

## IGBT Modules

$V_{CES}$	1200V
$I_C$	225A

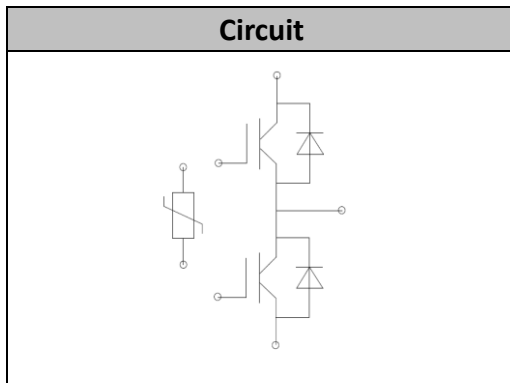


## Applications

- Motion/sevo control
- High frequency switching application
- UPS (Uninterruptible Power Supplies)
- Welding machine

## Features

- Low  $V_{CE(sat)}$  with Trench technology
- Low switching losses especially  $E_{off}$
- $V_{CE(sat)}$  with positive temperature coefficient
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance package
- Maximum junction temperature 175°C



## ● IGBT

### Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	$V_{CES}$	$V_{GE}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
Continuous Collector Current	$I_C$	$T_C=100^{\circ}C$	225	A
Repetitive Peak Collector Current	$I_{CRM}$	$t_p=1ms$	450	A
Gate-Emitter Voltage	$V_{GES}$	$T_{vj}=25^{\circ}C$	$\pm 20$	V
Total Power Dissipation	$P_{tot}$	$T_C=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	1540	W

**Characteristic values**

Parameter	Symbol	Conditions	Value			Unit	
			Min.	Typ.	Max.		
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=12mA, T_{vj}=25^{\circ}C$	5.2	5.8	6.4	V	
Collector-Emitter Cut-off Current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^{\circ}C$			1.0	mA	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=225A, V_{GE}=15V, T_{vj}=25^{\circ}C$		1.90	2.30	V	
		$I_C=225A, V_{GE}=15V, T_{vj}=125^{\circ}C$		2.20			
		$I_C=225A, V_{GE}=15V, T_{vj}=150^{\circ}C$		2.32			
Gate Charge	$Q_G$			1.38		$\mu C$	
Internal Gate Resistance	$R_{Gint}$			3.3		$\Omega$	
Input Capacitance	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz, T_{vj}=25^{\circ}C$		15.6		nF	
Reverse Transfer Capacitance	$C_{res}$			0.64		nF	
Gate-Emitter leakage current	$I_{GES}$	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA	
Turn-on Delay Time	$t_{d(on)}$	$I_C=225A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.5\Omega$ $T_{vj}=25^{\circ}C$		213		ns	
Rise Time	$t_r$			70		ns	
Turn-off Delay Time	$t_{d(off)}$			284		ns	
Fall Time	$t_f$			81		ns	
Energy Dissipation During Turn-on Time	$E_{on}$			22.6		mJ	
Energy Dissipation During Turn-off Time	$E_{off}$			9.1		mJ	
Turn-on Delay Time	$t_{d(on)}$		$I_C=225A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.5\Omega$ $T_{vj}=150^{\circ}C$		223		ns
Rise Time	$t_r$				75		ns
Turn-off Delay Time	$t_{d(off)}$				350		ns
Fall Time	$t_f$				164		ns
Energy Dissipation During Turn-on Time	$E_{on}$			33.1		mJ	
Energy Dissipation During Turn-off Time	$E_{off}$			15.4		mJ	
SC Data	$I_{sc}$	$t_p \leq 10\mu s, V_{GE}=15V,$ $T_{vj}=150^{\circ}C, V_{CC}=900V,$ $V_{CEM} \leq 1200V$			1100		A



## ● Diode

### Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	$V_{RRM}$	$T_{vj}=25^{\circ}C$	1200	V
Continuous DC Forward Current	$I_F$		225	A
Repetitive Peak Forward Current	$I_{FRM}$	$t_p=1ms$	450	A
$I^2t$ -value	$I^2t$	$V_R=0V, t_p=10ms, T_{vj}=125^{\circ}C$	11000	A <sup>2</sup> s
		$V_R=0V, t_p=10ms, T_{vj}=150^{\circ}C$	8500	

### Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	$V_F$	$I_F=225A, T_{vj}=25^{\circ}C$		2.15		V
		$I_F=225A, T_{vj}=125^{\circ}C$		1.95		
		$I_F=225A, T_{vj}=150^{\circ}C$		1.90		
Recovered Charge	$Q_{rr}$	$I_F=225A$		11.9		uC
Peak Reverse Recovery Current	$I_{rr}$	$V_R=600V$ $-di_F/dt=2500A/us$		65		A
Reverse Recovery Energy	$E_{rec}$	$T_{vj}=25^{\circ}C$		4.3		mJ
Recovered Charge	$Q_{rr}$	$I_F=225A$		51.1		uC
Peak Reverse Recovery Current	$I_{rr}$	$V_R=600V$ $-di_F/dt=2500A/us$		103		A
Reverse Recovery Energy	$E_{rec}$	$T_{vj}=150^{\circ}C$		11.5		mJ

## ● NTC-Thermistor

### Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Rated Resistance	$R_{25}$			5.0		k $\Omega$
Deviation of R100	$\Delta R/R$	$T_C=100, R_{100}=493.3\Omega$	-5		5	%
Power Dissipation	$P_{25}$				20.0	mW
B-value	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3375		K



## ● Module Characteristics

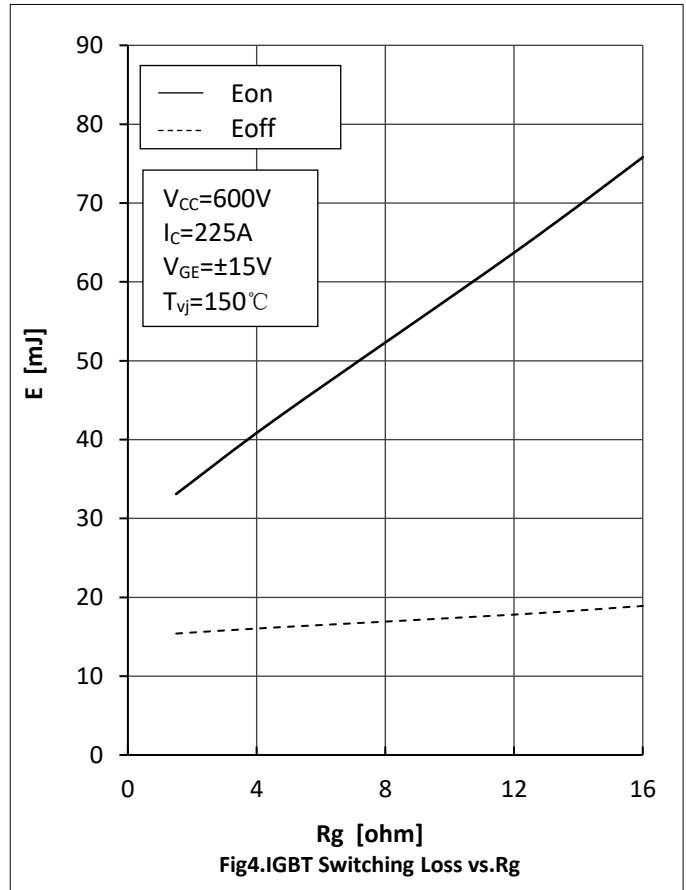
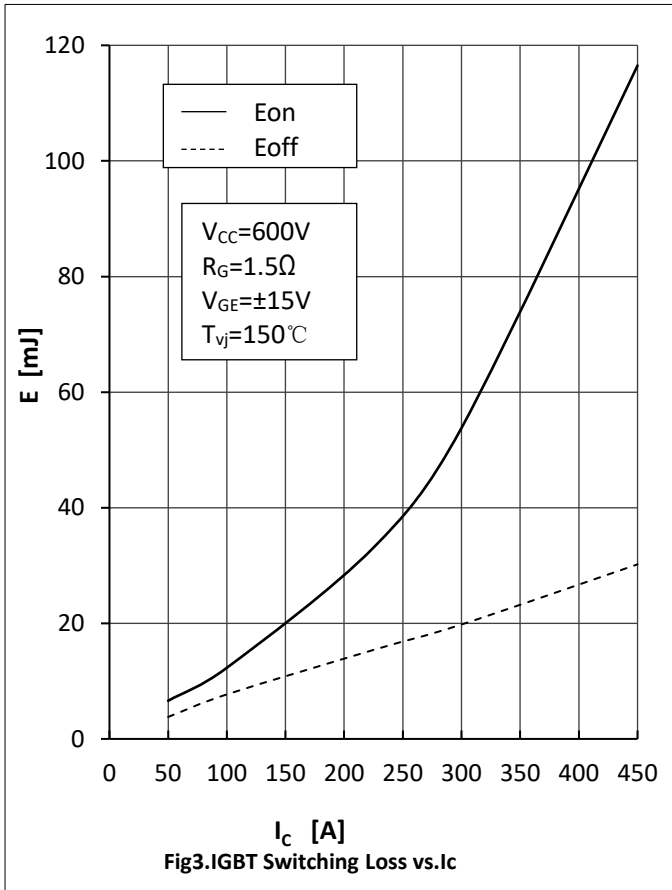
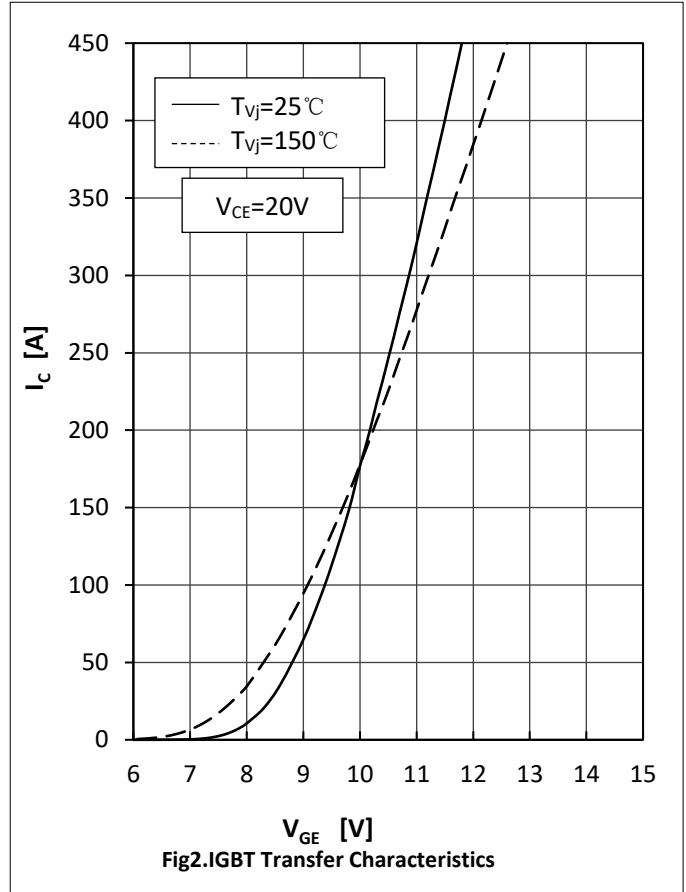
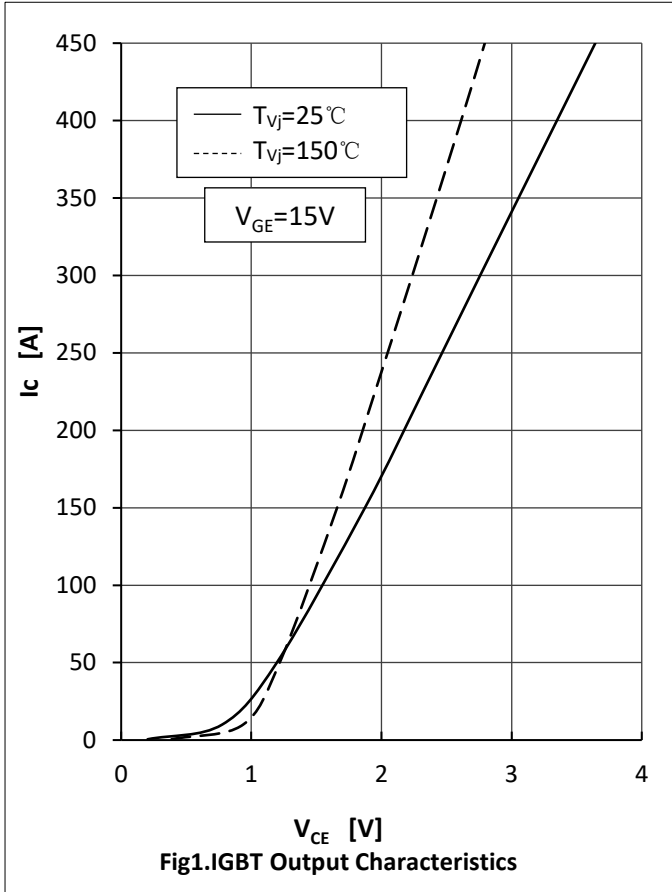
T<sub>c</sub>=25°C unless otherwise specified

