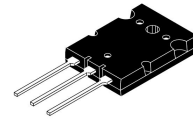


## Features

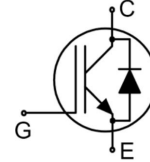
- $V_{CE(sat)(typ.)}=2.1V@V_{GE}=15V,I_C=50A$
- High speed switching
- Higher system efficiency
- Soft current turn-off wave forms



TO-264

## Applications

- General purpose inverters
- UPS



## Absolute Ratings (T<sub>c</sub>=25°C)

Parameter	Symbol	Value	Unit
Collector-Emmitter Voltage	$V_{CES}$	1200	V
*Collector Current-continuous	$I_C$ T=25°C T=100°C	80	A
		50	A
Collector Current-pulse(note 1)	$I_{CM}$	140	A
Diode Continuous forward current	$I_F$ T=100°C	50	A
Diode Maximum Forward Current (Note 1)	$I_{FM}$	140	A
Gate-Emmitter Voltage	$V_{GES}$	±30	V
Short Circuit Withstand Time	tsc	10	us
Power Dissipation(T <sub>c</sub> =25°C)	$P_D$ T <sub>c</sub> =25°C	320	W
Power Dissipation(T <sub>c</sub> =100°C)		130	W
Operating Temperature Range	$T_J$	-55~+150	°C
Storage Temperature Range	$T_{STG}$	-55~+150	°C
Maximum Lead Temperature for Soldering Purposes	$T_L$	300	°C

\*Collector current limited by maximum Junction temperature

## Electrical Characteristic(T<sub>C</sub>=25°C unless otherwise noted )

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
<b>Off-Characteristics</b>						
Collector-Emmitter Voltage	$BV_{CES}$	$I_C=250\mu A, V_{GE}=0V$	1200	-	-	V

Zero Gate Voltage Collector Current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V, T_c=25^\circ C$	-	-	250	$\mu A$
Gate-body leakage current	$I_{GES}$	$V_{CE}=0V, V_{GE}=\pm 30V$	-	-	$\pm 100$	nA
<b>On-Characteristics</b>						
Gate-Emmitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_c=250\mu A$	4.0	-	6.0	V
Collector-Emmitter saturation Voltage	$V_{CESAT}$	$V_{GE}=15V, I_c=50A, T_c=25^\circ C$	-	2.1	-	V
<b>Dynamic Characteristics</b>						
Input capacitance	$C_{ies}$	$V_{CE}=30V, V_{GE}=0V, f=1.0MHz, T_c=25^\circ C$	-	4120	-	pF
Output capacitance	$C_{oes}$		-	160	-	pF
Reverse transfer capacitance	$C_{res}$		-	100	-	pF
Total Gate Charge	$Q_g$	$V_{CC}=960V, I_c=50A, V_{GE}=15V, T_c=25^\circ C$	-	170	-	nC
Gate to emitter charge	$Q_{ge}$		-	40	-	
Gate to collector charge	$Q_{gc}$		-	80	-	
<b>Switching Characteristics</b>						
Turn-On delay time	$t_d(on)$	$V_{CC}=600V, I_c=50A, R_G=10\Omega, V_{GE}=15V$ Inductive load $T_c=25^\circ C$	-	50	-	ns
Turn-On rise time	$t_r$		-	80	-	ns
Turn-off delay time	$t_d(off)$		-	280	-	ns
Turn-off Fall time	$t_f$		-	30	-	ns
Turn-on energy	$E_{on}$		-	4.6	-	mJ
Turn-off energy	$E_{off}$		-	2.8	-	mJ
Total switching Energy	$E_{tot}$		-	7.4	-	mJ
<b>Anti-Paraller Diode Characteristics and Maximum Ratings</b>						
Diode Forward Voltage	$V_F$	$V_{GE}=0V, I_F=50A.$	-	2.3	3.2	V
Diode Reverse recovery time	$t_{rr}$	$V_{CE}=600V, I_F=50A$ $di_F/dt=200A/us$	-	250	-	ns
Reverse recovery charge	$Q_{rr}$		-	1350	-	nC
Diode Reverse recovery Current	$I_{rrm}$		-	10	-	A

