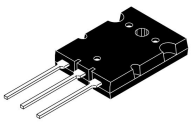
Features

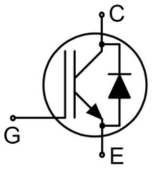
- Extremely Efficient Trench with Field Stop Technology
- TJmax =175°C
- Soft Fast Reverse Recovery Diode
- Optimized for High Speed Switching
- 10μs Short Circuit Capability



TO-264

Applications

- Solar Inverter
- UPS



Absolute Ratings（Tc=25℃）

Parameter	Symbol	Value	Unit
Collector-Emmiter Voltage	V_{CES}	1200	V
Collector Current-continuous	Ic T=25℃	100	A
	T=100℃	50	A
Collector Current-pulse(note 1)	I_{CM}	200	A
Diode Continuous forward current	I_F T=100℃	50	A
Diode Maximum Forward Current (Note 1)	I_{FM}	200	A
Gate-Emmiter Voltage	V_{GES}	±20	V
Short Circuit Withstand Time	tsc	10	us
Power Dissipation(Tc=25℃)	P_D T_C=25℃	535	W
Power Dissipation(Tc=100℃)	T_C=100℃	267	W
Operating Temperature Range	T_J	-55~+175	℃
Storage Temperature Range	T_{STG}	-55~+175	℃
Maximum Lead Temperature for Soldering Purposes	T_L	260	℃

Electrical Characteristic(TC=25℃ unless otherwise noted)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off-Characteristics						
Collector-Emmiter Voltage	BV_{CES}	I_C=500μA,V_{GE}=0V	1200	-	-	V

Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=1200V,V_{GE}=0V	-	-	0.1	mA
		T_C=175℃			2.0	mA
Gate-body leakage current	I_{GES}	V_{CE}=0V,V_{GE}=±20V	-	-	±200	nA
On-Characteristics						
Gate-Emmiter Threshold Voltage	$V_{GE(th)}$	VCE=VGE, Ic=250uA	4.5	5.5	6.5	V
Collector-Emmiter saturation Voltage	V_{CESAT}	V_{GE}=15V,I_C=50A, V_{GE} =15 V, I_C =50 A, T_J =175°C	-	2.20	2.40	V
				2.60		
Dynamic Characteristics						
Input capacitance	Cies	VCE=20V, VGE=0V, f=1.0MHZ, Tc=25℃	-	7383	-	pF
Output capacitance	Coes		-	233	-	pF
Reverse transfer capacitance	Cres		-	139	-	pF
Total Gate Charge	Qg	V_{CE}=600V,I_C=50A, V_{GE}=15V,T_C=25°C	-	311	-	nC
Gate to emitter charge	Qge		-	64	-	
Gate to collector charge	Qgc		-	155	-	
Switching Characteristics						
Turn-On delay time	t_d(on)	V_{CC}=600V,Ic=50A, R_G=10Ω,V_{GE}=15V Inductive load Tc=25℃	-	118	-	ns
Turn-On rise time	t_r		-	48	-	ns
Turn-off delay time	t_d(off)		-	282	-	ns
Turn-off Fall time	t_f		-	113	-	ns
Turn-on switching loss	E_{on}		-	4.40	-	mJ
Turn-off switching loss	E_{off}		-	1.40	-	mJ
Total switching loss	E_{ts}		-	5.80	-	mJ
Turn-On delay time	t_d(on)	V_{CC}=600V,Ic=50A, R_G=10Ω,V_{GE}=15V Inductive load Tc=175℃	-	114	-	ns
Turn-On rise time	t_r		-	49	-	ns
Turn-off delay time	t_d(off)		-	298	-	ns
Turn-off Fall time	t_f		-	243	-	ns
Turn-on switching loss	E_{on}		-	5.65	-	mJ
Turn-off switching loss	E_{off}		-	3.26	-	mJ
Total switching loss	E_{ts}		-	8.91	-	mJ
Anti-Paraller Diode Characteristics and Maximum Ratings						
Diode Forward Voltage	V_F	V_{GE}=0V,I_F=50A.	-	2.00	2.60	V
		T_J=175℃		2.55		

