

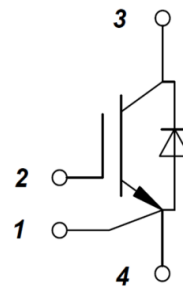
## PRODUCT FEATURES

- IGBT CHIP(Trench+Field Stop technology)
- Low switching losses
- Low saturation voltage and positive temperature coefficient
- Fast switching and short tail current
- Free wheeling diodes with fast and soft reverse recovery
- Popular SOT-227 Package



## APPLICATIONS

- AC motor control
- Motion/servo control
- Inverter and power supplies



## IGBT

ABSOLUTE MAXIMUM RATINGS( $T_C=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
$V_{CES}$	Collector Emitter Voltage	$T_J=25^{\circ}\text{C}$	1200	V
$V_{GES}$	Gate Emitter Voltage		$\pm 20$	
$I_C$	DC Collector Current	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	110	A
		$T_C=95^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	75	
$I_{CM}$	Repetitive Peak Collector Current	$t_p=1\text{ms}$	150	
$P_{tot}$	Power Dissipation Per IGBT	$T_C=25^{\circ}\text{C}, T_{Jmax}=175^{\circ}\text{C}$	385	W

## Diode

ABSOLUTE MAXIMUM RATINGS ( $T_C=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
$V_{RRM}$	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current		75	A
$I_{FRM}$	Repetitive Peak Forward Current	$t_p=1\text{ms}$	150	
$I^2t$		$T_J=125^{\circ}\text{C}, t=10\text{ms}, V_R=0\text{V}$	1250	$\text{A}^2\text{S}$

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# MMG75J120U6TC

## IGBT

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit	
$V_{GE(th)}$	Gate Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=3\text{mA}$	5.0	5.8	6.5	V	
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	$I_C=75\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		1.8	2.25		
		$I_C=75\text{A}, V_{GE}=15\text{V}, T_J=125^\circ\text{C}$		2.1			
		$I_C=75\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		2.15			
$I_{CES}$	Collector Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA	
		$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$			10		
$I_{GES}$	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}, T_J=25^\circ\text{C}$	-400		400	nA	
$R_{gint}$	Integrated Gate Resistor			5		$\Omega$	
$Q_g$	Gate Charge	$V_{CE}=600\text{V}, I_C=75\text{A}, V_{GE}=15\text{V}$		0.4		$\mu\text{C}$	
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		5		nF	
$C_{res}$	Reverse Transfer Capacitance				220		pF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=600\text{V}, I_C=75\text{A}$ $R_G=7.5\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$		120		ns
			$T_J=125^\circ\text{C}$		140		ns
			$T_J=150^\circ\text{C}$		150		ns
$t_r$	Rise Time		$T_J=25^\circ\text{C}$		38		ns
			$T_J=125^\circ\text{C}$		42		ns
			$T_J=150^\circ\text{C}$		44		ns
$t_{d(off)}$	Turn off Delay Time	$T_J=25^\circ\text{C}$		300		ns	
		$T_J=125^\circ\text{C}$		350		ns	
		$T_J=150^\circ\text{C}$		360		ns	
$t_f$	Fall Time	$T_J=25^\circ\text{C}$		100		ns	
		$T_J=125^\circ\text{C}$		180		ns	
		$T_J=150^\circ\text{C}$		220		ns	
$E_{on}$	Turn on Energy	$V_{CC}=600\text{V}, I_C=75\text{A}$ $R_G=7.5\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=125^\circ\text{C}$		11		mJ
			$T_J=150^\circ\text{C}$		12		mJ
$E_{off}$	Turn off Energy		$T_J=125^\circ\text{C}$		6.3		mJ
			$T_J=150^\circ\text{C}$		6.9		mJ
$I_{SC}$	Short Circuit Current		$tp_{sc} \leq 10\mu\text{S}, V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}, V_{CC}=800\text{V}$		310		A
$R_{thJC}$	Junction to Case Thermal Resistance (Per IGBT)				0.39	K/W	

