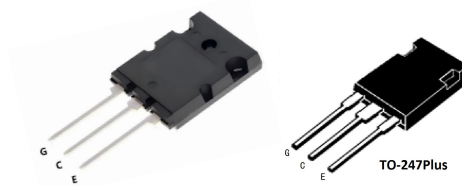


Features

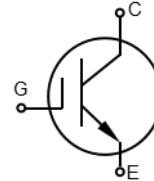
- High Blocking Voltage
- International Standard Package
- Low Conduction Losses
- High Current Handling Capability
- MOS Gate Turn-On, Drive Simplicity

M IGBT



Applications

- Switch-Mode and Resonant-Mode Power Supplies
- UPS
- Capacitor Discharge Circuits
- Laser Generators



Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-Emitter voltage		V_{CES}	2500	V
Gate-emitter voltage(Continuous)		V_{GES}	± 25	
Gate-emitter voltage(Transient)		V_{GEM}	± 35	
Collector current	$T_C = 25^\circ\text{C}$	I_C	130	A
	$T_C = 110^\circ\text{C}$		55	
Pulsed collector current($T_C = 25^\circ\text{C}$, 1ms)		I_{CM}	600	
Power dissipation	$T_C = 25^\circ\text{C}$	P_D	625	W
	$T_C = 100^\circ\text{C}$		313	
Operating Junction and storage temperature rang		T_J	-55 to 150	$^\circ\text{C}$
		T_{stg}	-55 to 150	
Maximum Lead Temperature for Soldering Purposes		T_L	300	$^\circ\text{C}$

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

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Static Characteristics							
Collector-emitter breakdown voltage	BV_{CES}	$I_C = 1\text{mA}$, $V_{GE} = 0\text{V}$		2500	-	-	V
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$, $I_C = 4\text{mA}$		3.5	-	6.0	
Zero gate voltage collector current	I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0\text{V}$	$T_J=25^{\circ}\text{C}$	-	-	50	μA
			$T_J=125^{\circ}\text{C}$	-	-	3	mA

Gate-emitter leakage current	I _{GES}	V _{GE} = ±20V, V _{CE} = 0V	-	-	±200	nA
Collector-emitter saturation voltage	V _{CE(sat)}	I _C = 55A,V _{GE} = 15V T _C = 25°C	-	5.3	7.7	V
		I _C = 55A, V _{GE} = 15V, T _C = 125°C	-	7.6	-	
Dynamic and Switching Characteristics						
Transconductance	g _{fs}	I _C =55A,V _{CE} =10V,Note 1	32	50		S
Input capacitance	C _{ies}	V _{CE} =25V, V _{GE} =0V, f=1.0MHz	-	7300	-	pF
Reverse transfer capacitance	C _{oes}		-	275	-	
Output capacitance	C _{res}		-	83	-	
Total gate charge	Q _g	V _{CE} =1000V, I _C = 55A, V _{GE} = 15V	-	335	-	nC
Gate to emitter Charge	Q _{ge}		-	47	-	
Gate to collector Charge	Q _{gc}		-	130	-	
Turn-on delay time	t _{d(on)}	V _{GE} = 15V, V _{CC} = 850V, I _C = 70A, R _G = 2Ω, Inductive Load, T _C = 25°C	-	54	-	ns
Rise time	t _r		-	307	-	
Turn-off delay time	t _{d(off)}		-	230	-	
Fall time	t _f		-	268	-	
Turn-on delay time	t _{d(on)}	V _{GE} = 15V, V _{CC} = 850V, I _C = 70A, R _G = 2Ω, Inductive Load, T _C =125°C	-	52	-	ns
Rise time	t _r		-	585	-	
Turn-off delay time	t _{d(off)}		-	215	-	
Fall time	t _f		-	260	-	

Notes:

1: Pulse Test, $t_s \leq 300\mu s$, Duty Cycle, $d \leq 2\%$

Additional provisions for lead-to-lead isolation are required at $V_{CE} > 1200V$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance junction-to-ambient	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal resistance junction-to-case for IGBT	$R_{\theta JC}$	0.24	