Diode Reverse recovery time	t_{rr}	V_R=400V,I_F=50A dI_F/dt=200A/us T_J=25℃	-	256	-	ns
Reverse recovery charge	Q_{rr}		-	2.7	-	μC
Diode Reverse recovery Current	Irrm		-	19	-	A
Diode Reverse recovery time	t_{rr}	V_R=400V,I_F=50A dI_F/dt=200A/us T_J=175℃	-	400	-	ns
Reverse recovery charge	Q_{rr}		-	5.75	-	μC
Diode Reverse recovery Current	Irrm		-	27	-	A

Thermal Characteristics

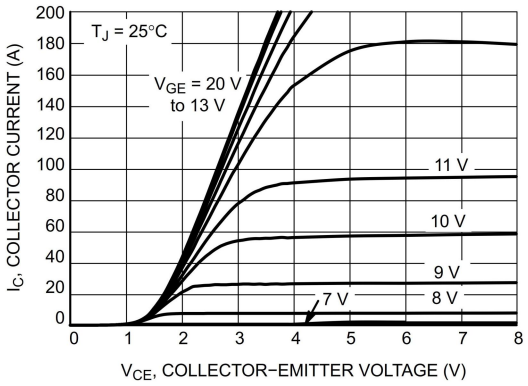
Symbol	Parameter	Max	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	0.28	℃/W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	0.5	℃/W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	40	℃/W

Notes:

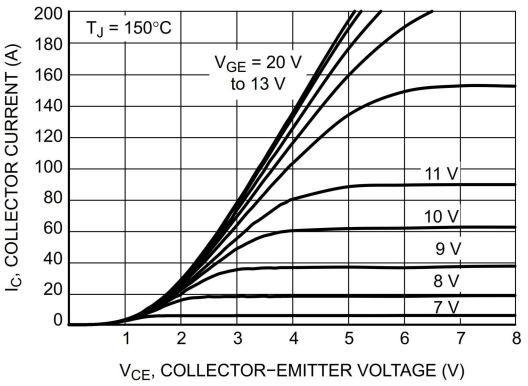
1：. Repetitive Rating: Pulse width limited by maximum junction temperature

Electrical Characteristics(curves)

