

“HALF-BRIDGE” IGBT

Features

- IGBT NPT Technology
- 10 μ s Short Circuit Capability
- Low Turn-off losses
- Short tail current
- Positive $V_{CE(sat)}$ temperature coefficient

Applications

- AC & DC Motor controls
- General purpose inverters
- Optimized for high current inverter (AC TIG Welding machines)
- Servo Controls
- UPS, Robotics

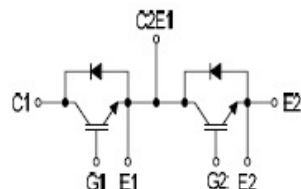
$$V_{CES} = 1200V$$

$$I_c = 150A$$

$$V_{CE(sat)} \text{ typ.} = 2.8V$$



Package : V3



Absolute Maximum Ratings @ $T_j=25^\circ\text{C}$ (per leg)

Symbol	Parameter	Condition	Ratings	Unit
V_{CES}	Collector to emitter voltage	$V_{GE}=0V, I_c=500\mu A$	1200	V
V_{GES}	Gate emitter voltage		± 20	V
I_c	Continuous collector current	$T_c = 75^\circ\text{C} (25^\circ\text{C})$	150 (200)	A
I_{CP}	Pulsed collector current	$T_c = 25^\circ\text{C}$	300	A
I_F	Diode continuous forward current	$T_c = 75^\circ\text{C} (25^\circ\text{C})$	150 (200)	A
I_{FM}	Diode maximum forward current	$T_c = 25^\circ\text{C}$	400	A
t_p	Short circuit test, $V_{GE}=15V, V_{CC}=360V$	$T_c = 100^\circ\text{C}$	10	μs
V_{iso}	Isolation voltage test	AC @ 1 minute	2500	V
P_D	Maximum power dissipation	$T_c = 25^\circ\text{C}$	1250	W
T_j	Junction temperature		-40 ~ 150	$^\circ\text{C}$
T_{stg}	Storage temperature		-40 ~ 125	$^\circ\text{C}$
Weight	Weight of module		360	g
Md	Mounting torque with screw : M6		4.0	Nm
	Terminal connection torque : M6		4.0	Nm

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

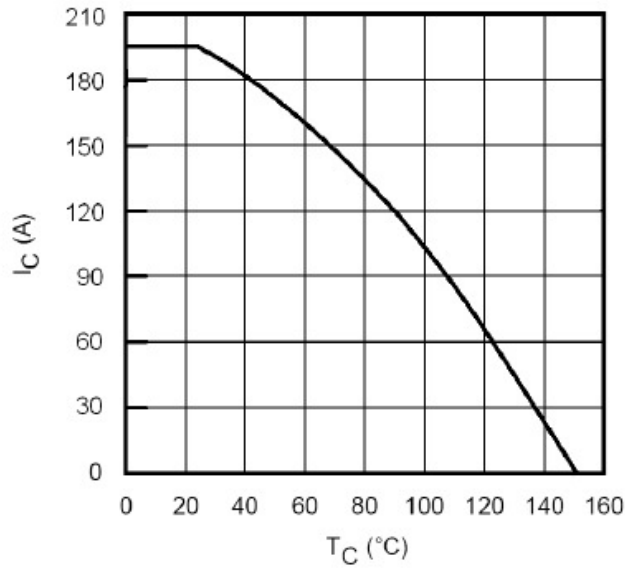
Symbol	Parameters	Min	Typ	Max	Unit	Test conditions
$V_{CE(sat)}$	Collector to emitter saturation voltage	-	2.8	3.3	V	$I_c = 150A, V_{GE} = 15V$
$V_{GE(th)}$	Gate threshold voltage	3.5	5.0	6.5		$V_{CE} = V_{GE}, I_c = 500\mu A$
I_{CES}	Zero gate voltage collector current	-	-	500	μA	$V_{GE} = 0V, V_{CE} = 1200V$
I_{GES}	Gate to emitter leakage current	-	-	2.0	μA	$V_{CE} = 0V, V_{GE} = \pm 20V$
V_F	Diode forward voltage drop	-	2.3	2.7	V	$I_c = 150A$

