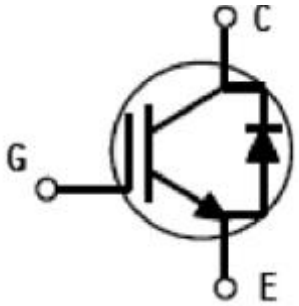
50A 1200V Trenchstop Insulated Gate Bipolar Transistor

1 Description

These Insulated Gate Bipolar Transistor used advanced trench and Fieldstop technology design, provided excellent Vcesat and switching speed， low gate charge. Which accords with the RoHS standard.



2 Features

- Low Vcesat
- Low gate charge
- Excellent switching speed
- Easy paralleling capability due to positive

temperature Coefficient in Vcesat

- Tsc≥10μs
- Fast recovery full current anti-parallel diode

3 Applications

- Welding
- UPS

Type	Vce	Ic	Vcesat,Tj=25℃	Tjmax	Package
DHG50N120	1200V	50A	1.9V	150℃	TO-264

4 Electrical Characteristics

4.1 Absolute Maximum Ratings （Tc=25℃,unless otherwise noted）

Parameter		Symbol	Value	Units
Collector-to-Emitter Voltage		V_{CE}	1200	V
Gate-to-Emitter Voltage		V_{GE}	±20	V
DC Collector current	T_C=25℃	I_C	100	A
	T_C=100℃		50	A
Pulsed Collector Current(1)		I_{CM}	200	A
Diode forward current	T_C=25℃	I_F	50	A
	T_C=100℃		25	
Diode Pulsed Current		I_{FM}	100	A
Short circuit withstand time， V_{GE}=15V，V_{CC}=600V， Allowed number of short circuits < 1000 Time between short circuits: ≥ 1.0s Tj=150℃		T_{SC}	10	μs
Power Dissipation	T_C=25℃	P_{tot}	460	W
	T_C=100℃		230	W
Junction Temperature Range		T_j	-55～150	℃
Storage Temperature Range		T_{stg}	-55～150	℃
Soldering temperature		T_L	260	℃

4.2 Thermal Characteristics

Parameter	Symbol	Rating	Units
IGBT Thermal Resistance,Junction to Case-sink	R_{thJC}	0.22	℃/W
IGBT Thermal Resistance,Junction to Ambient	R_{thJA}	37.1	℃/W
Diode Thermal Resistance,Junction to Case-sink	R_{thJC}	0.61	℃/W

4.3 Electrical Characteristics (Tc=25℃,unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Collector-to-Emitter Breakdown Voltage	Vce	I_C=250μA,V_{GE}=0V	1200	--	--	V
Collector-to-Emitter Leakage Current	I_{CES}	V_{CE}=30V,V_{GE}=0V,T_C=25℃	--	--	1	μA
		V_{CE}=30V,V_{GE}=0V,T_C=100℃	--	--	100	μA
Gate-to-Emitter Leakage Current	I_{GES}	V_{GE}=±20V,V_{CE}=0V	--	--	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE}=V_{GE},I_C=250μA	4.5	5.5	6.5	V
Collector-emitter saturation voltage	Vcesat	V_{GE}=15V,I_C=50A	--	1.9	2.2	V
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{CE}=25V,V_{GE}=0V f=1MHz	--	6218	--	pF
Output Capacitance	C_{oss}		--	208	--	
Reverse Transfer Capacitance	C_{rss}		--	39	--	
Switching Characteristics						
Turn-on delay time	td(on)	V_{CE}=600V,I_C=50A, R_g=10Ω,V_{GE}=15V, 感性负载,Ta=25℃	--	40	--	nS
Rise time	tr		--	35	--	nS
Turn-off delay time	td(off)		--	340	--	nS
Fall time	tf		--	87	--	nS
Turn-on energy	Eon		--	1.0	--	mJ
Turn-off energy	Eoff		--	2.3	--	mJ
Total switching energy	Ets		--	3.3	--	mJ
Turn-on delay time	td(on)	V_{CE}=600V,I_C=50A, R_g=10Ω,V_{GE}=15V, 感性负载,Ta=150℃	--	35	--	nS
Rise time	tr		--	37	--	nS
Turn-off delay time	td(off)		--	392	--	nS
Fall time	tf		--	170	--	nS
Turn-on energy	Eon		--	1.1	--	mJ
Turn-off energy	Eoff		--	2.9	--	mJ
Total switching energy	Ets		--	4	--	mJ
Gate charge	Qg	V_{CE}=600V,I_C=50A, V_{GE}=15V	--	275	--	nC