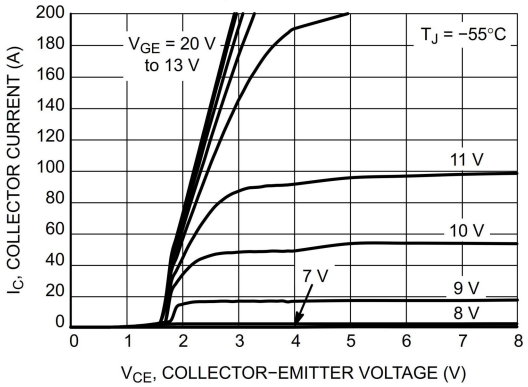
Output Characteristics



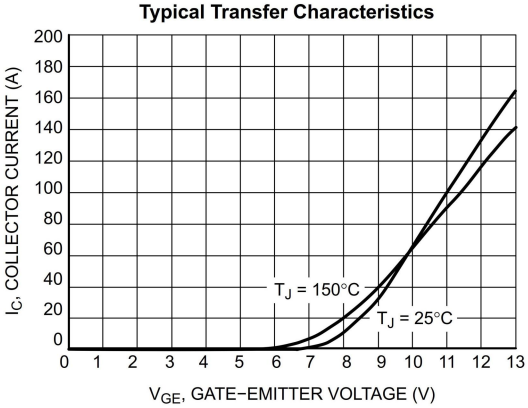
Output Characteristics



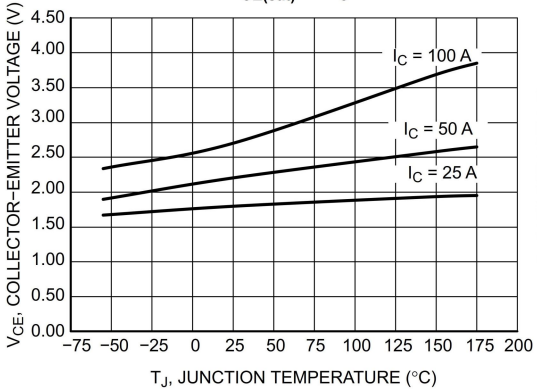
Output Characteristics



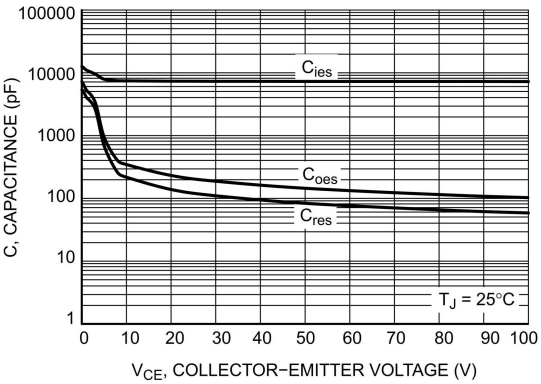
Typical Transfer Characteristics



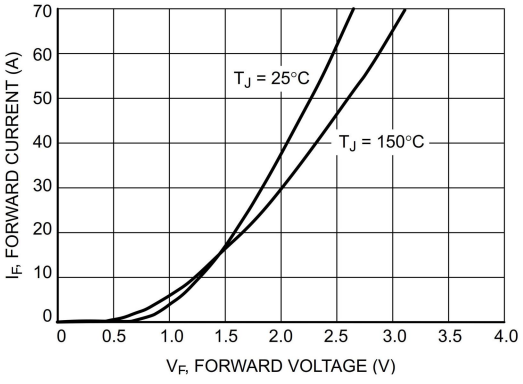
$V_{CE(sat)}$ vs T_J



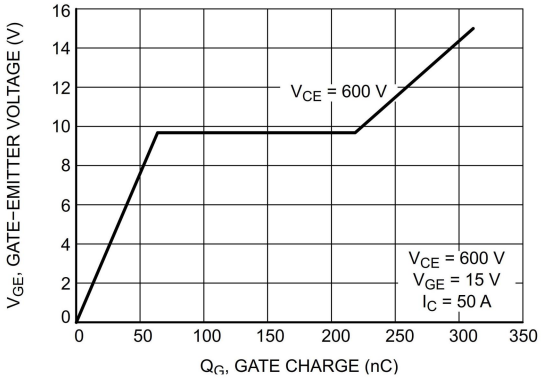
Typical Capacitance



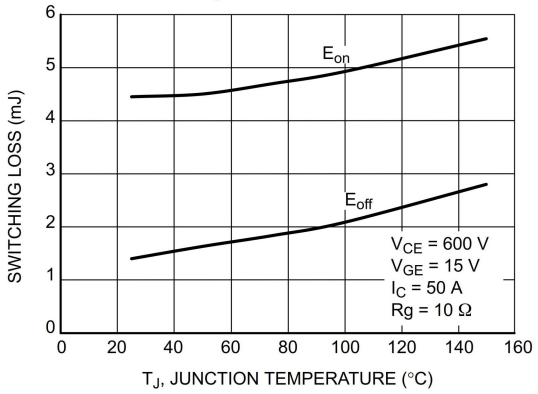
