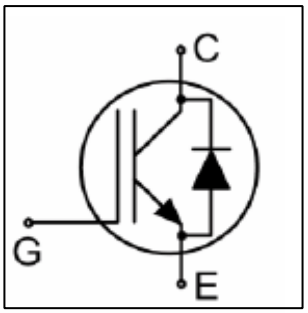
WGW40G60W

Low Loss IGBT

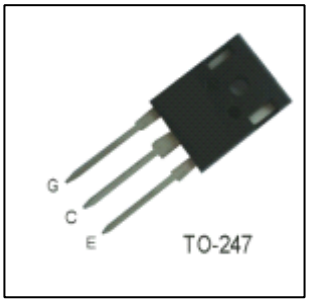


Features

- High current capability
- low saturation voltage:(V_{CE}(sat)=2.3@I_C=40A)
- High input impedance
- Fast switching
- RoHS compliant

Applications

- Induction Heating
- UPS
- SMPS
- PFC



Absolute Maximum Ratings(Tc=25℃)

Symbol	Parameter		Value	Unit
V_{CES}	Collector-Emitter Voltage		600	V
I_C	DC Collector Current	Tc=25℃	80	A
		Tc=100℃	40	A
$I_{CM(1)}$	Pulsed Collector Current	Tc=25℃	120	A
V_{GES}	Gate-Emitter Voltage		±20	V
P_D	Maximum Power Dissipation	Tc=25℃	290	W
	Maximum Power Dissipation	Tc=100℃	116	W
T_J	Operation Junction Temperature		-55~ 150	℃
T_{STG}	Storage Temperature		-55 ~ 150	℃
T_L	Maximum Lead Temperature for Soldering Purposes,1/8 from case for 5 seconds		300	℃

Thermal Characteristics

Symbol	Parameter	Value			Unit
		Min	Typ	Max	
$R_{\theta JC(IGBT)}$	Thermal Resistance , Junction -to -Case	-	-	0.43	℃/W
$R_{\theta JC(Diode)}$	Thermal Resistance, Junction-to-Case			1.45	℃/W
$R_{\theta JA}$	Thermal Resistance , Junction-to -Ambient	-	-	40	℃/W

Electrical Characteristics(Tc=25℃)

Characteristics		Symbol	Test Condition	Min	Typ	Max	Unit
G-E leakage current		I_{GES}	V_{GE}=V_{GES},V_{CE}=0V	-	-	±400	nA
Collector-Emitter Breakdown Voltage		$V_{(BR)CES}$	I_C=0.5mA,V_{GE}=0V	600	-	-	V
Temperature Coefficient of Breakdown voltage		$\triangle BV_{CES}$ /$\triangle T_J$	V_{GE}=0V,I_C=250μA	-	0.6	-	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C=40A, V_{GE}=15V	-	2.3	2.9	
			I_C=40A, V_{GE}=15V Tc=125℃	-	2.5	-	
Collector Cut-off current		I_{CES}	V_{CE}=V_{CES},V_{CE}=0V	-	-	250	mA
G-E threshold voltage		$V_{GE(th)}$	V_{CE}=V_{GE},I_C=250μA	4.0	5.0	6.5	V
Input capacitance		C_{iss}	V_{CE}=30V V_{GE}=0V, f=1MHz	-	2110	-	pF
Reverse transfer capacitance		C_{rss}		-	60	-	
Output capacitance		C_{oss}		-	200	-	
Switching time	Turn-on delay time	Td(on)	V_{CE}=400 I_C=40A R_G=10Ω,V_{GE}=15V Inductive Load,Tc=25℃	-	25	-	ns
	Turn-onRise time	tr		-	42	-	
	Turn-off delay time	Td(off)		-	115	-	
	Turn-off Fall time	tf		-	27	54	
Turn-on energy		E_{on}		-	1.13	-	mJ
Turn-off energy		E_{off}		-	0.31	-	
Total swiitching energy		E_{ts}		-	1.44	-	
Switching time	Turn-on delay time	Td(on)	V_{CE}=400 I_C=40A R_G=10Ω,V_{GE}=15V Inductive Load,Tc=125℃	-	24	-	ns
	Turn-onRise time	tr		-	43	-	
	Turn-off delay time	Td(off)		-	120	-	
	Turn-off Fall time	tf		-	30	-	
Turn-on energy		E_{on}		-	1.14	-	mJ
Turn-off energy		E_{off}		-	0.48	-	
Total swiitching energy		E_{ts}		-	1.62	-	
Total Switching Loss		Qg	V_{CE}=400v,I_C=40A, V_{GE}=15V	-	120	-	nC
Gate to Emitter Charge		Qge		-	14	-	
Gate to Collector Charge		Qgc		-	58	-	