Diode Characteristic						
Diode forward voltage	V_F	I_F=25A	--	3.1	--	V
Diode reverse recovery time	trr	I_F=25A di/dt=100A/uS	--	44	--	ns
Diode peak reverse recovery current	Irrm		--	2.1	--	A
Diode reverse recovery charge	Qrr		--	51	--	nC

Notes：

1.Pulse duration is limited bv $T_{j,max}$

6 Typical Characteristic Curves

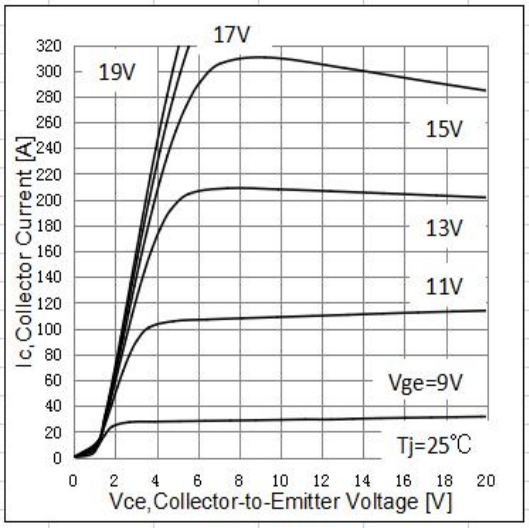


Fig1.**Typical output characteristic**

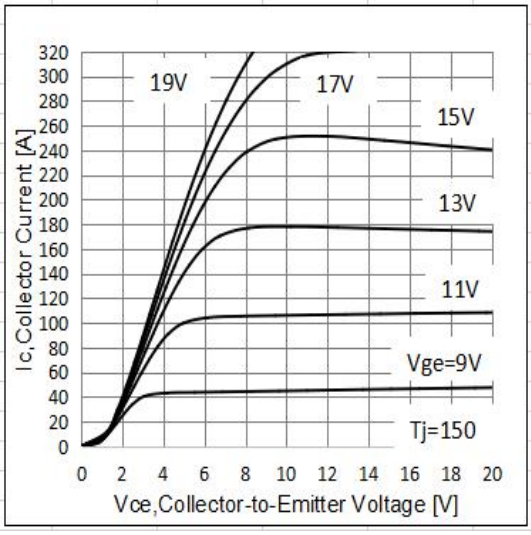


Fig2.**Typical output characteristic**

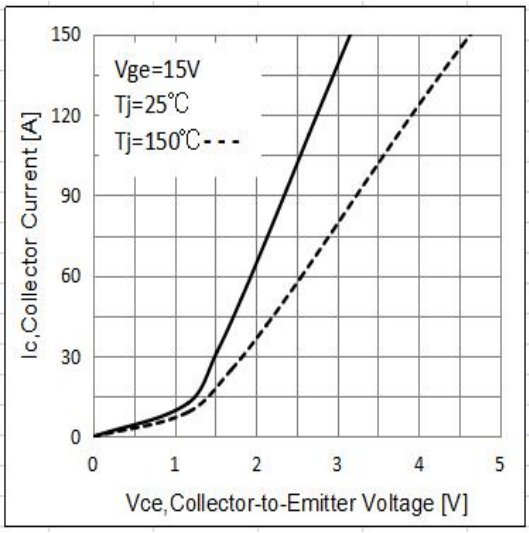