Order Message

Order Codes	Package
MSG55T250HLB3	TO-264
MSG55T250HLC1	TO-247Plus

Typical Performance Characteristics

Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

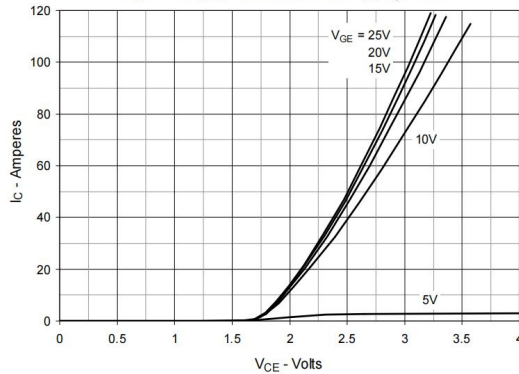


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

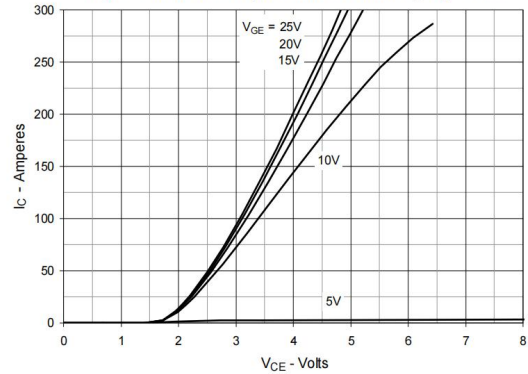


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

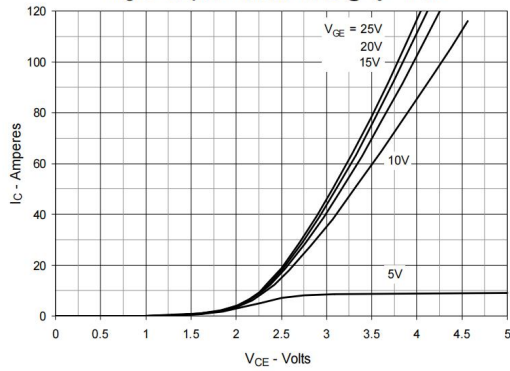