Anti-Parallet Diode Characteristics (Ta=25℃)

Characteristics	Symbol	Test Condition		Min	Type	Max	Unit
Forward voltage(diode)	V_{FM}	I_F=20A	Tc=25℃	-	1.95	2.6	V
			Tc=125℃	-	1.85	-	
Reverse recovery time	trr	I_{ES}=20A,dI_{ES} / dt =200 A / μs	Tc=25℃	-	45	-	ns
			Tc=125℃	-	140	-	
Reverse recovery charge	Qrr		Tc=25℃	-	75	-	μC
			Tc=125℃	-	375	-	

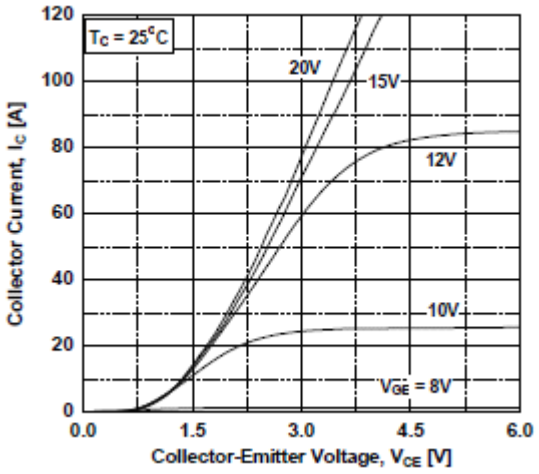


Fig.1 Typical Out Characteristics

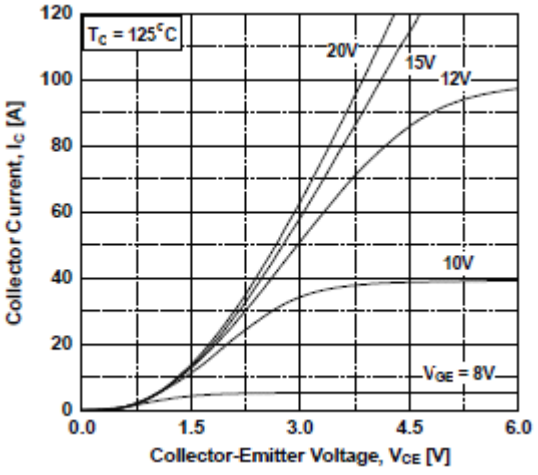