Switching Characteristic @ $T_j = 25^\circ\text{C}$ (unless otherwise specified)

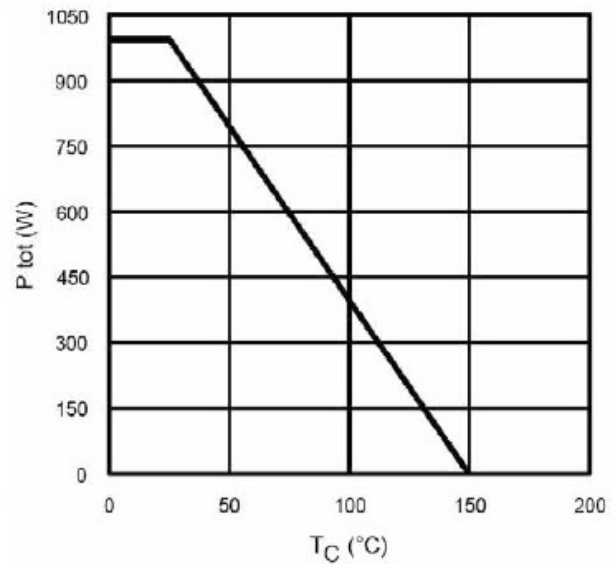
Symbol	Parameters	Min	Typ	Max	Unit	Test conditions
C_{ies}	Input capacitance	-	8600	-	pF	$V_{CC} = 30V, V_{GE} = 0V$ $f = 1.0\text{MHz}$
C_{oss}	Output capacitance	-	790	-		
C_{res}	Reverse transfer capacitance	-	320	-		
$t_{d(on)}$	Turn-on delay time	-	72	94	ns	$T_j = 125^\circ\text{C}, V_{CC} = 600V$ $I_C = 150A, V_{GE} = 15V$ $R_G = 4.7\Omega$
t_r	Rise time	-	32	45		
$t_{d(off)}$	Turn-off delay time	-	366	400		
t_f	Fall time	-	45	58	ns	$T_j = 125^\circ\text{C}, V_{CC} = 600V$ $I_F = 120A, V_{GE} = 15V$ $R_G = 4.7\Omega$
I_{rr}	Diode peak reverse recovery current	-	50	-	A	
t_{rr}	Diode reverse recovery time	-	180	-	ns	

Thermal Characteristic Values

Symbol	Parameters	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-Case (IGBT Part, Per 1/2 Module)	-	-	0.1	$W/^\circ\text{C}$
$R_{\theta JC}$	Junction-to-Case (Diode Part, Per 1/2 Module)	-	-	0.24	
$R_{\theta CS}$	Case-to-Heat Sink (Conductive grease applied)	-	0.03	-	



**Fig 1. Maximum DC Collector Current
vs. Case Temperature**



**Fig 2. Power Dissipation vs. Case
Temperature**

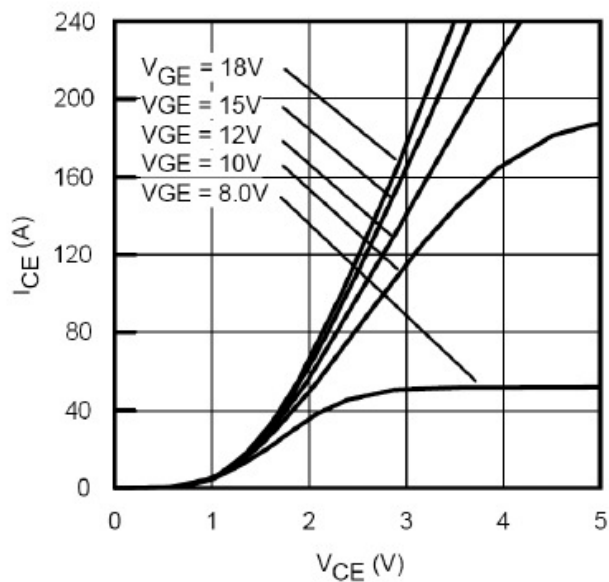


Fig 3. Typ. IGBT Output Characteristics
 $T_J = 25^{\circ}\text{C}; t_p = 80\mu\text{s}$