Fig3.**Collector-emitter saturation voltage Characteristic**

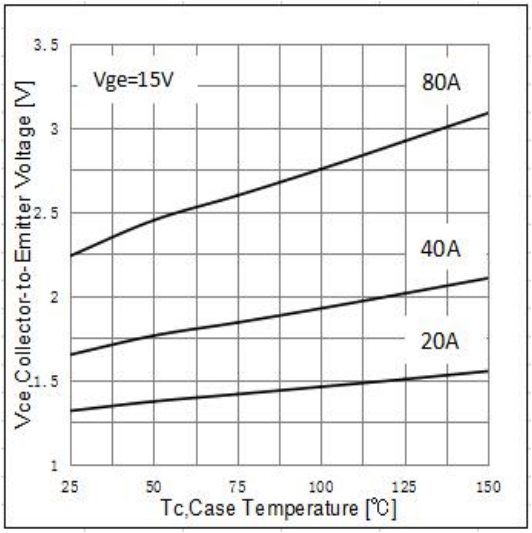


Fig4.**Collector-emitter saturation voltage Temperature Characteristic**

6 Typical Characteristic Curves(Continue)

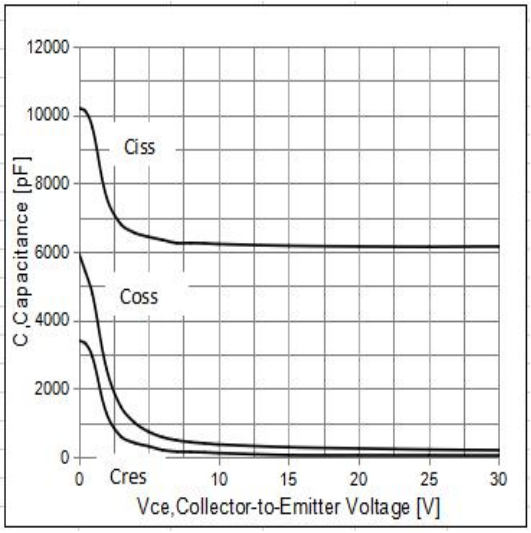


Fig5.**Typical capacitance as a function of collector-emitter voltage**

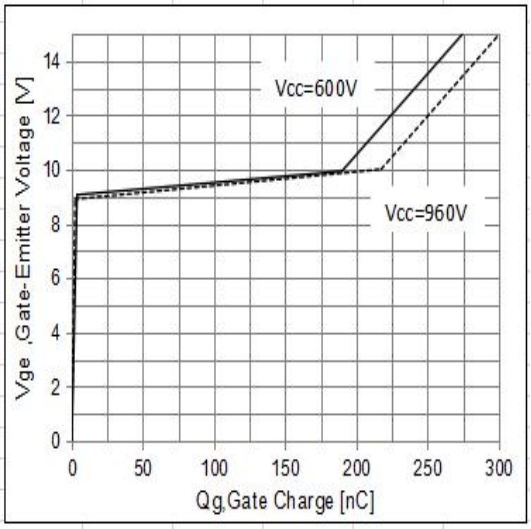


Fig6.**Typical gate charge**

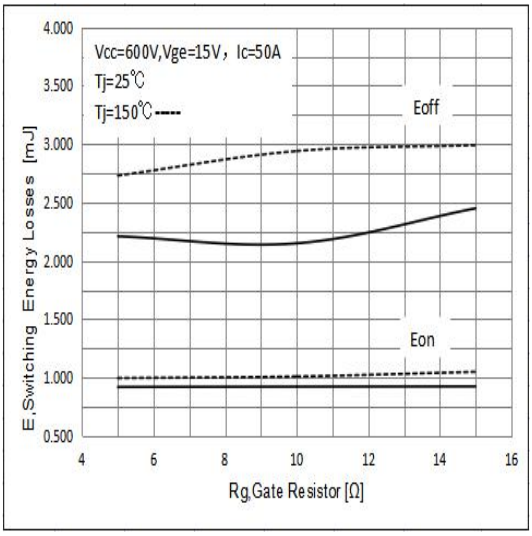


Fig7.**Typical switching energy losses as a function of gate resistor**