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

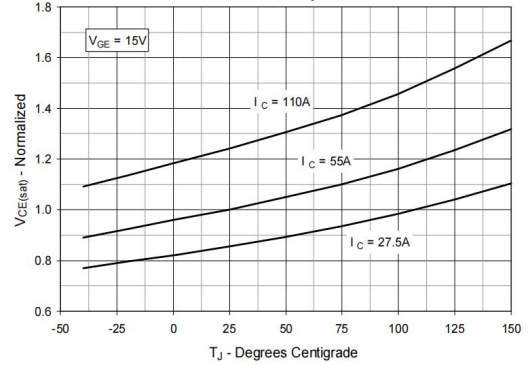


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

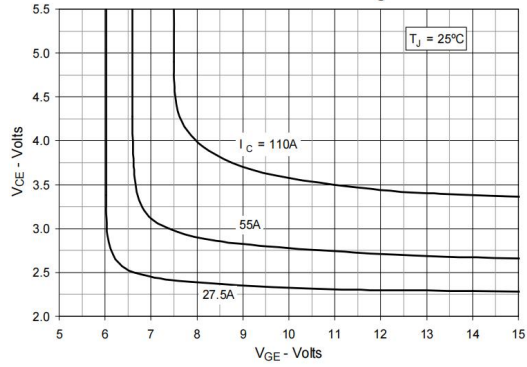


Fig. 6. Input Admittance

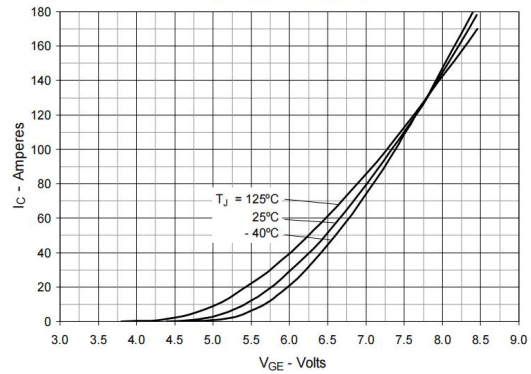


Fig. 7. Transconductance

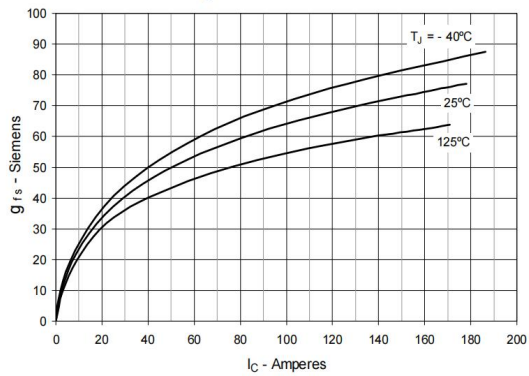


Fig. 8 Collector to Emitter Breakdown Voltage vs. Junction Temperature

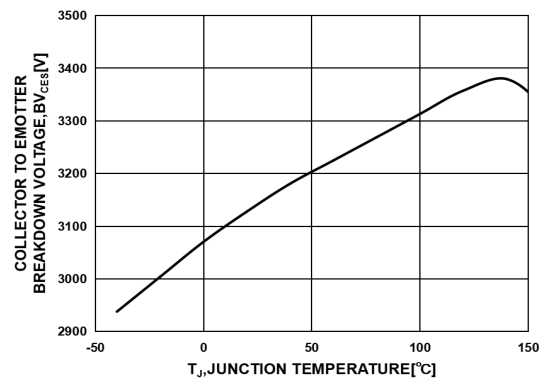