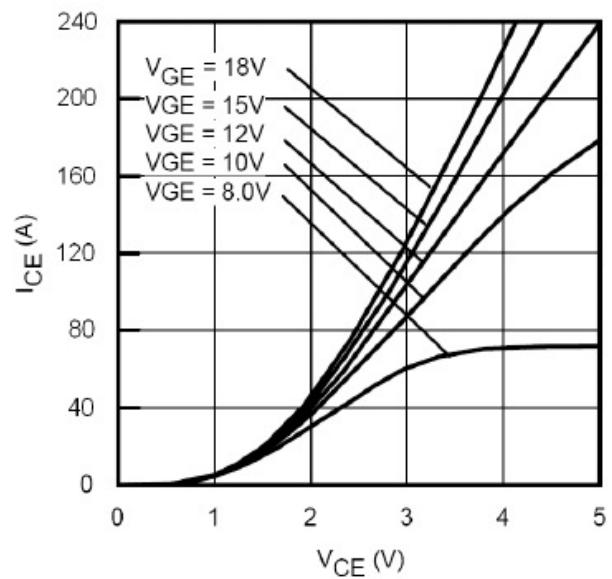


Fig 4. Typ. IGBT Output Characteristics
 $T_J = 125^{\circ}\text{C}; t_p = 80\mu\text{s}$