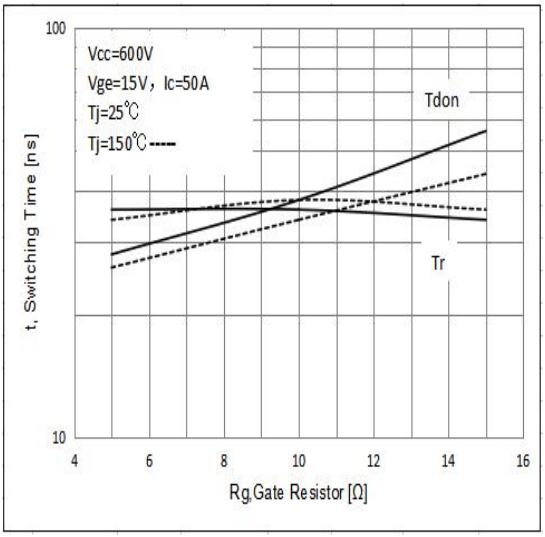


Fig8.**Typical switching times as a function of gate resistor**

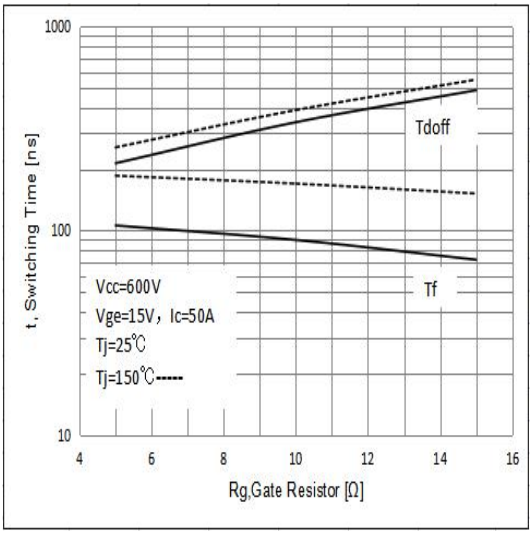


Fig9.**Typical switching times as a function of gate resistor**

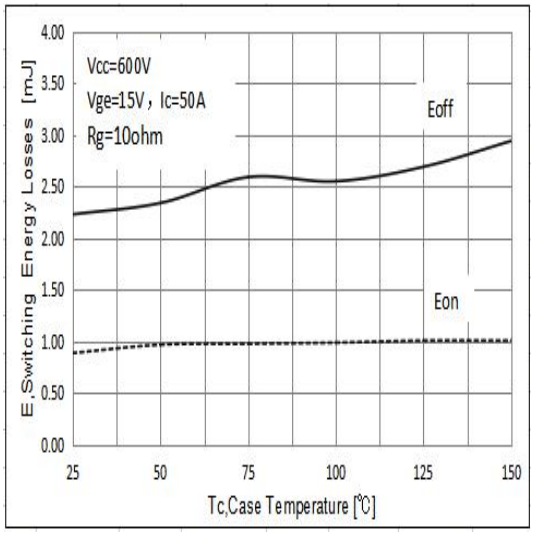


Fig10.**Typical switching energy losses as a function of Case Temperature**

6 Typical Characteristic Curves(Continue)

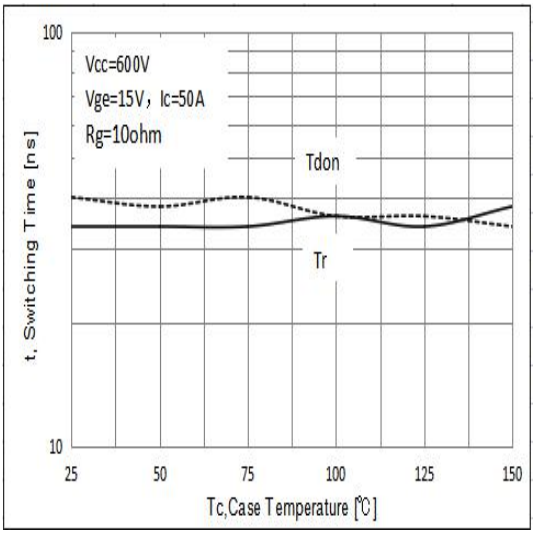


Fig11.**Typical switching times as a function of Case Temperature**