## Diode

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$V_F$	Forward Voltage	$I_F=75\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.75	2.15	V
		$I_F=75\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.55		
		$I_F=75\text{A}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$		1.50		
$t_{rr}$	Reverse Recovery Time	$I_F=75\text{A}, V_R=600\text{V}$ $dI_F/dt=-1700\text{A}/\mu\text{s}$ $T_J=150^\circ\text{C}$		470		ns
$I_{RRM}$	Max. Reverse Recovery Current			85		A
$Q_{RR}$	Reverse Recovery Charge			17.4		$\mu\text{C}$
$E_{rec}$	Reverse Recovery Energy			6.1		mJ
$R_{thJCD}$	Junction to Case Thermal Resistance (Per Diode)				0.6	K/W

# MMG75J120U6TC

## MODULE CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
$T_{Jmax}$	Max. Junction Temperature		175	°C
$T_{Jop}$	Operating Temperature		-40~150	
$T_{stg}$	Storage Temperature		-40~125	
$V_{isol}$	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	3000	V
Torque	to heatsink	Recommended (M4)	0.7~1.1	Nm
	to terminal	Recommended (M4)	0.7~1.1	Nm
Weight			26.5	g

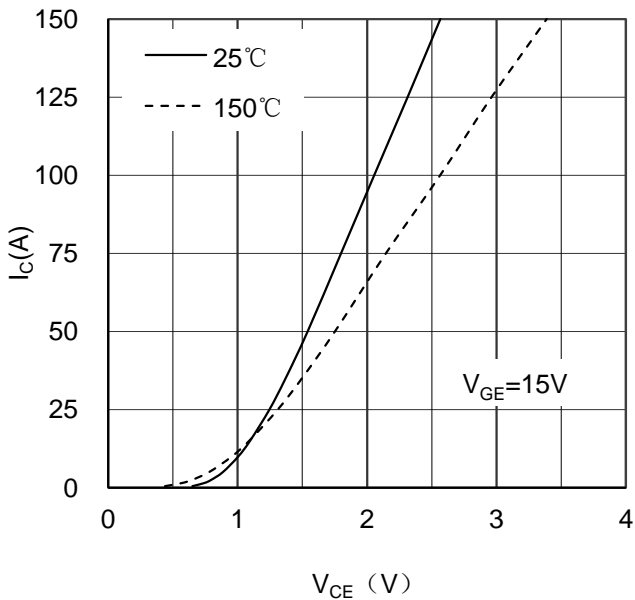


Figure 1. Typical Output Characteristics IGBT

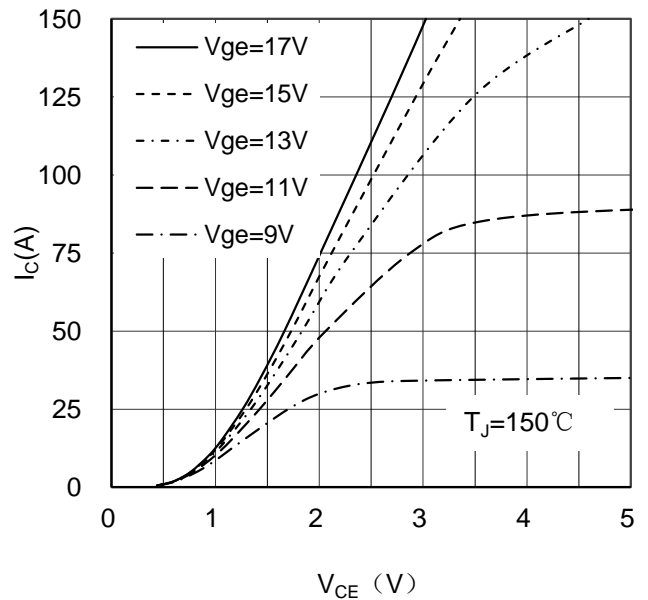


Figure 2. Typical Output Characteristics IGBT

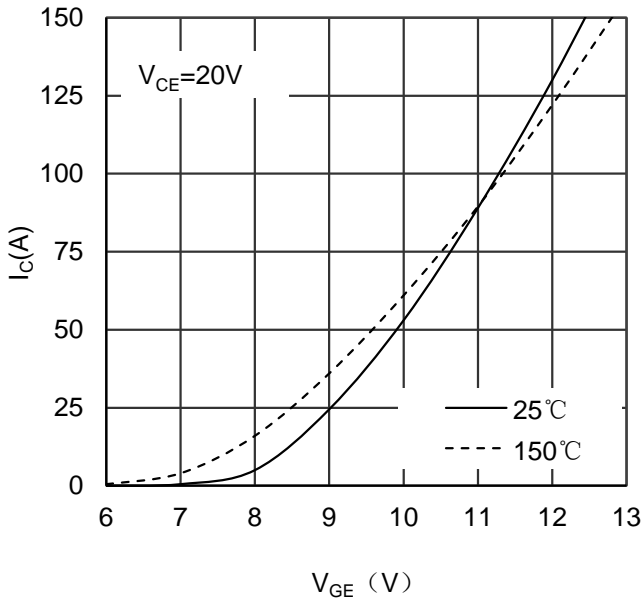


Figure 3. Typical Transfer characteristics IGBT

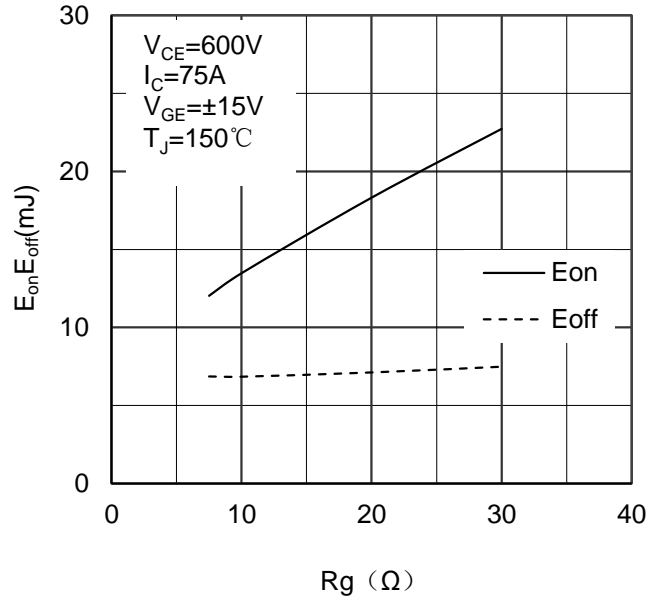