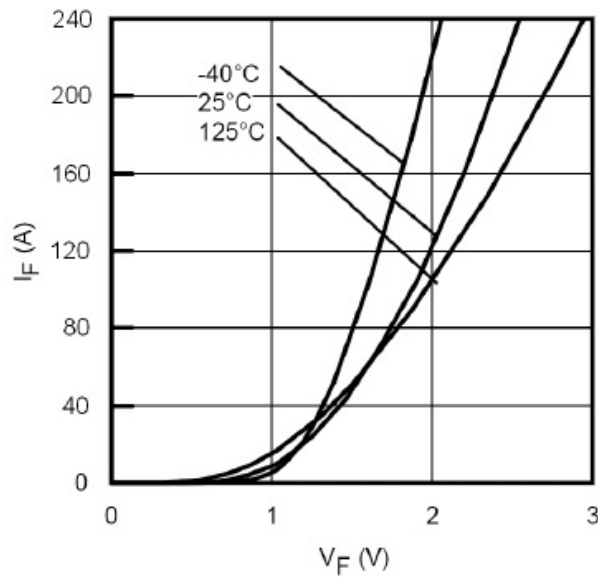


Fig 5. Typ. Diode Forward Characteristics
 $t_p = 80\mu s$

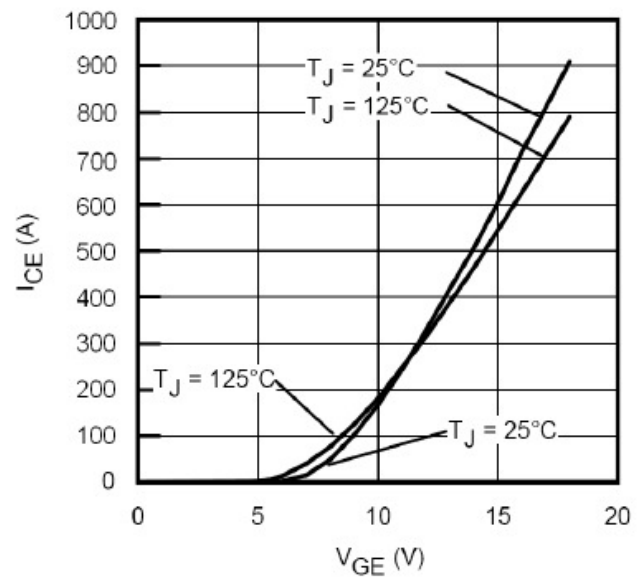


Fig 6. Typ. Transfer Characteristics
 $V_{CE} = 50V$; $t_p = 10\mu s$

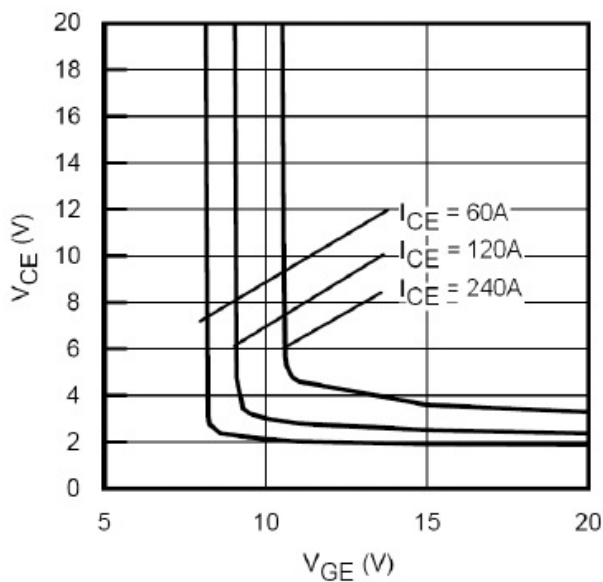


Fig 7. Typical V_{CE} vs. V_{GE}
 $T_J = 25^\circ C$

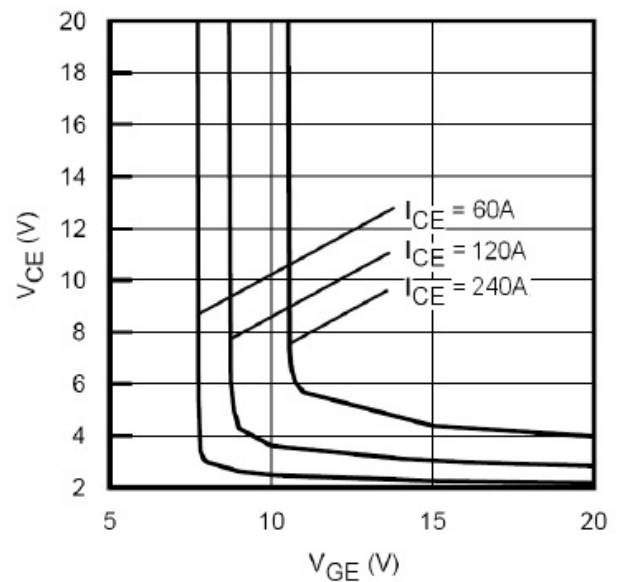