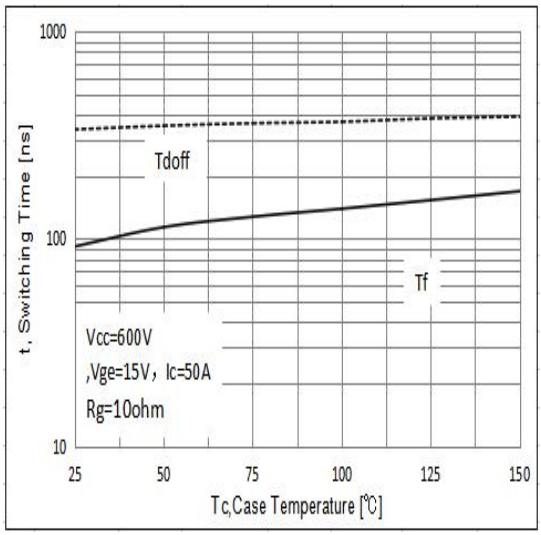


Fig12.**Typical switching times as a function of Case Temperature**

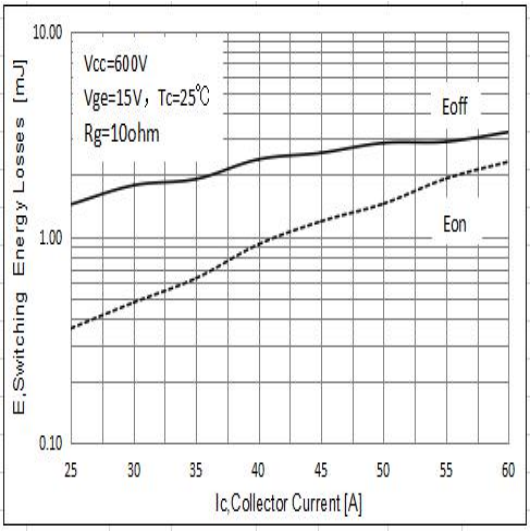


Fig13.**Typical switching energy losses as a function of Collector Current**

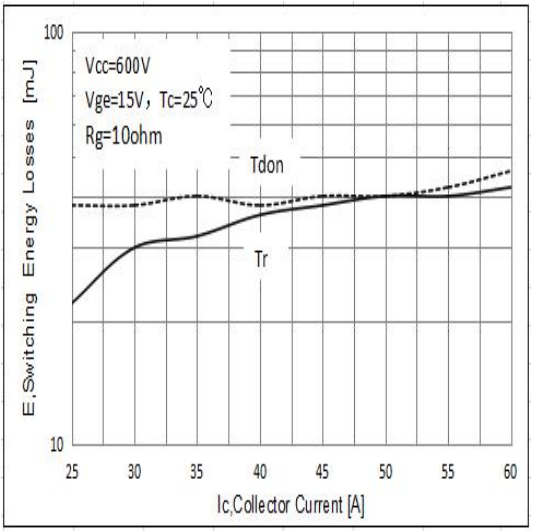


Fig14.**Typical switching times as a function of Collector Current**

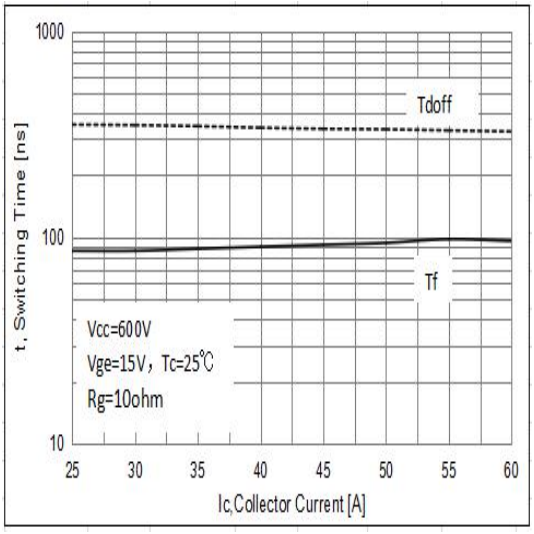


Fig15.**Typical switching times as a function of Collector Current**

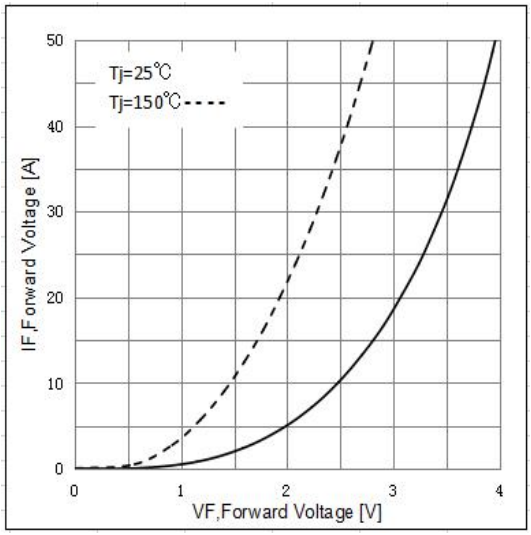