Fig. 9. Gate Charge

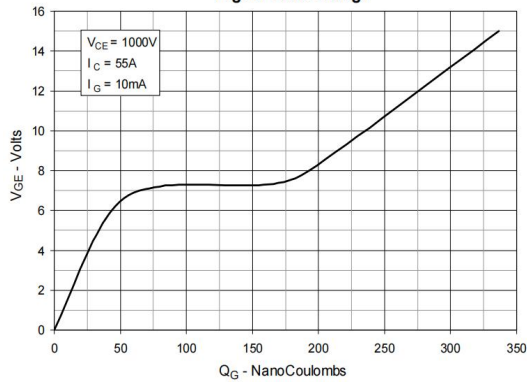


Fig. 10. Capacitance

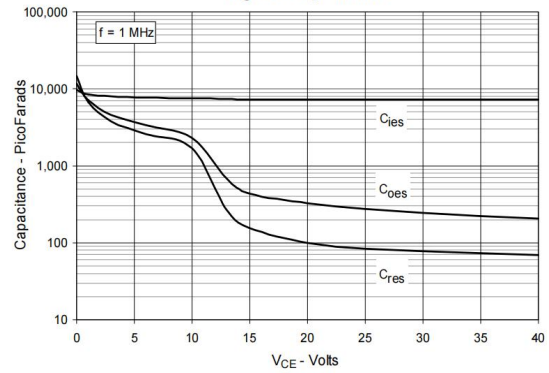


Fig. 11. Reverse-Bias Safe Operating Area

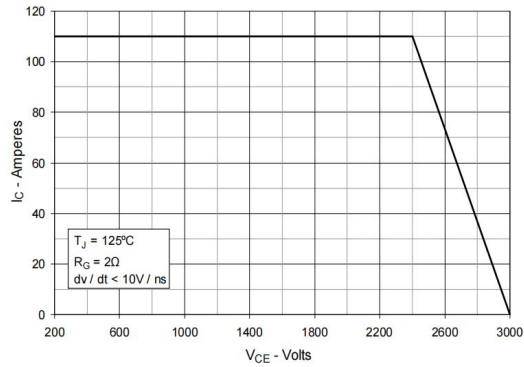


Fig. 12. Maximum Transient Thermal Impedance

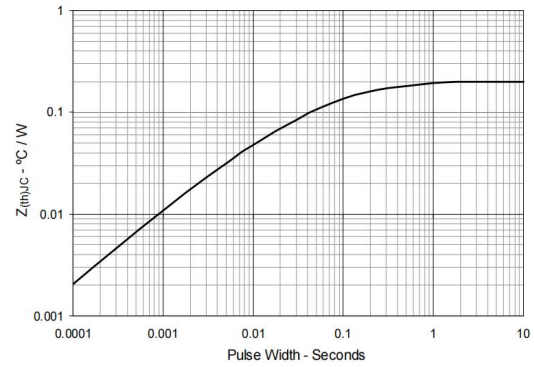


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

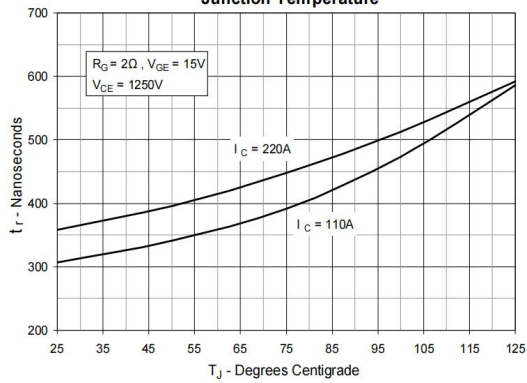