Fig 8. Typical V_{CE} vs. V_{GE}
 $T_J = 125^\circ C$

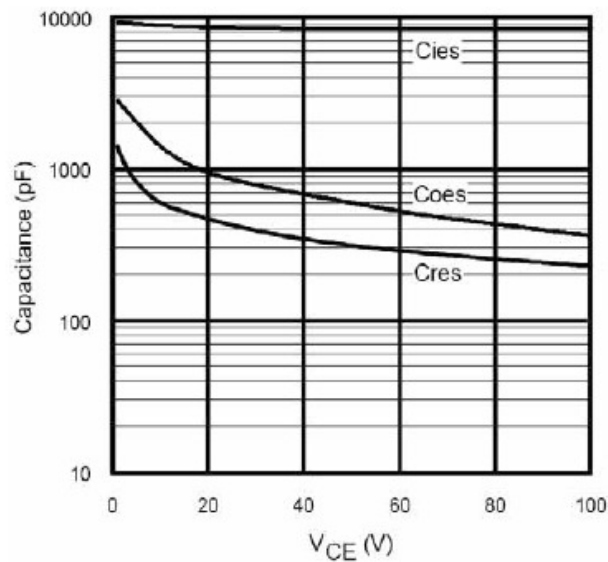


Fig 9. Typ. Capacitance vs. V_{CE}

$V_{GE} = 0V$; $f = 1MHz$

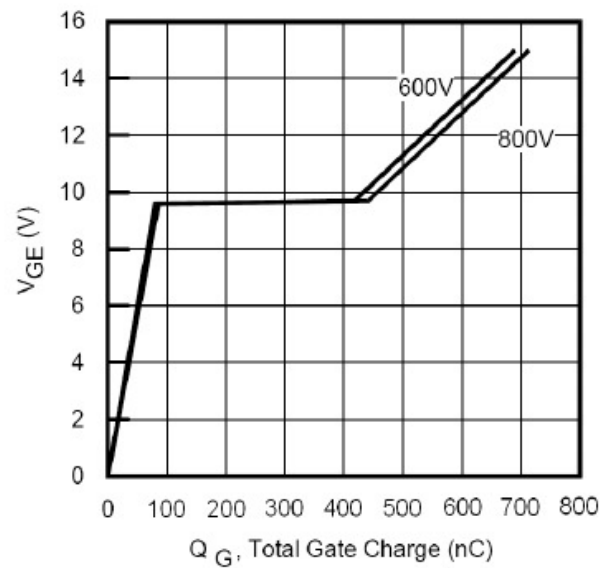


Fig 10. Typical Gate Charge vs. V_{GE}

$I_{CE} = 120A$; $L = 600\mu H$

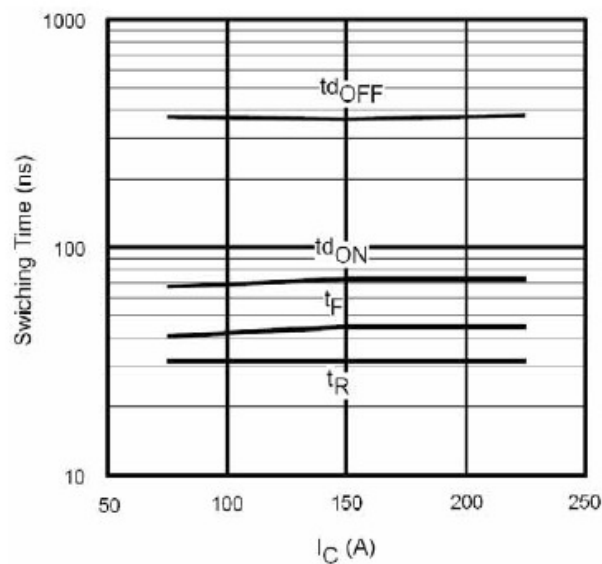


Fig 11. Typ. Switching Time vs. I_C