Diode Forward Characteristics



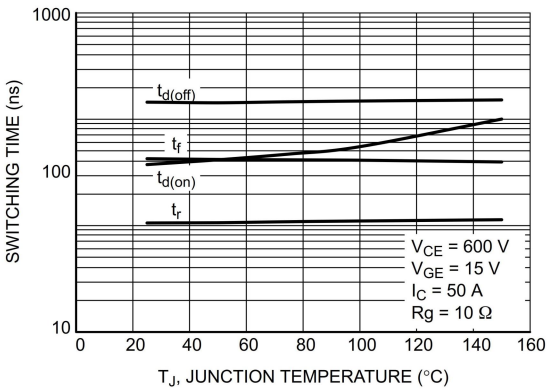
Typical Gate Charge



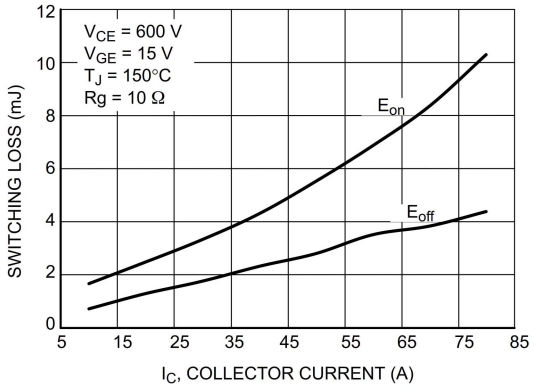
Switching Loss vs. Temperature



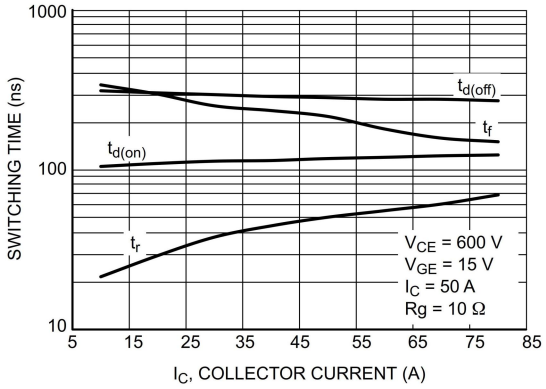
Switching Time vs. Temperature



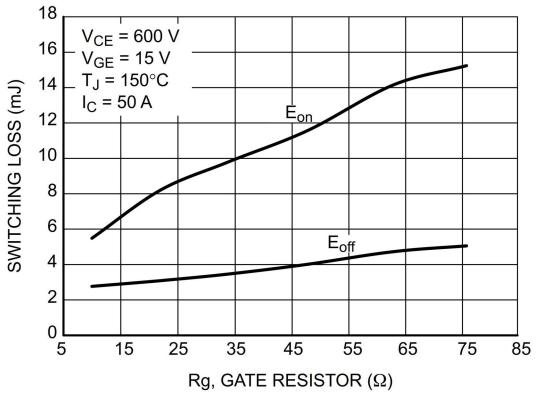
Switching Loss vs. I_C



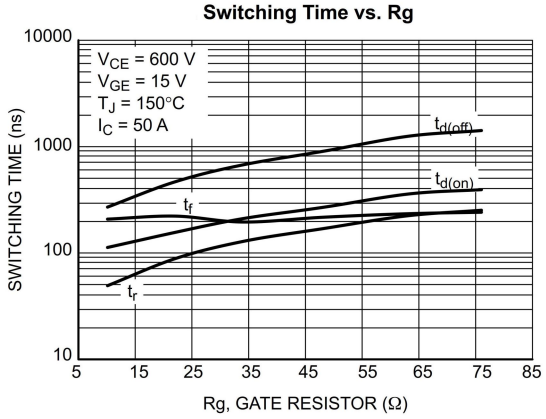
Switching Time vs. I_C



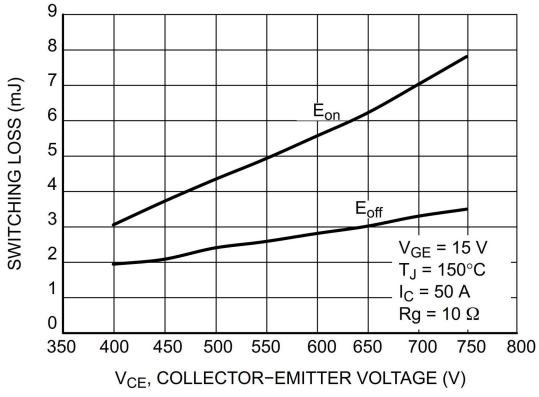