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

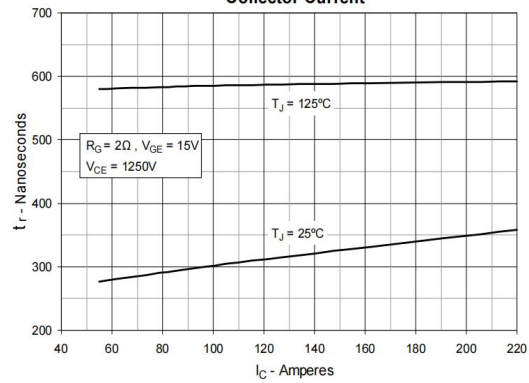


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

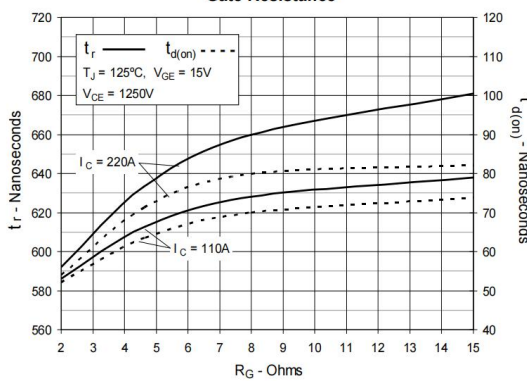


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

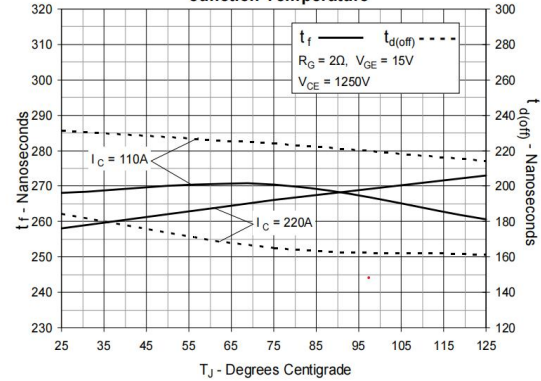


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

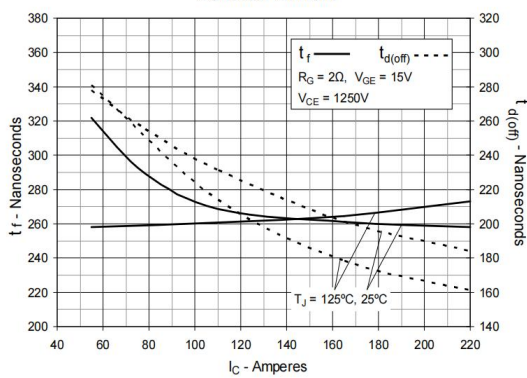


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