## Thermal Characteristics

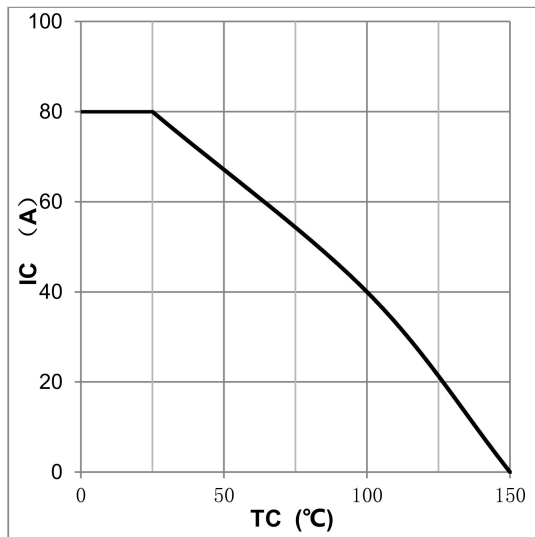
Symbol	Parameter	Max	Units
$R_{th\ j-c}$	Thermal Resistance, Junction to case for IGBT	0.38	$^{\circ}C/W$
$R_{th\ j-c}$	Thermal Resistance, Junction to case for Diode	0.5	$^{\circ}C/W$
$R_{th\ j-a}$	Thermal Resistance, Junction to Ambient	40	$^{\circ}C/W$

Notes:

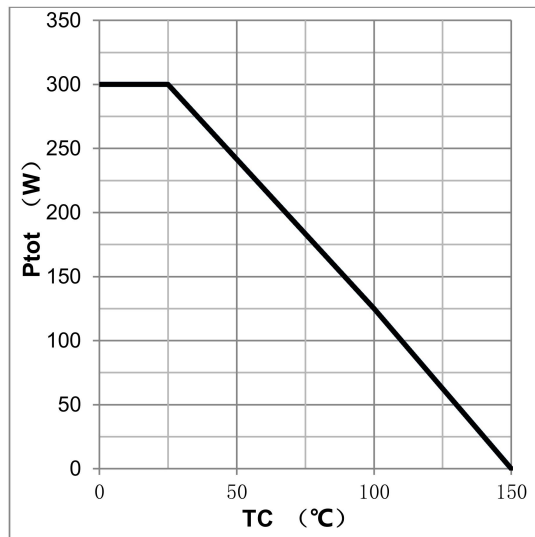
1: . Repetitive Rating: Pulse width limited by maximum junction temperature

## Electrical Characteristics(curves)

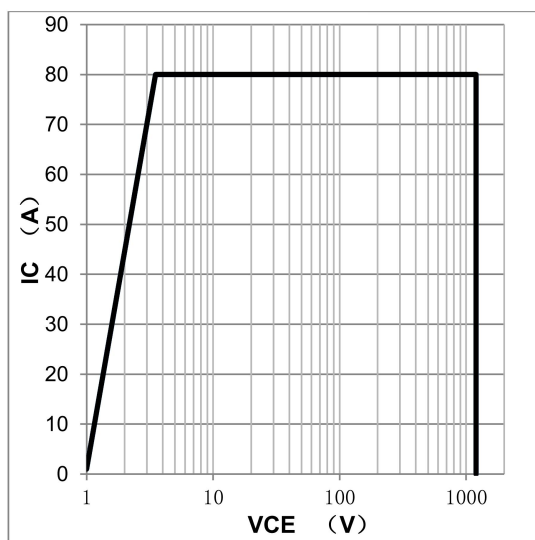
maximum DC collector current  
VS. case temperature