$T_J = 125^\circ C$; $L = 200\mu H$; $V_{CE} = 600V$

$R_G = 4.7\Omega$; $V_{GE} = 15V$

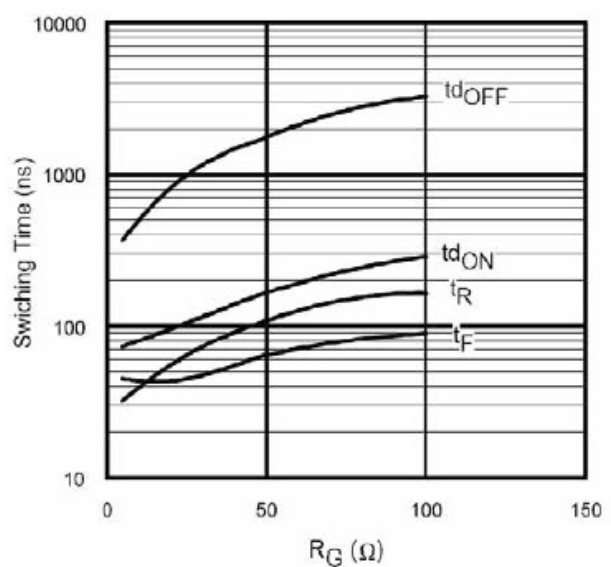


Fig 12. Typ. Switching Time vs. R_G

$T_J = 125^\circ C$; $L = 200\mu H$; $V_{CE} = 600V$

$I_{CE} = 150A$; $V_{GE} = 15V$

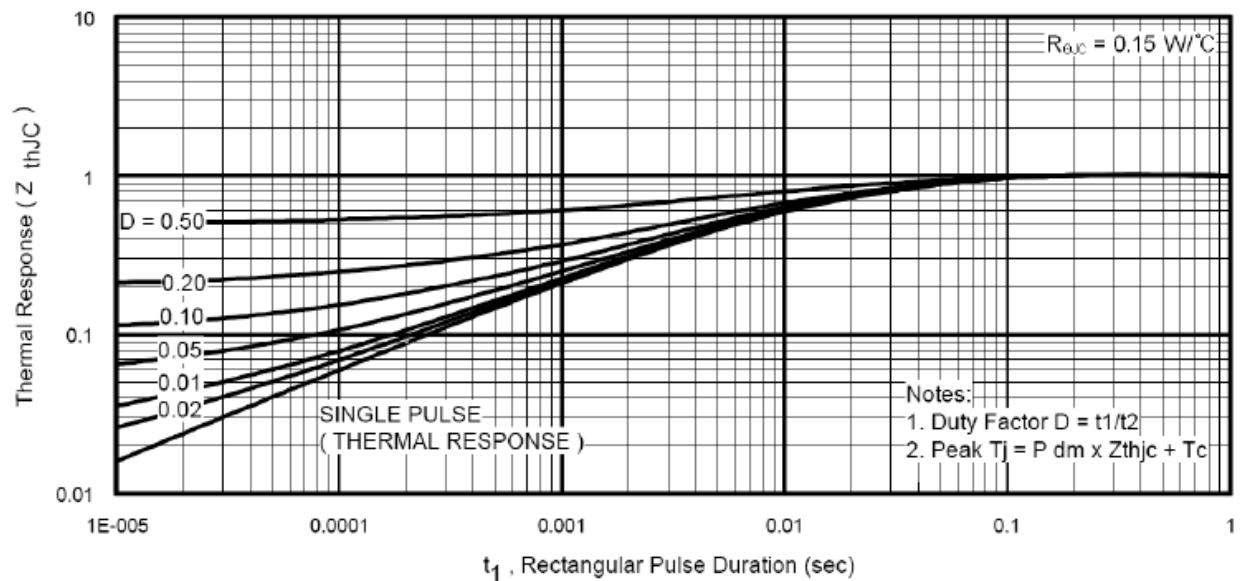


Fig 13. Normalized Transient Thermal Impedance, Junction-to-Case (IGBT)