Fig.2 Typical output Characteristics

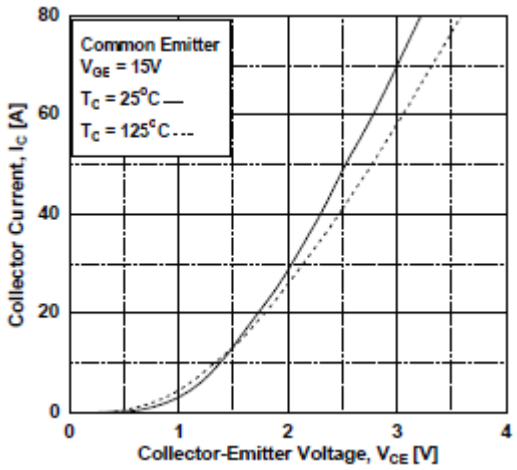


Fig.3 Typical Saturation Voltage characteristics

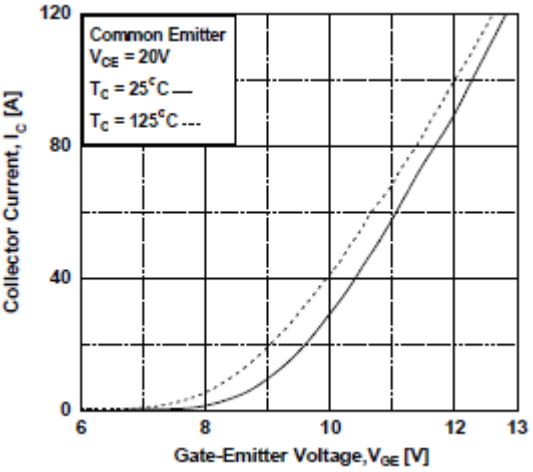


Fig.4 Transfer characteristics

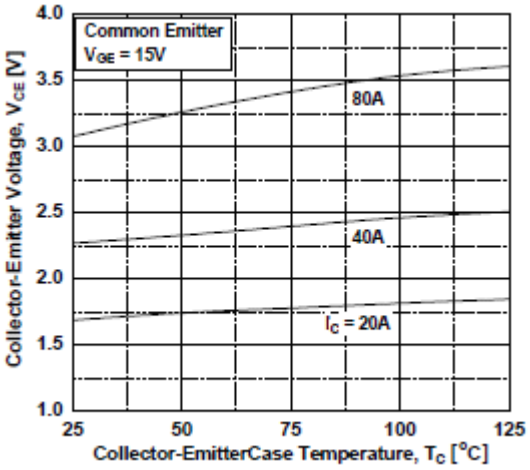


Fig.5 Saturation Voltage vs.Case Temperature at Variant current level

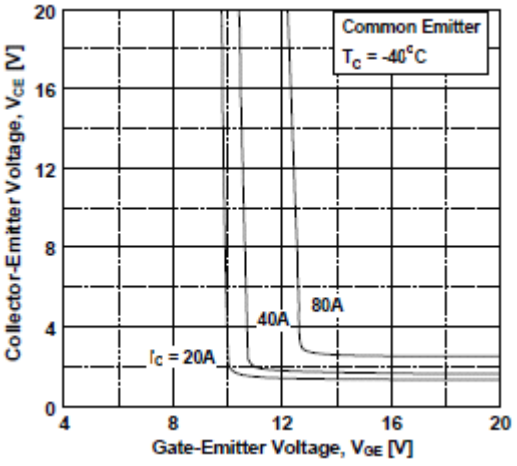


Fig.6 Saturation Voltage vs.V_{GE}

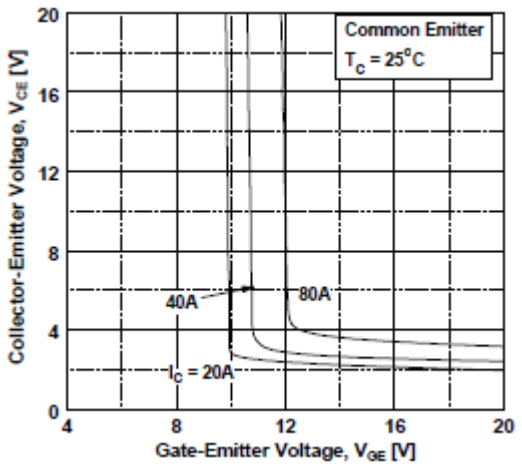


Fig.7 Saturation Voltage vs.V_{GE}