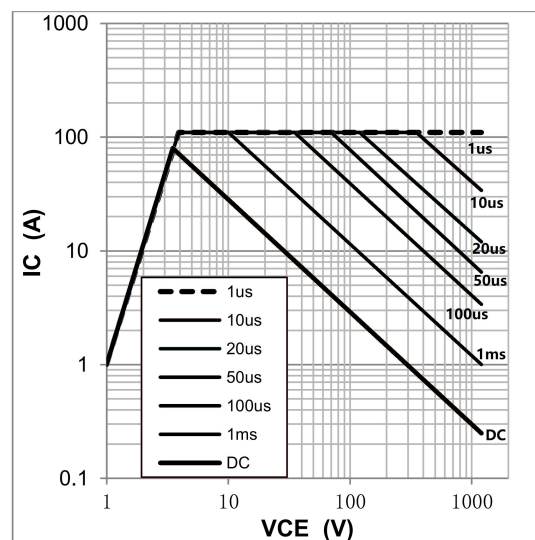
power dissipation VS. case temperature



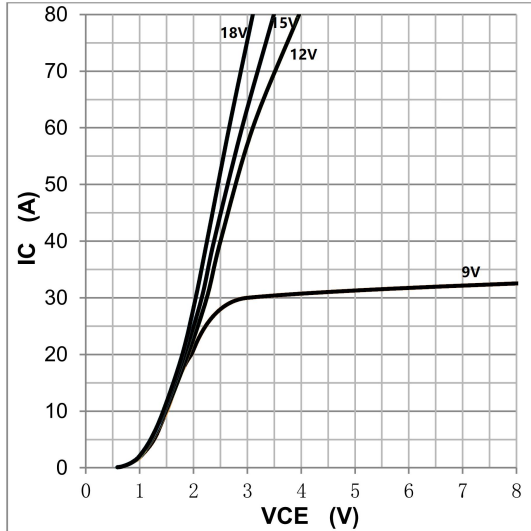
reverse bias SOA,  $T_J=150^{\circ}C$ ,  $V_{GE}=15V$



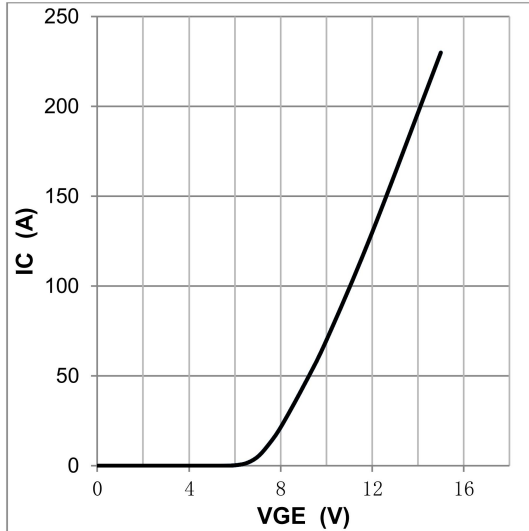
forward SOA,  $T_C=25^{\circ}C$ ,  $T_J \leq 150^{\circ}C$



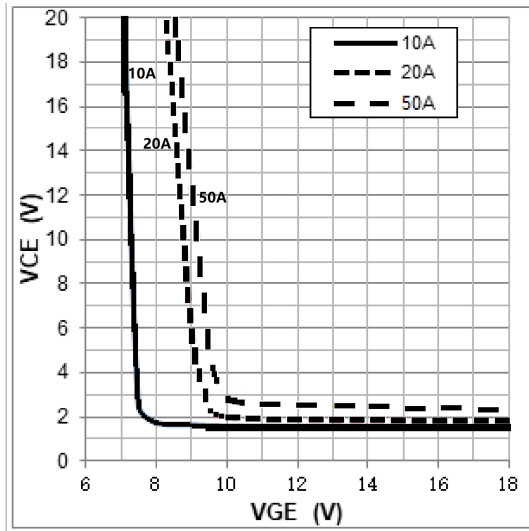
typical IGBT output characteristics,  
T<sub>J</sub>=25°C; t<sub>p</sub>=300us