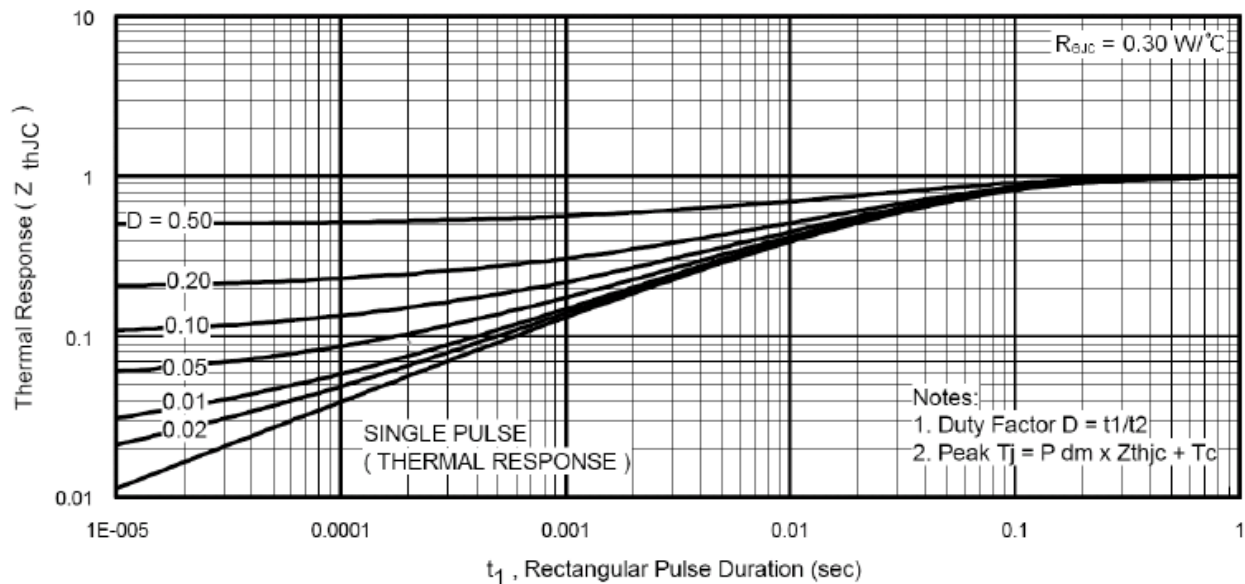
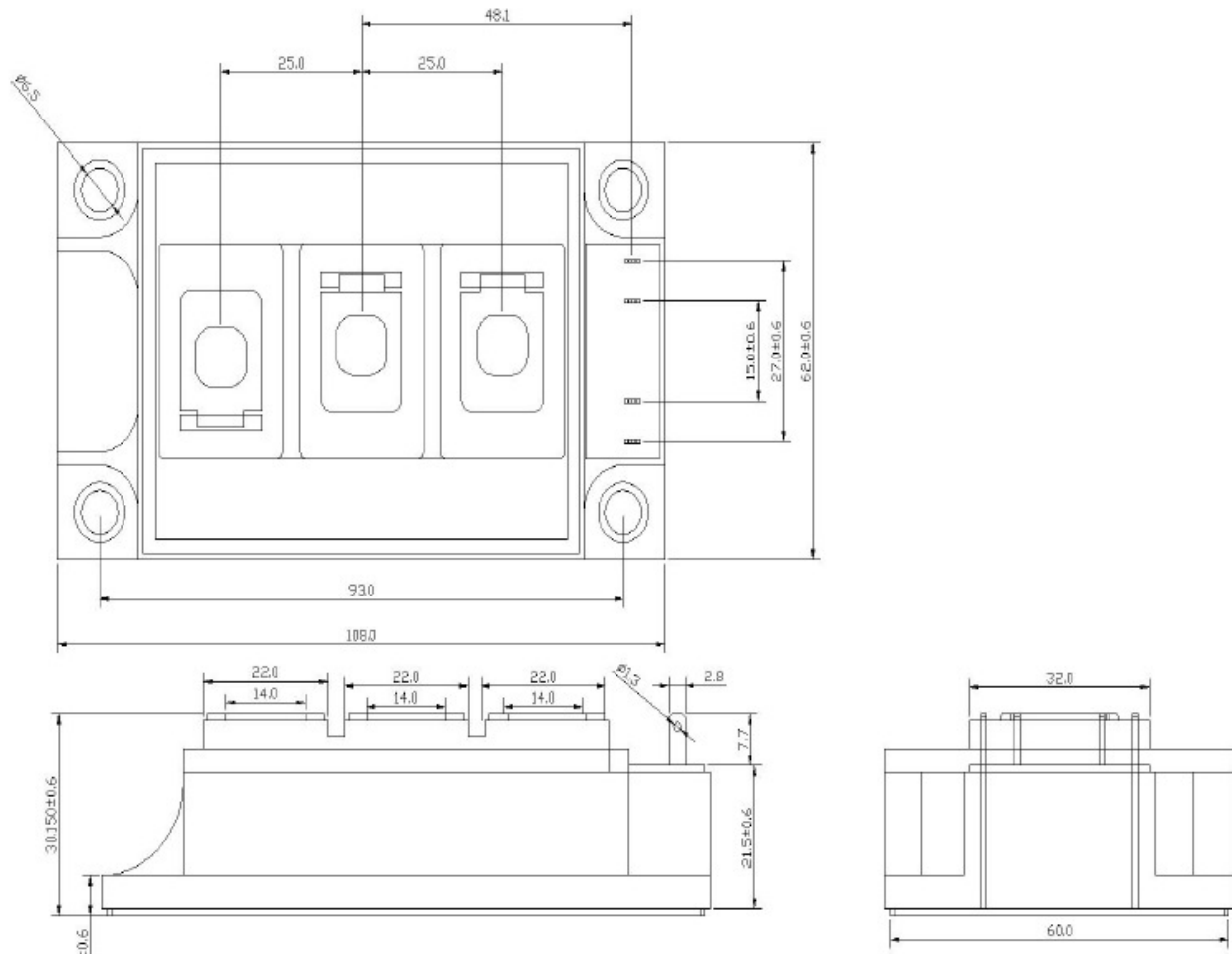


Fig 14. Normalized Transient Thermal Impedance, Junction-to-Case (DIODE)

Package Outline (dimensions in mm)



* Data and specifications subject to change without notice.