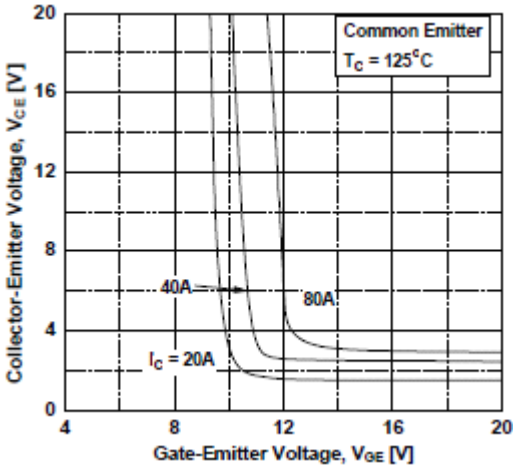


Fig.8 Saturation Voltage vs.V_{GE}

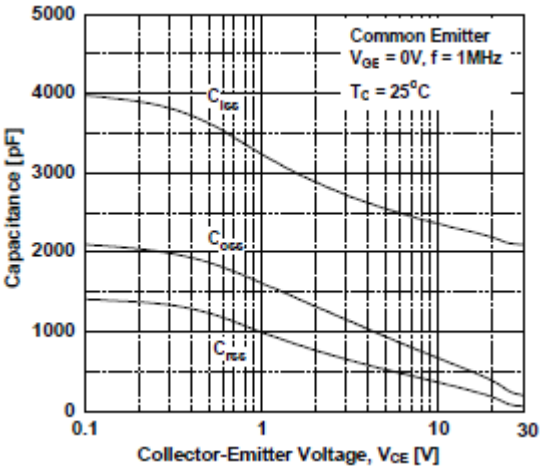


Fig.9 Capacitance Characteristics

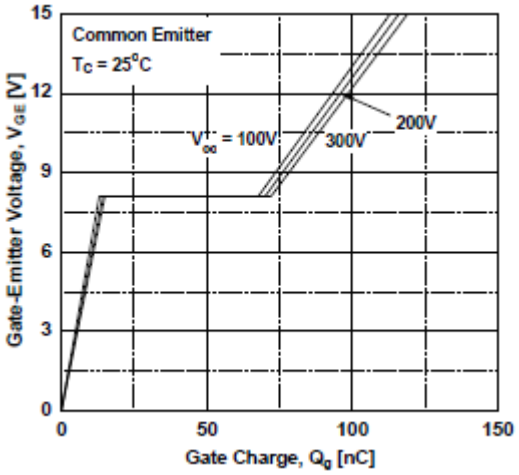


Fig.10 Gate Charge Characteristics

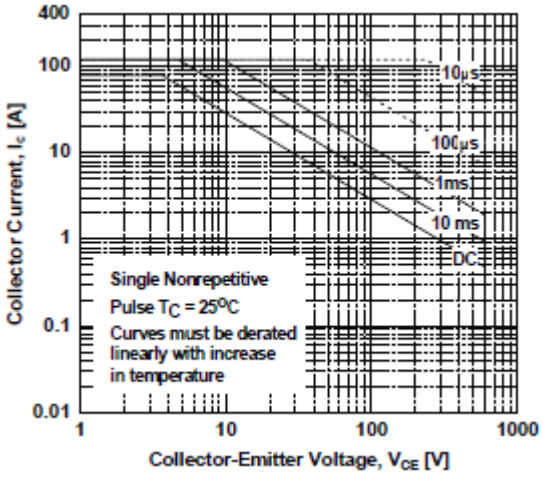


Fig.11 SOA Characteristics

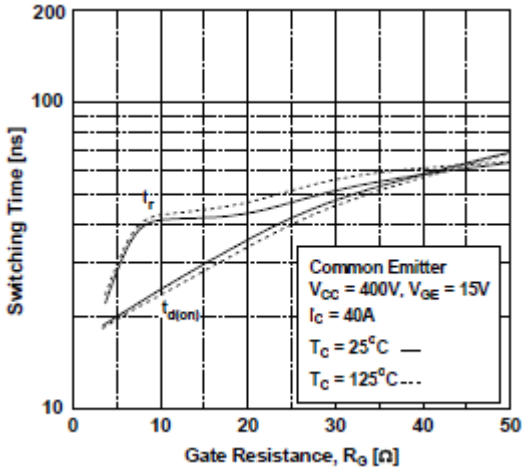


Fig.12 Turn-on Characteristics vs.Gate Resistance

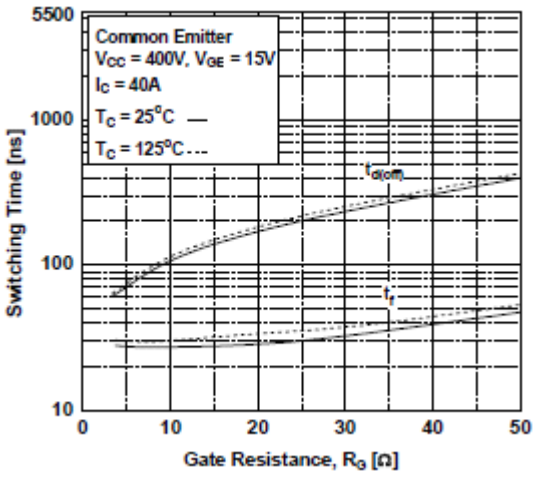