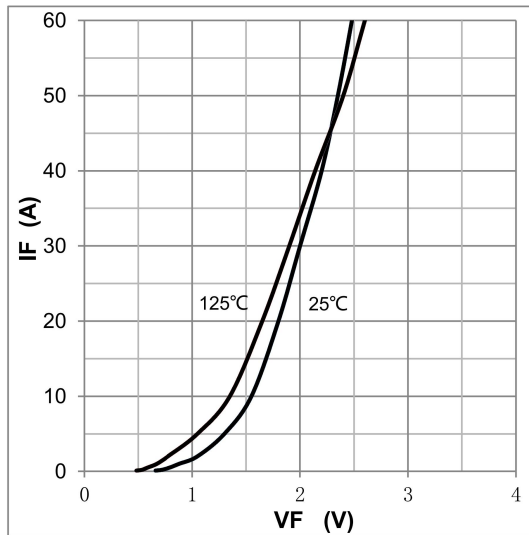
typical trans characteristics, V<sub>CE</sub>=20V, t<sub>p</sub>=20us



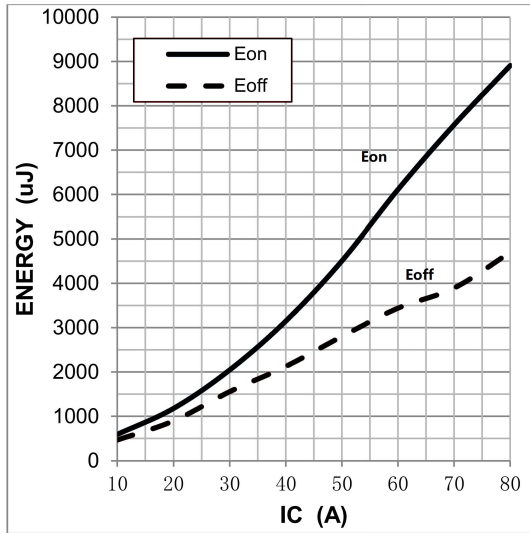
typical VCE VS. VGE, T<sub>J</sub>=25°C



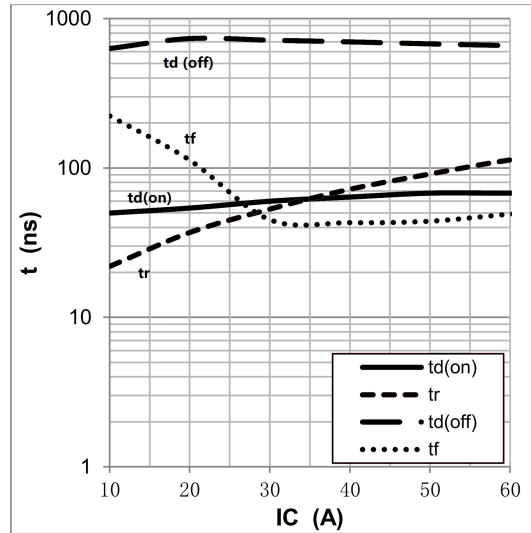
typical diode forward characteristic, t<sub>p</sub>=300us



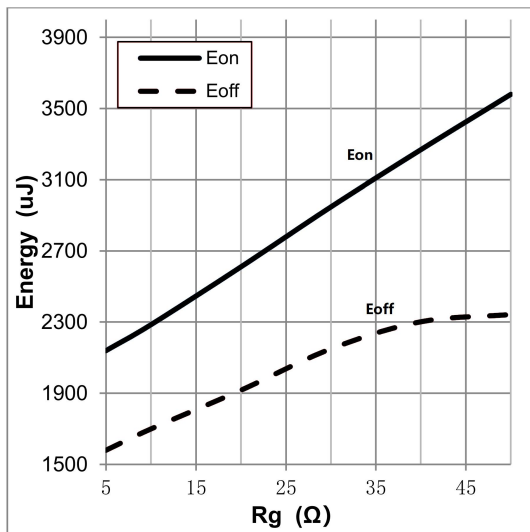
typical energy loss VS. IC, TC=25°C,  
L=500uH, VCE=600V, VGE=15V, Rg=28Ω