Figure 4. Switching Energy vs Gate Resistor IGBT

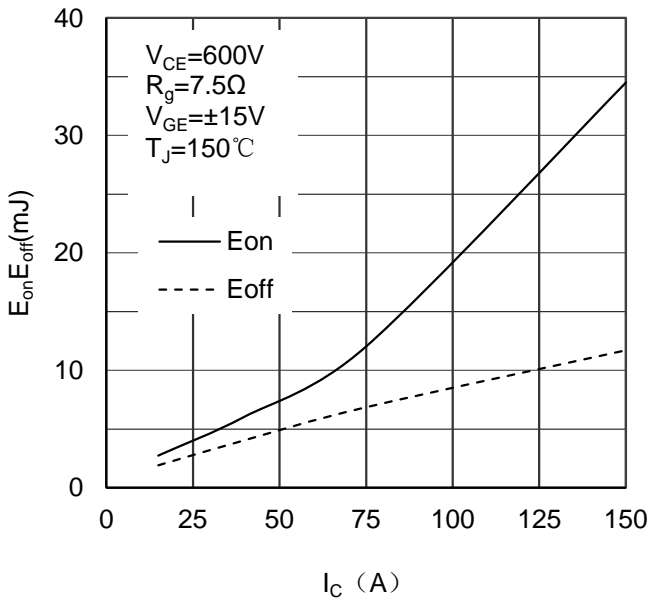


Figure 5. Switching Energy vs Collector Current IGBT

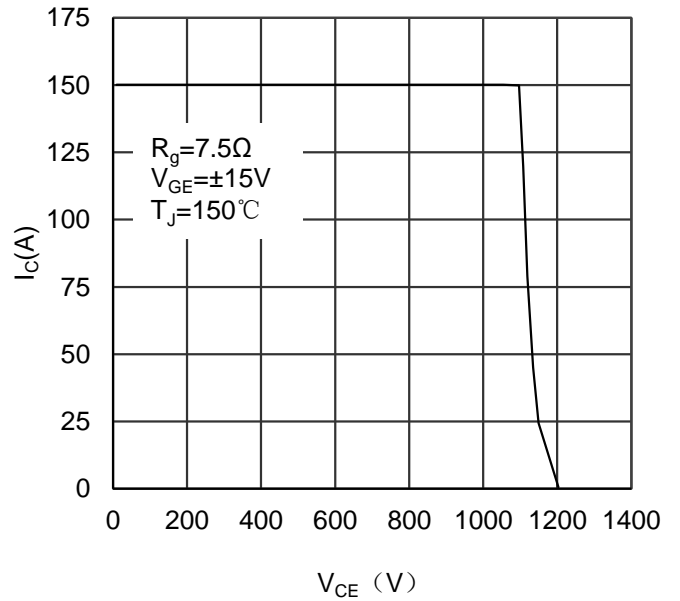


Figure 6. Reverse Biased Safe Operating Area IGBT

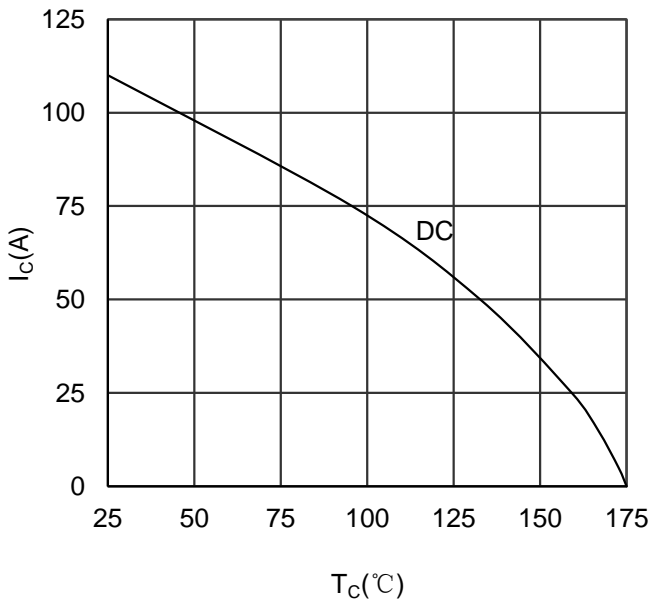


Figure 7. Collector Current vs Case temperature IGBT

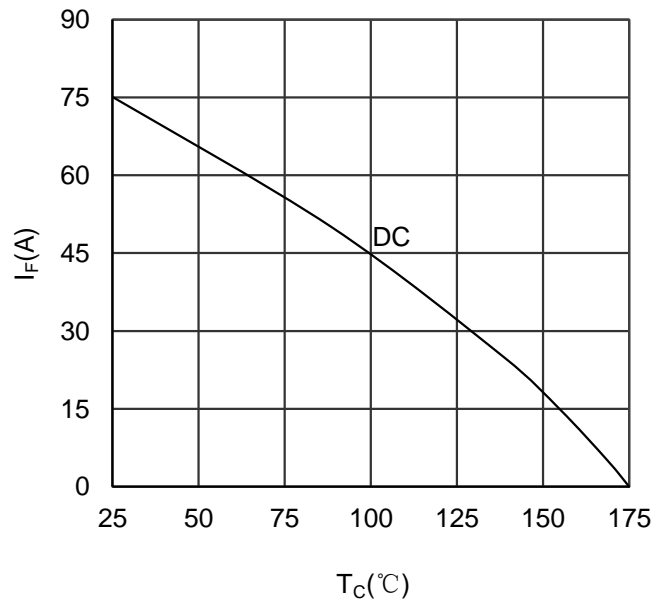


Figure 8. Forward current vs Case temperature Diode

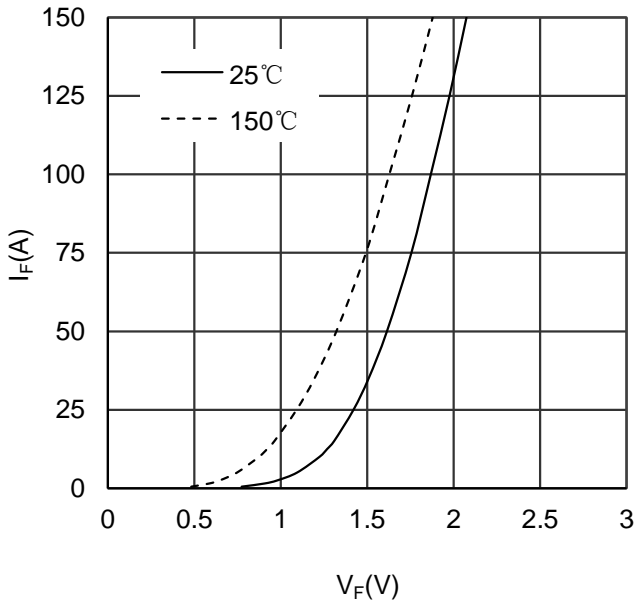