Fig.13Turn-off Characteristics vs.Gate Resistance

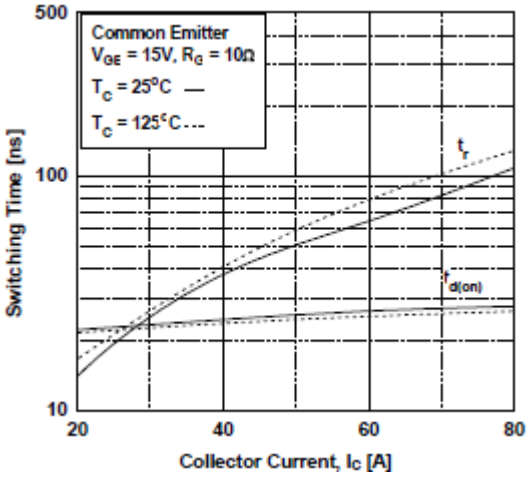


Fig.14 Turn-on characteristics vs.Collector Current

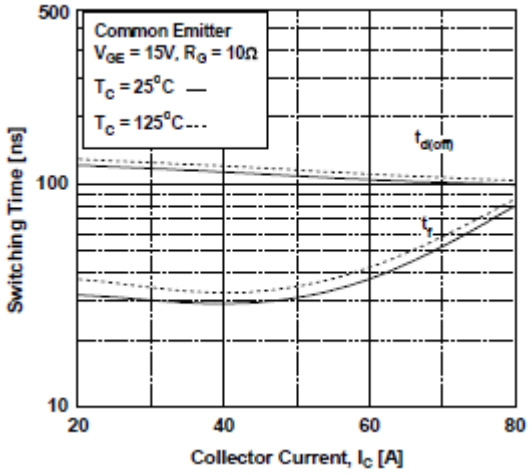


Fig.15 Turn-off characteristics vs.Collector Current

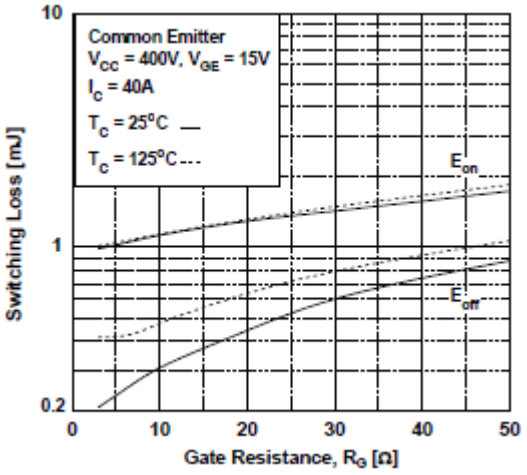


Fig.16 Switching Loss vs. Gate Resistance

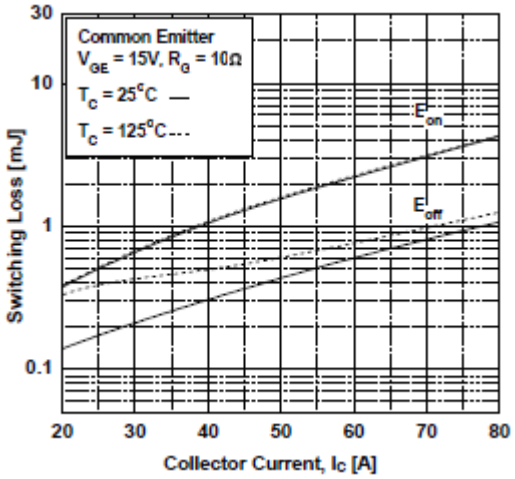


Fig.17 Switching Loss vs.Collector Current

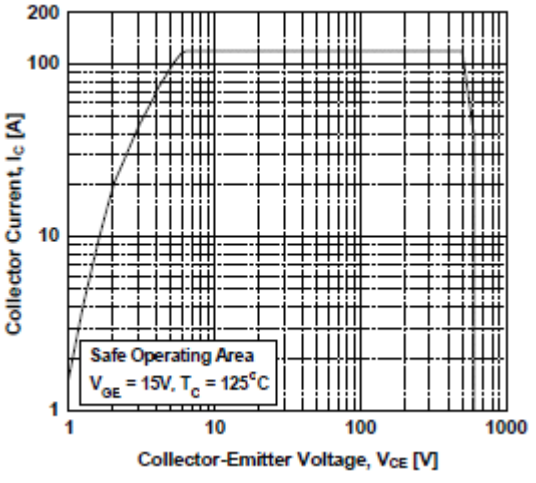