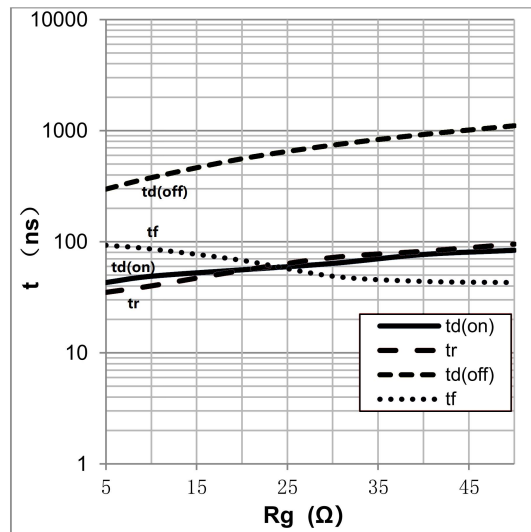
typical switching time VS. IC, TC=25°C,  
L=500uH, VCE=600V, VGE=15V, Rg=28Ω



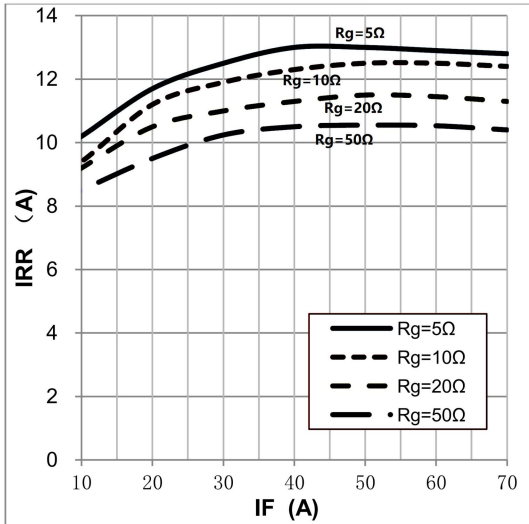
typical energy loss VS. Rg, TC=25°C,  
L=500uH, VCE=600V, VGE=15V, IC=50A



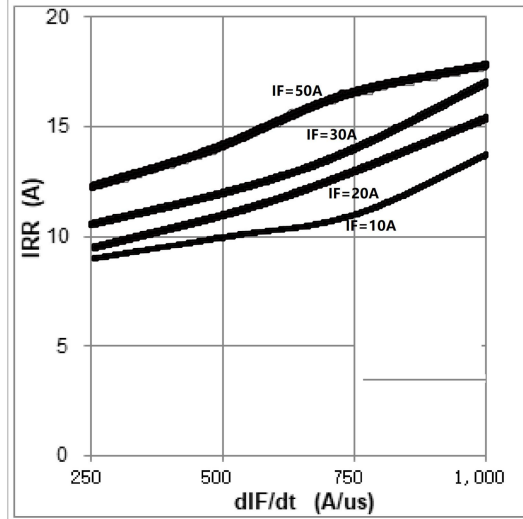
typical switching time VS. Rg, TC=25°C,  
L=500uH, VCE=600V, VGE=15V, IC=50A



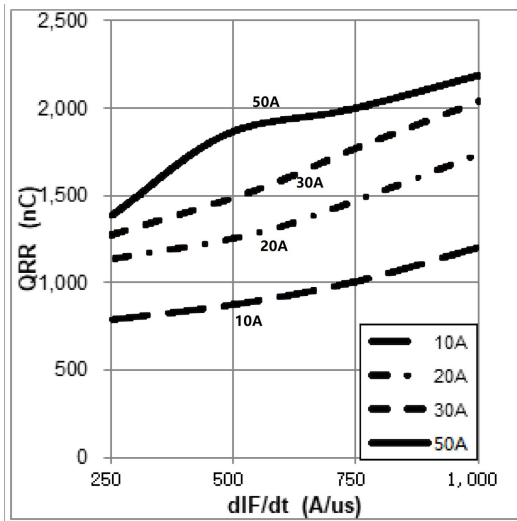
typical diode IRR VS. IF, TC=25°C  
VCC=600V, VGE=15V