Figure 9. Diode Forward Characteristics Diode

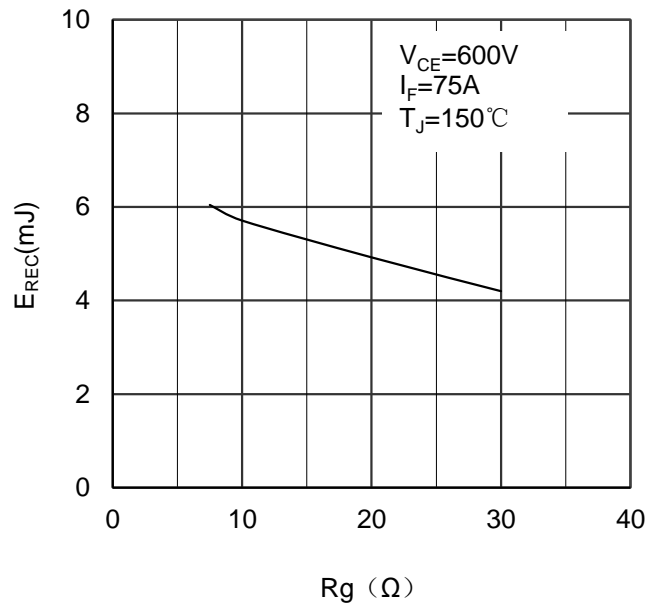


Figure 10. Switching Energy vs Gate Resistor Diode

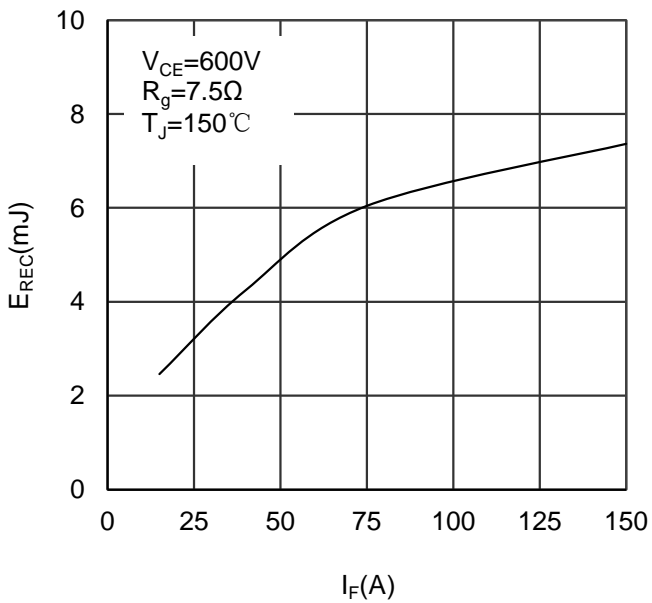


Figure 11. Switching Energy vs Forward Current Diode

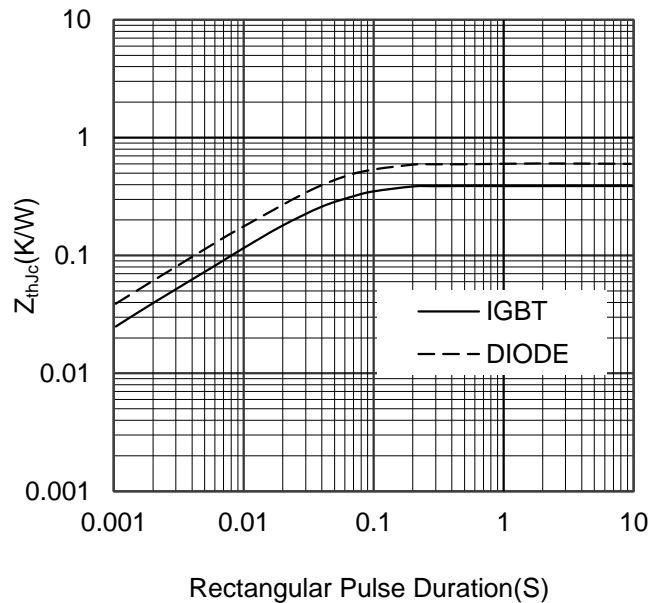
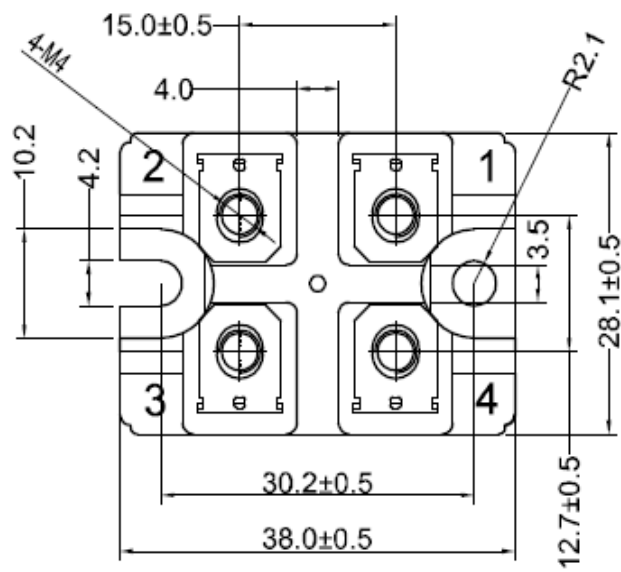
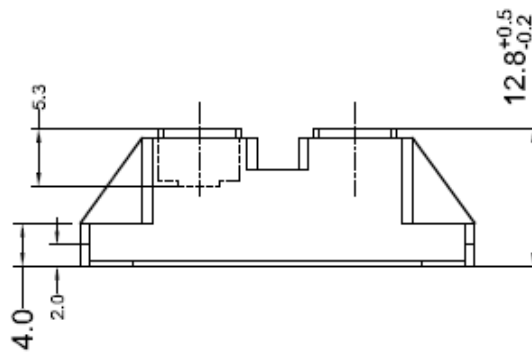


Figure 12. Transient Thermal Impedance of Diode and IGBT



Dimensions in (mm)  
Figure 13. Package Outline