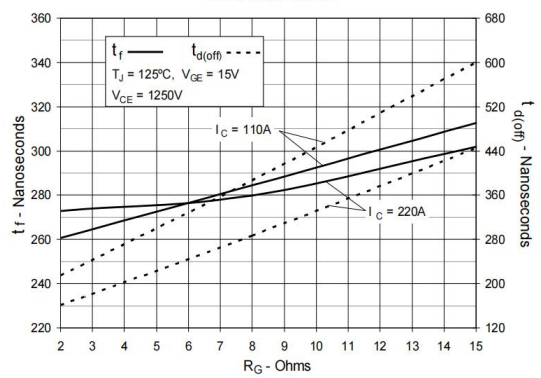


Fig. 19. Forward-Bias Safe Operating Area @ $T_C = 25^\circ C$

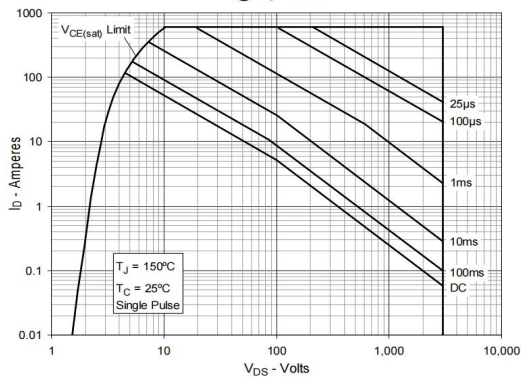


Fig. 20. Forward-Bias Safe Operating Area @ $T_C = 75^\circ C$

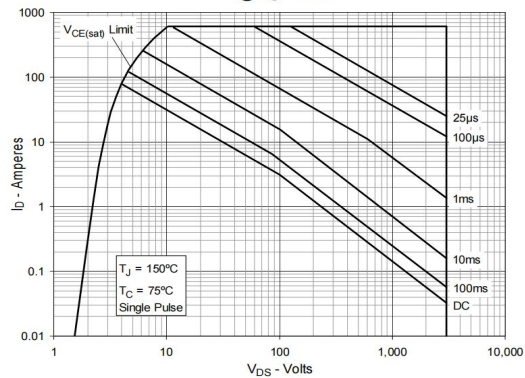
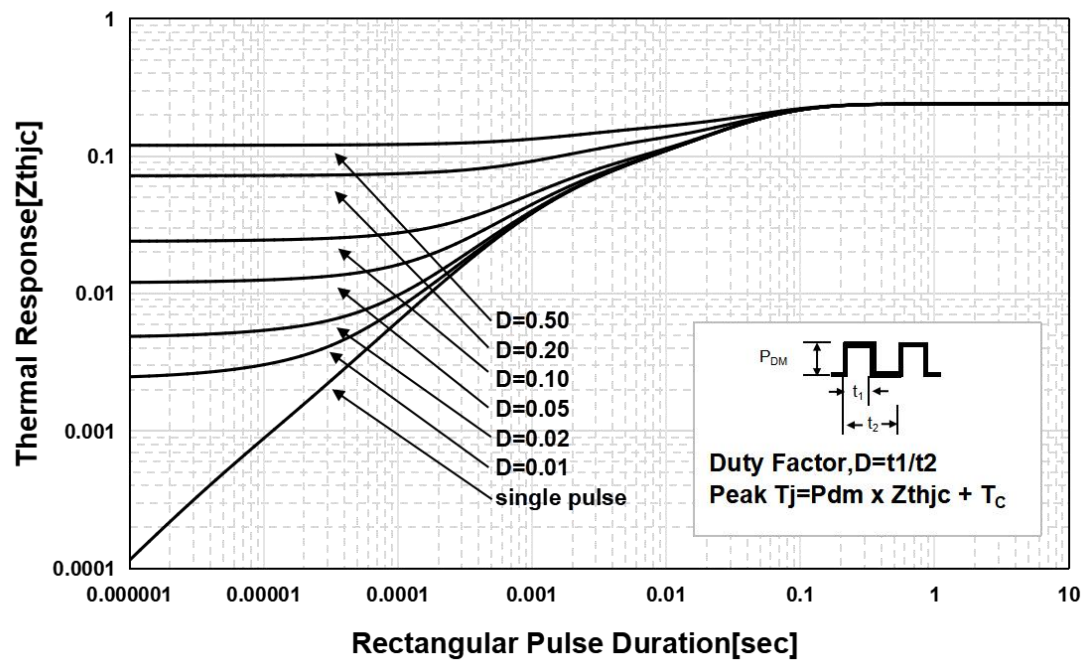
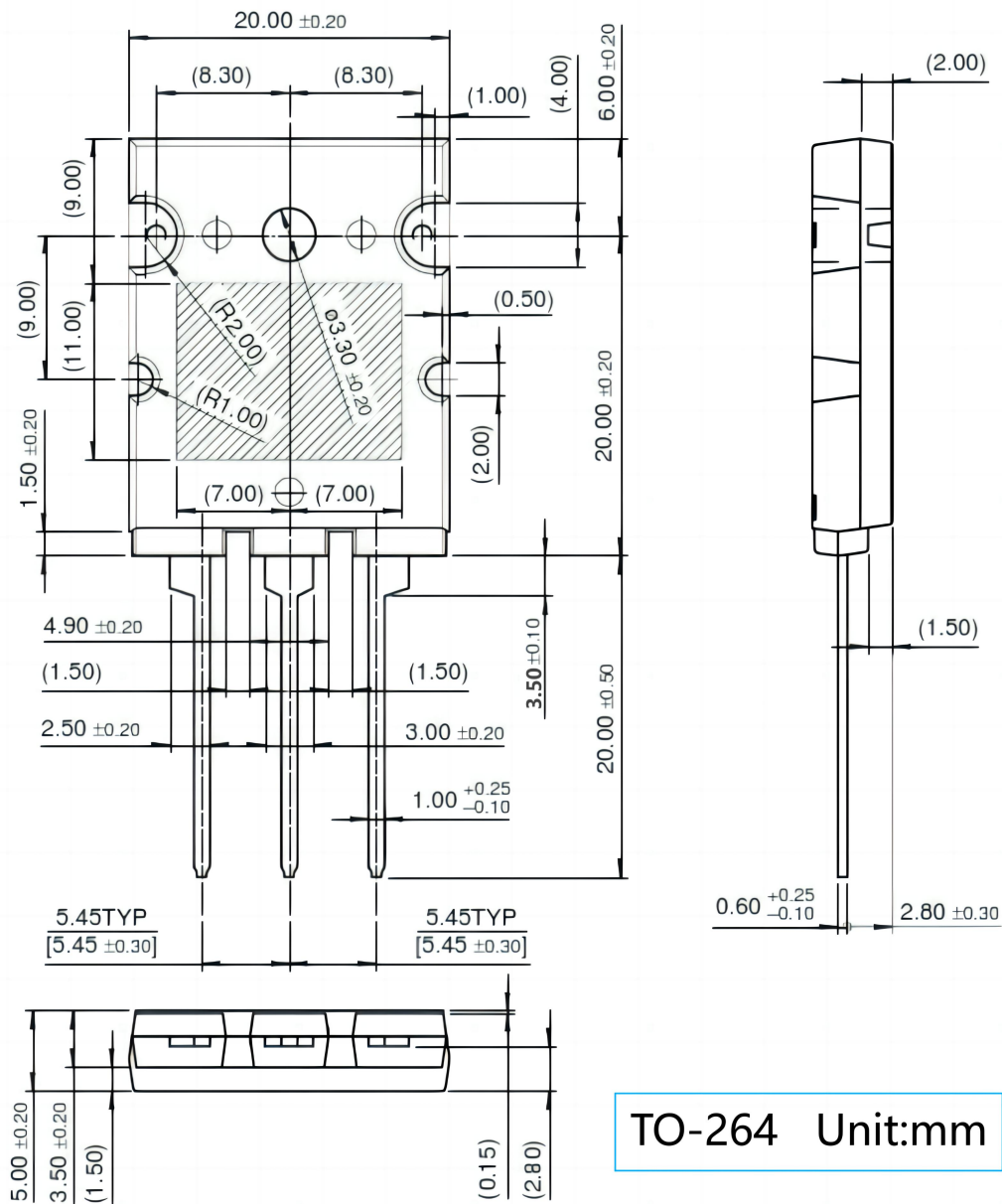


Fig. 21. Transient Thermal Impedance of IGBT



Package outline dimension



TO-264 Unit:mm