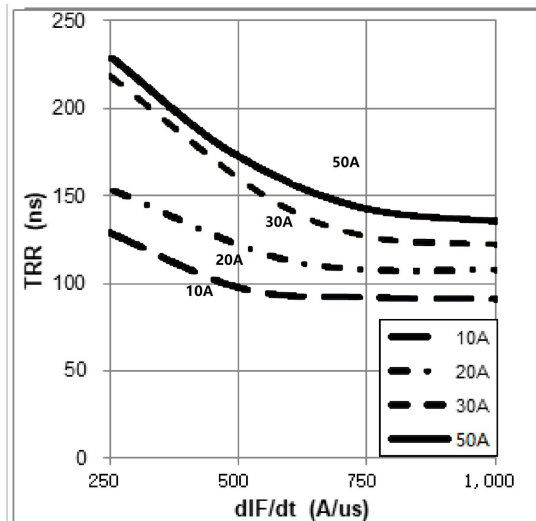
typical diode IRR VS. dIF/dt  
VCC=600V, VGE=15V



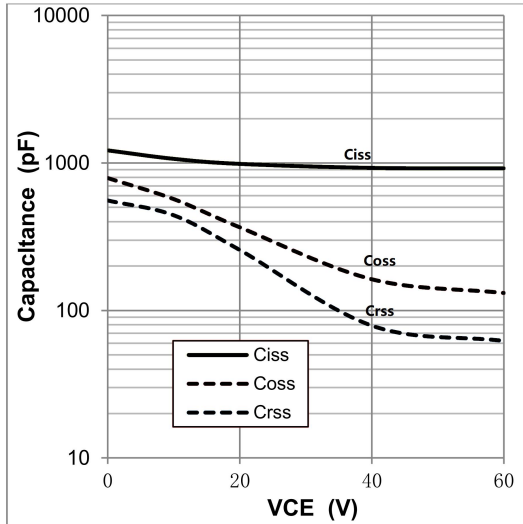
typical diode QRR VS. dIF/dt  
VCC=600V, VGE=15V



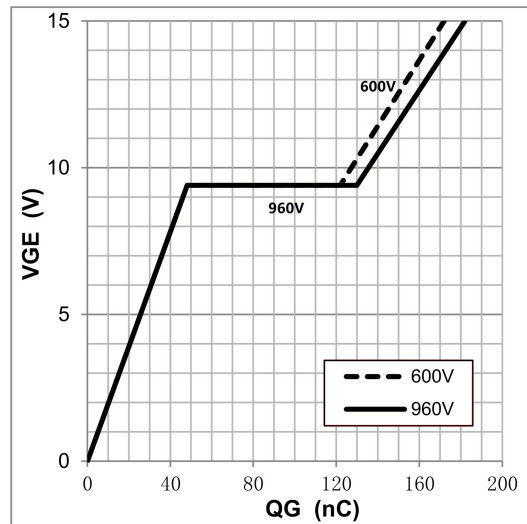
typical diode TRR VS. dIF/dt,  
VCC=600V, VGE=15V