Switching Loss vs. Rg



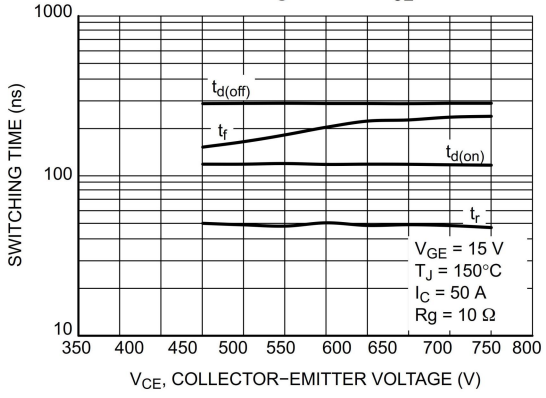
Switching Time vs. Rg



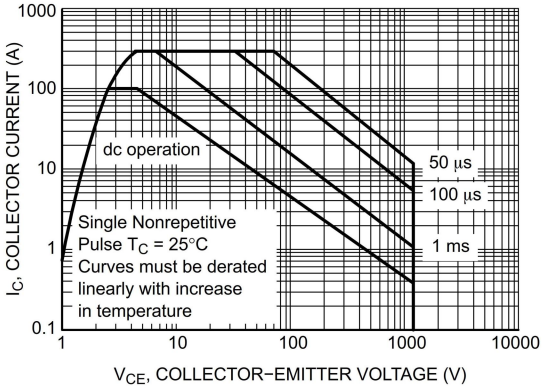
Switching Loss vs. V_{CE}



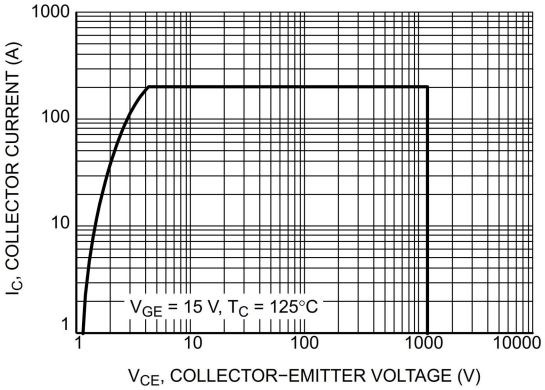
Switching Time vs. V_{CE}



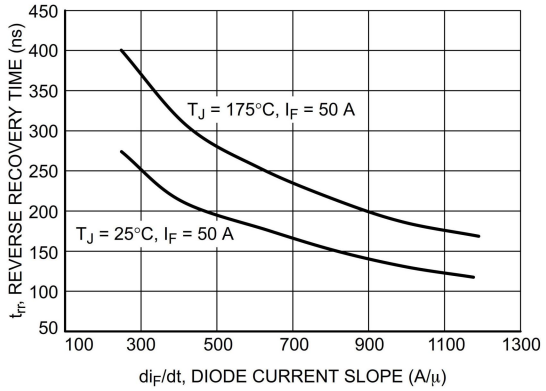
Safe Operating Area



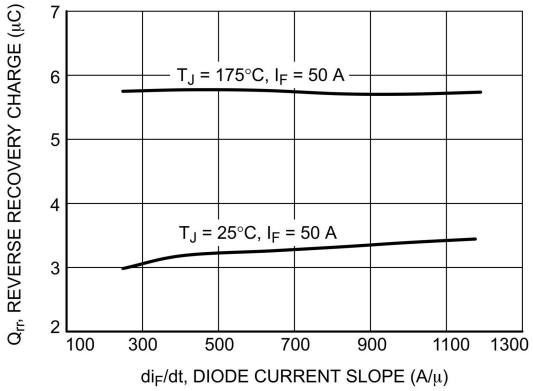
Reverse Bias Safe Operating Area



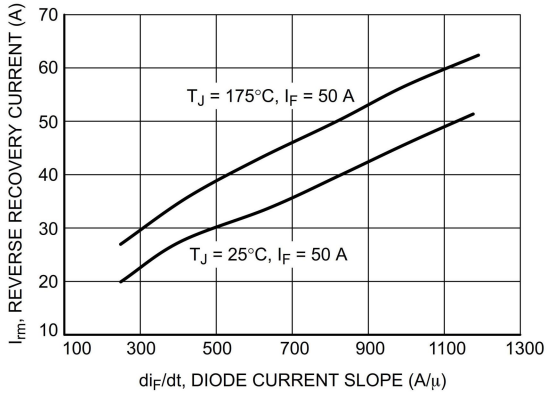
t_{rr} vs. di_F/dt (V_R = 400 V)