Fig16.**Typical diode forward current as a function of forward voltage**

6 Typical Characteristic Curves(Continue)

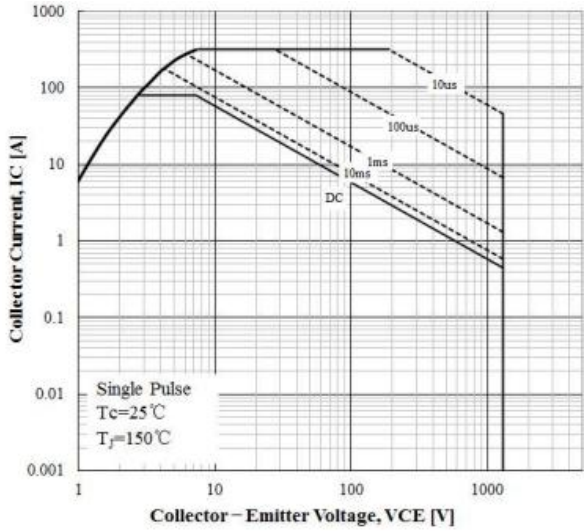


Fig17.**Forward bias safe operating area**

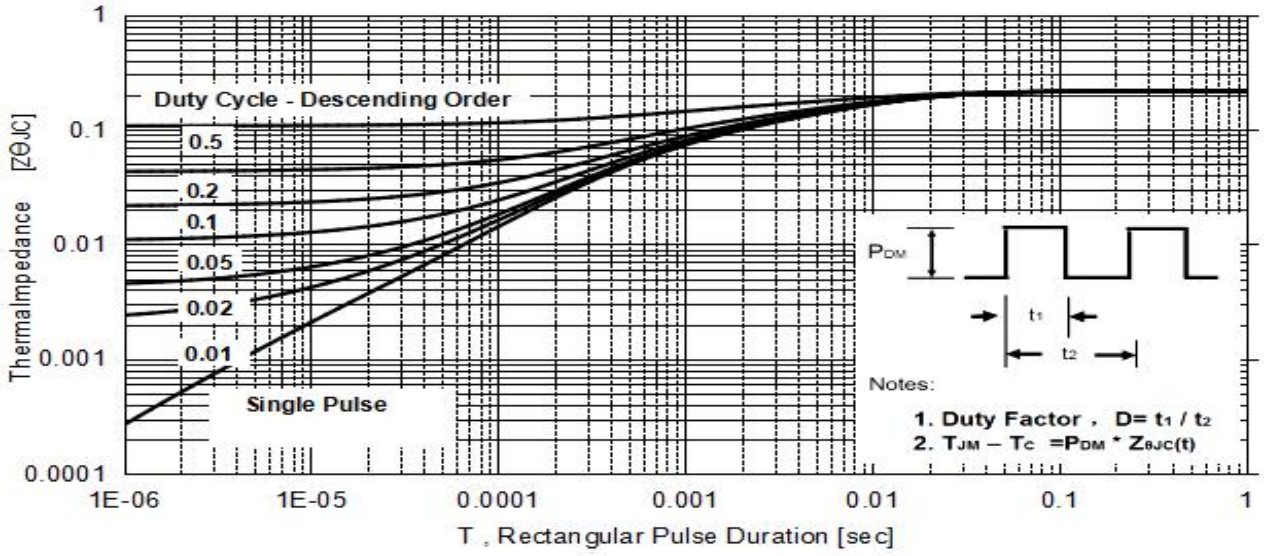


Fig18.**IGBT transient thermal resistance**

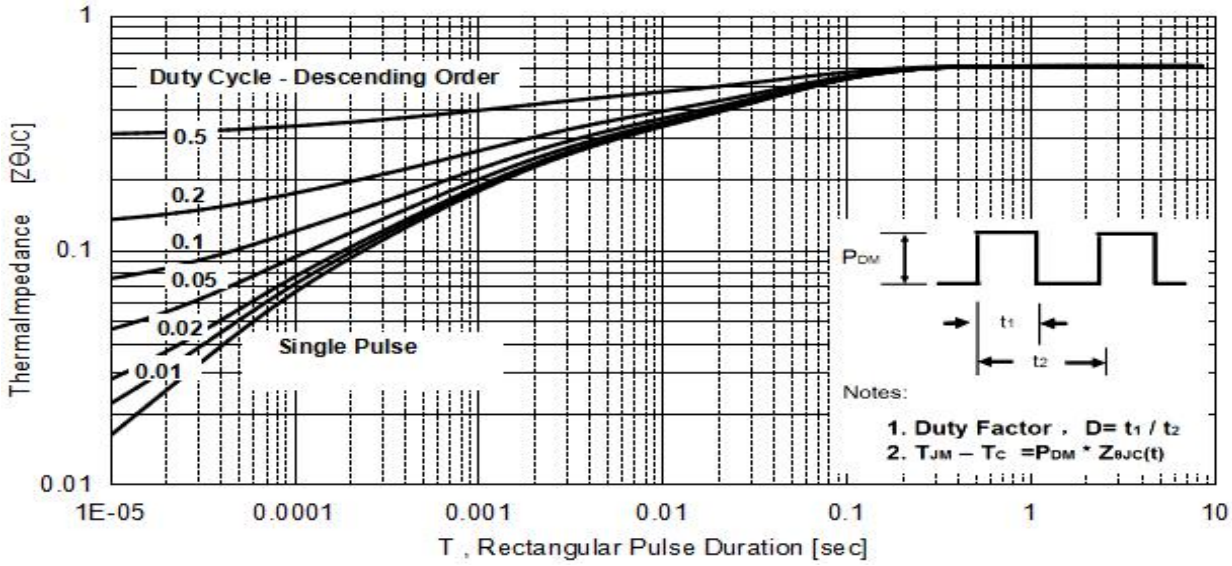
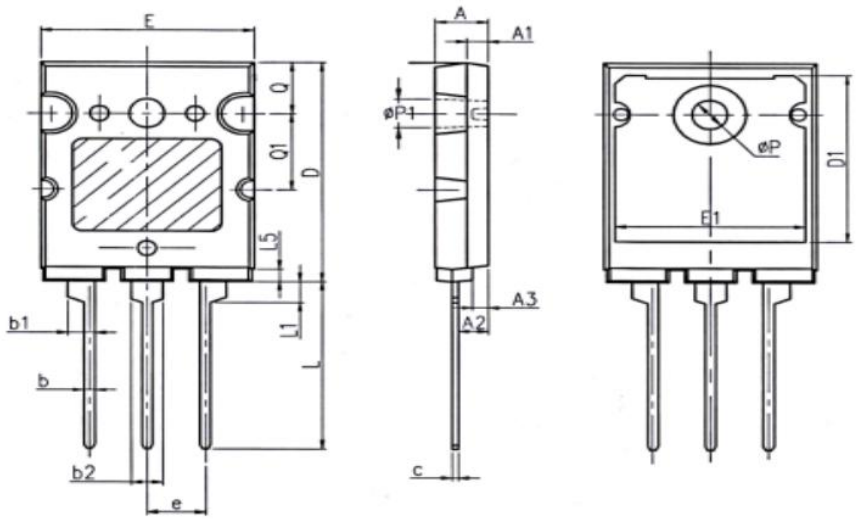


Fig19.**Diode transient thermal resistance**

7 Dimensions (TO-264)



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1		2.00REF	
A2	2.50	2.80	3.10
A3		1.50REF	
b	0.90	1.00	1.25
b1	2.30	2.50	2.75
b2	2.80	3.00	3.20
c	0.50	0.60	0.85
D	25.70	26.00	26.30
D1	19.00	–	–
E	19.50	20.00	20.50
E1	16.00	–	–
e		5.45TYP	
L	19.50	20.00	20.50
L1	2.30	2.50	2.70
L5		1.35REF	
øP	3.00	3.20	3.40
øP1	3.20	3.40	3.60
Q	5.80	6.00	6.20
Q1	8.80	9.00	9.20

8 Attentions

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- Product promotion is endless, our company will be dedicated to provide customers with better products.

9 Appendix

Revision history:

Date	REV.	Description	Page
2020.10.12	1.0	Original	