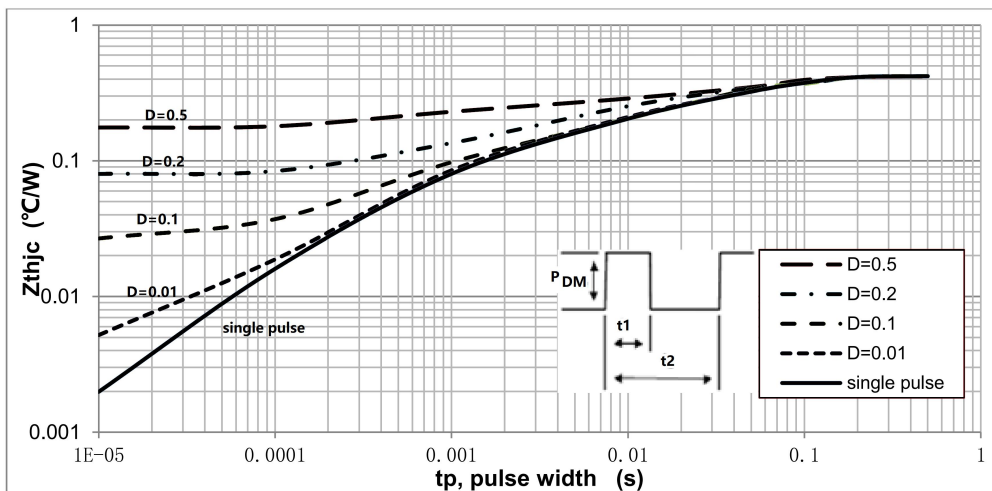
typical capacitance VS. VCE, VGE=0V, f=100kHz



typical gate charge VS. VGE, IC=50A



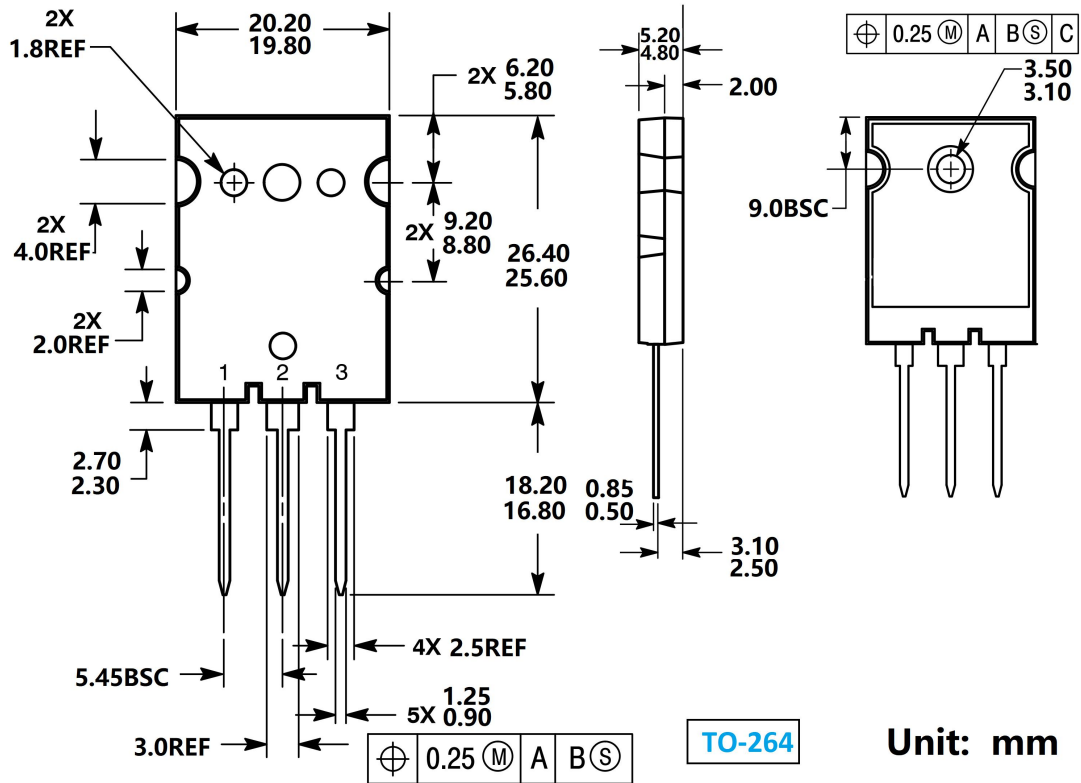
normalized transient thermal impedance, junction-to-case



Note1. Duty factor  $D = t_1/t_2$ ;

Note2: peak  $T_J = P_{DM} \times Z_{thjc} + T_C$

Package Mechanical DATA



Unit: mm



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