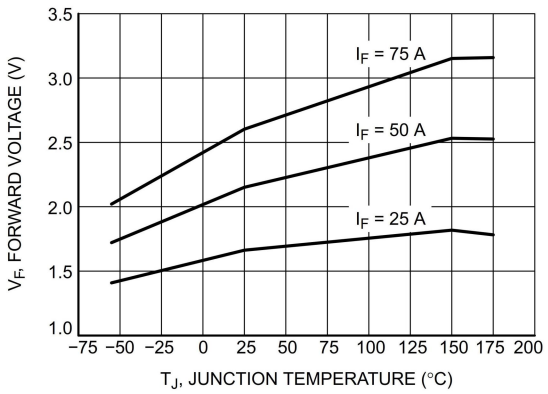
Q_{rr} vs. di_F/dt (V_R = 400 V)



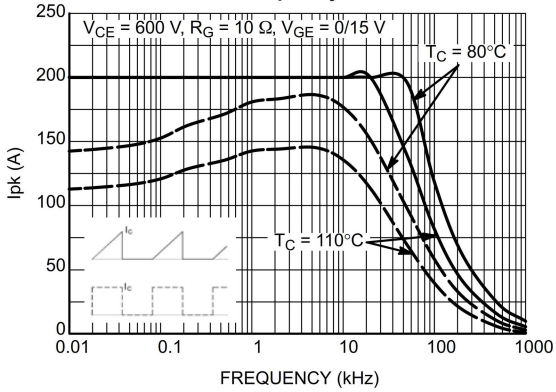
I_{rm} vs. di_F/dt (V_R = 400 V)



