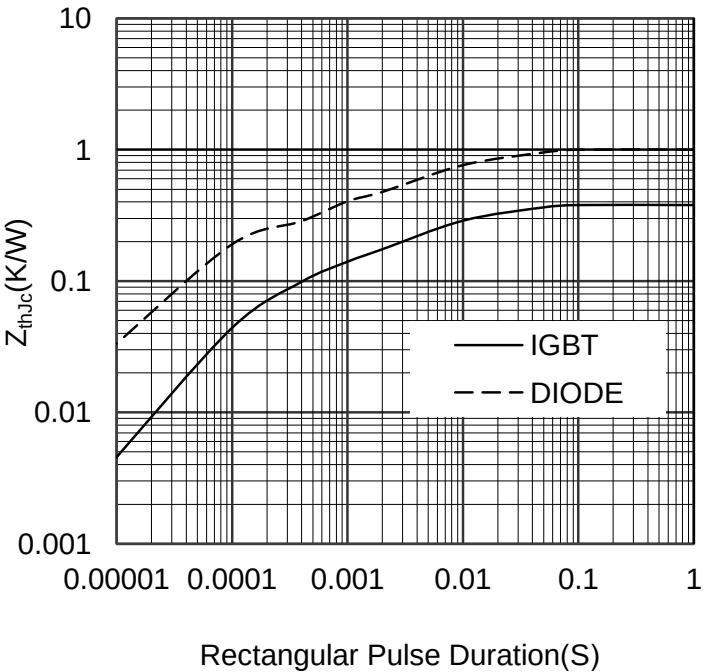
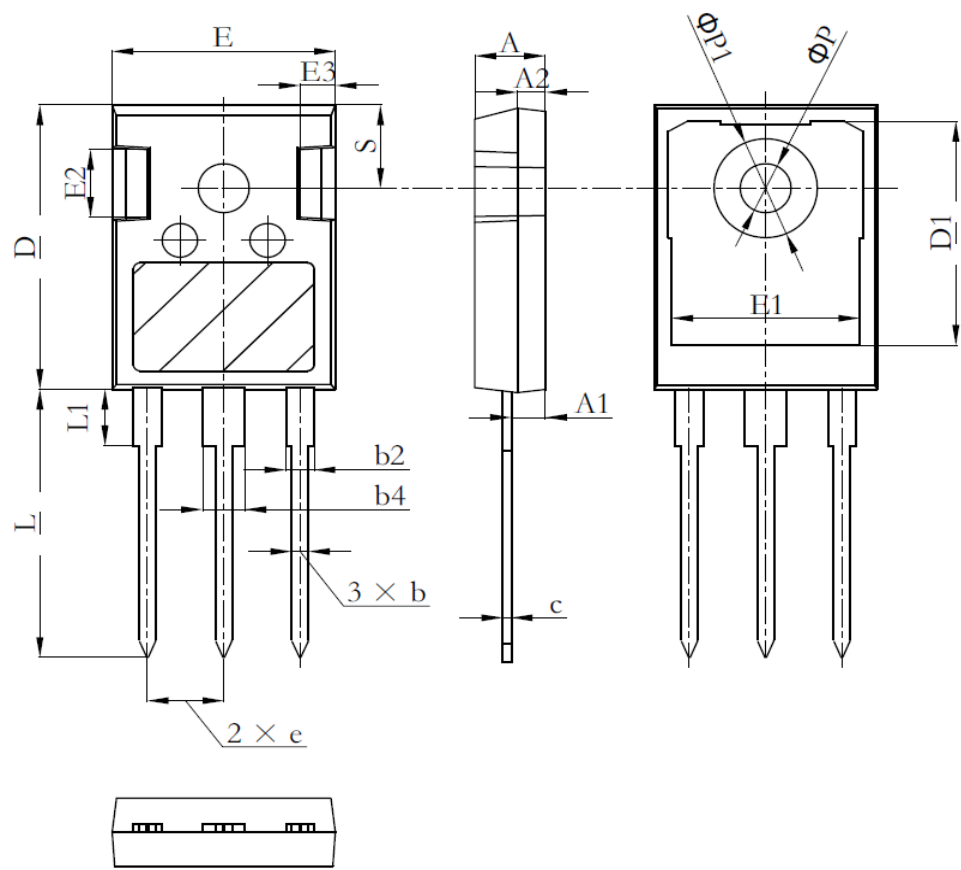


Figure 12. Transient Thermal Impedance of Diode and IGBT



Symbol	Min	Nom	Max
A	4.80	5.00	5.21
A1	2.21	2.41	2.61
A2	1.85	2.00	2.16
b	1.07	1.23	1.36
b2	1.90	2.05	2.41
b4	2.87	3.05	3.38
c	0.50	0.60	0.75
e	5.44BSC		
E	15.50	15.80	16.13
E1	12.38	13.30	13.60
E2	3.68	-	5.20
E3	1.00	-	2.70
D	20.70	21.00	21.30
D1	16.25	-	17.65
L	19.60	19.91	20.32
L1	-	-	4.40
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		

技术要求：
1. 单位：mm
2. 成品需符合RoHS2.0要求.

Figure Package Outline

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