Fig.18 Turn-off Switching SOA Characteristics

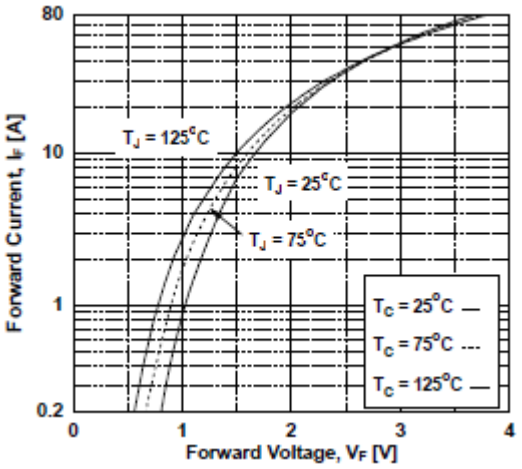


Fig.19 Forward Characteristics

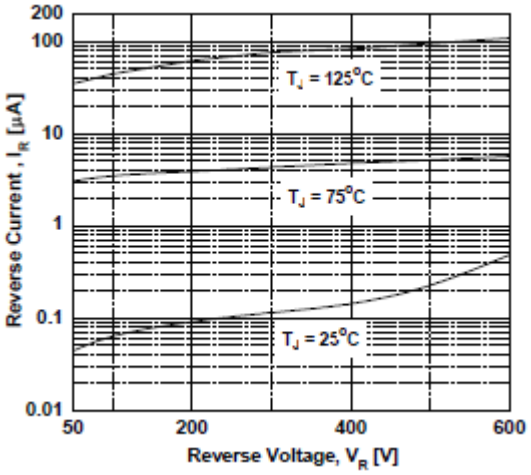


Fig. 20 Typical Reverse Current vs.Reverse Voltage

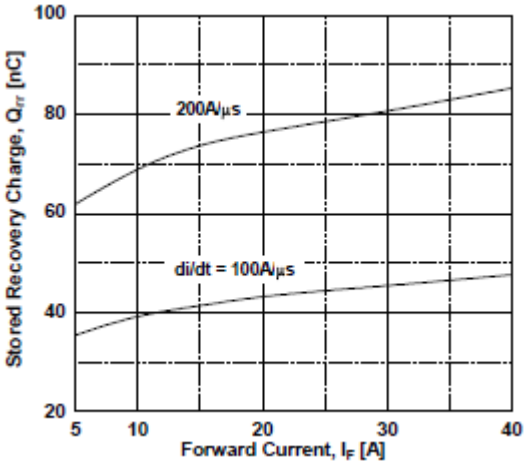


Fig.21 Stored Charge

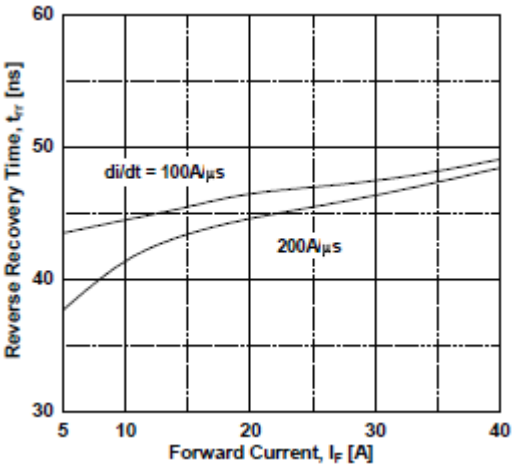


Fig. 22 Reverse Recovery time

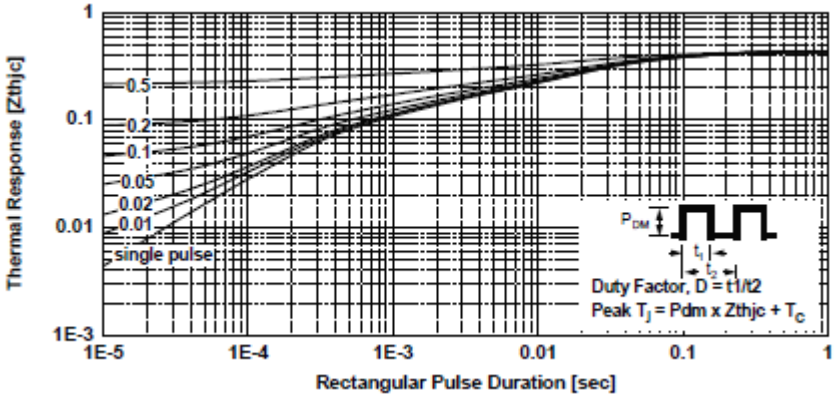


Fig.23 Transient Thermal Impedance of IGBT

TO-247 Package Dimension

Unit:mm