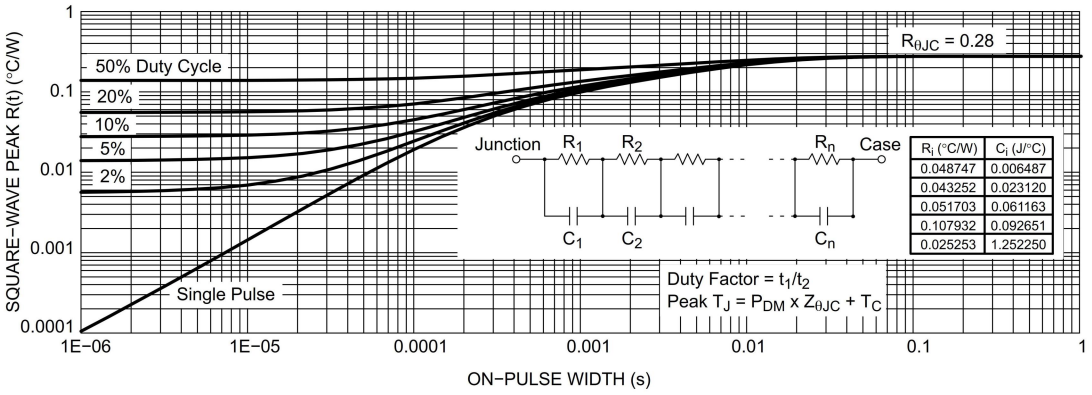
V_F vs. T_J



Collector Current vs. Switching Frequency

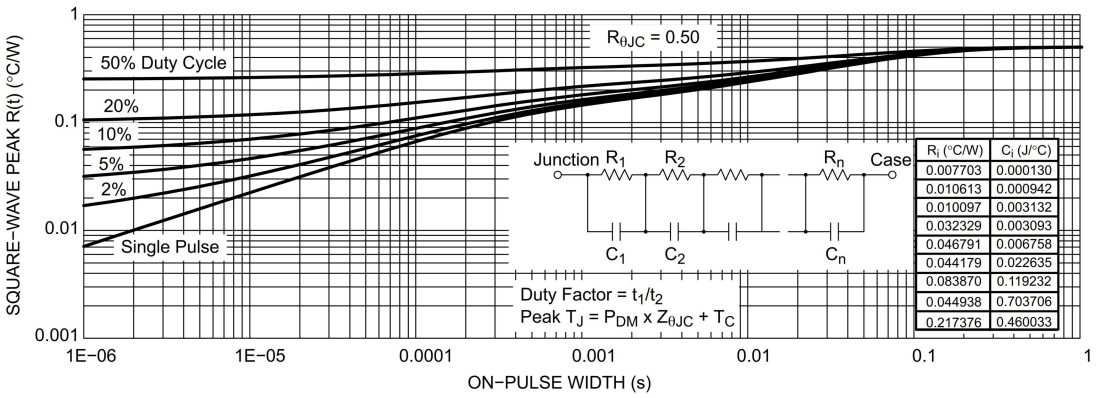


IGBT Transient Thermal Impedance



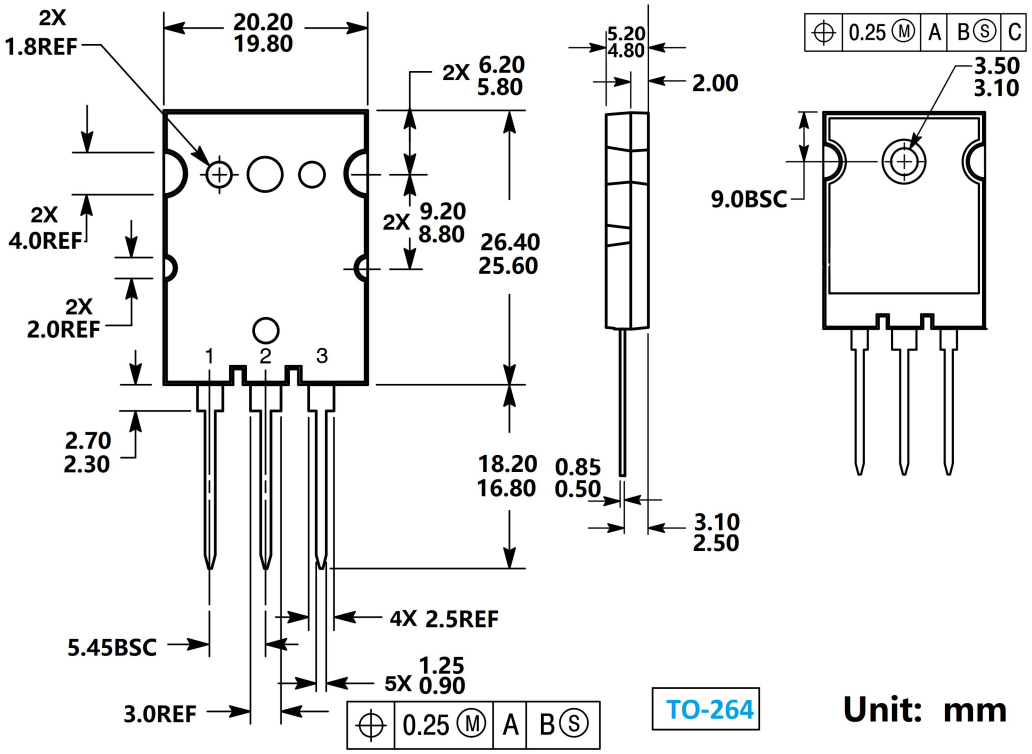
R_i (°C/W)	C_i (J/°C)
0.048747	0.006487
0.043252	0.023120
0.051703	0.061163
0.107932	0.092651
0.025253	1.252250

Diode Transient Thermal Impedance



R_i (°C/W)	C_i (J/°C)
0.007703	0.000130
0.010613	0.000942
0.010097	0.003132
0.032329	0.003093
0.046791	0.006758
0.044179	0.022635
0.083870	0.119232
0.044938	0.703706
0.217376	0.460033

Package Mechanical DATA



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