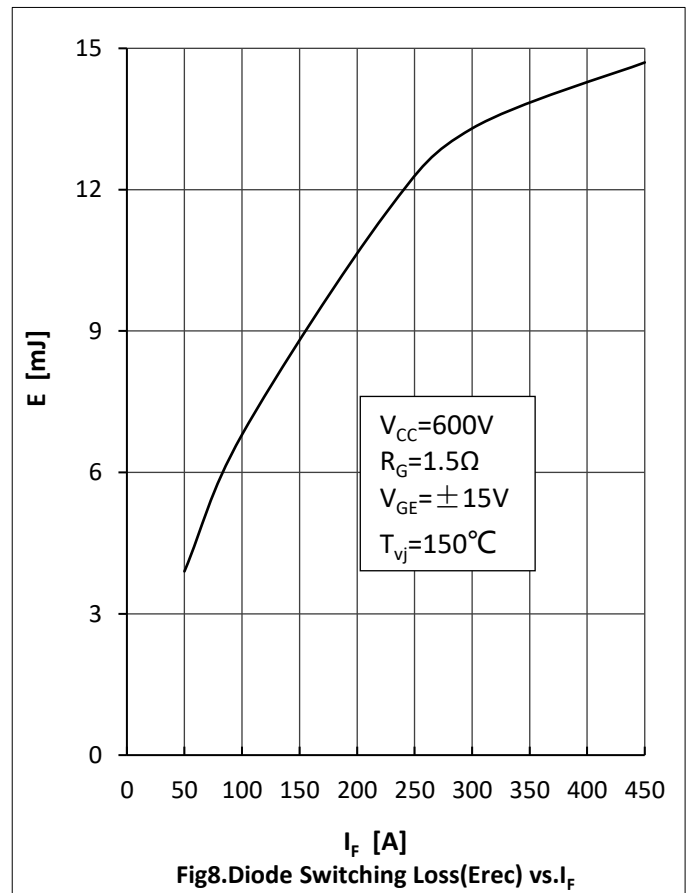
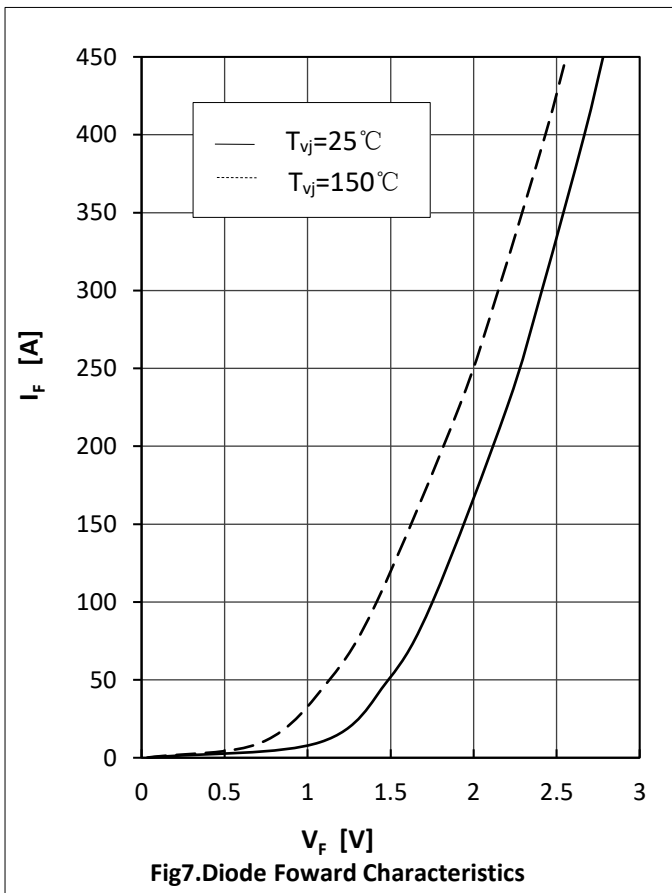
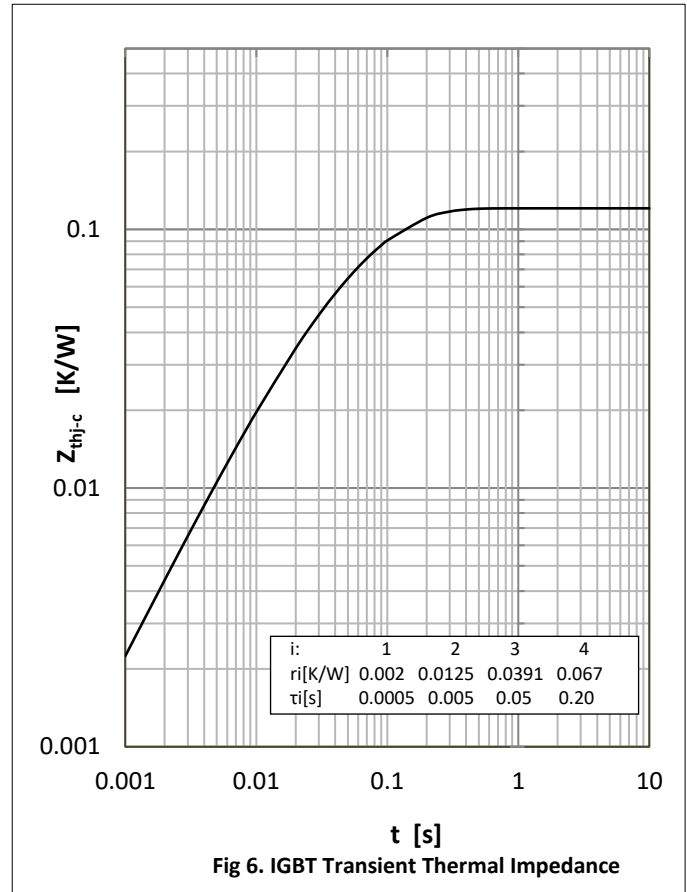
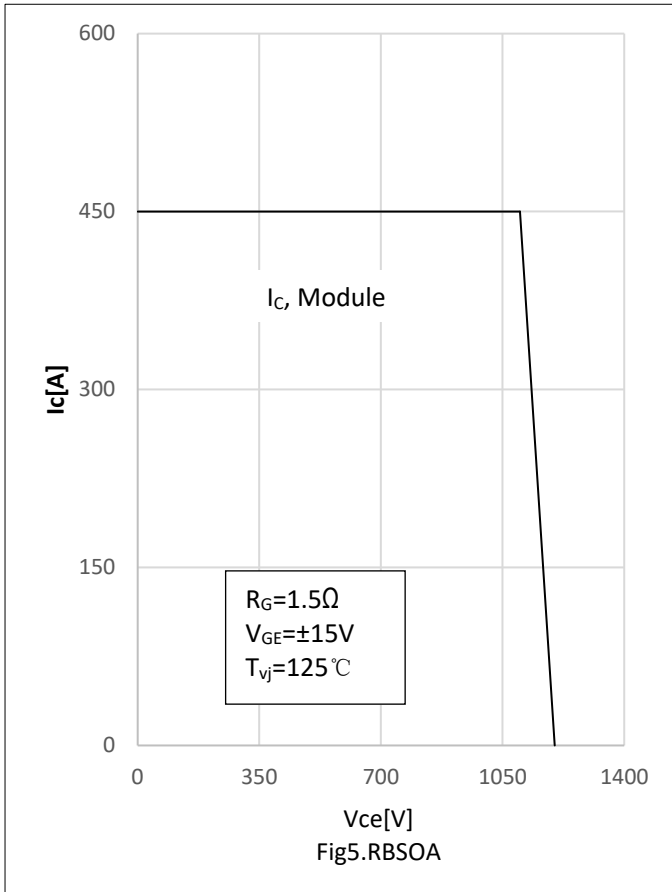
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation voltage	V <sub>isol</sub>	t=1min,f=50Hz	2500			V
Maximum Junction Temperature	T <sub>jmax</sub>				175	°C
Operating Junction Temperature	T <sub>vj op</sub>		-40		150	°C
Storage Temperature	T <sub>stg</sub>		-40		125	°C
Thermal Resistance Junction-to Case	R <sub>θJC</sub>	per IGBT			0.12	K/W
		per Diode			0.19	
Thermal Resistance Case-to Sink	R <sub>θCS</sub>	Conductive grease applied		0.009		K/W
Comparative Tracking Index	CTI		200			
Module Electrodes Torque	M <sub>t</sub>	Recommended(M6)	4.0		5.0	N·m
Module-to-Sink Torque	M <sub>s</sub>	Recommended(M5)	3.0		6.0	N·m
Weight of Module	G			345		g

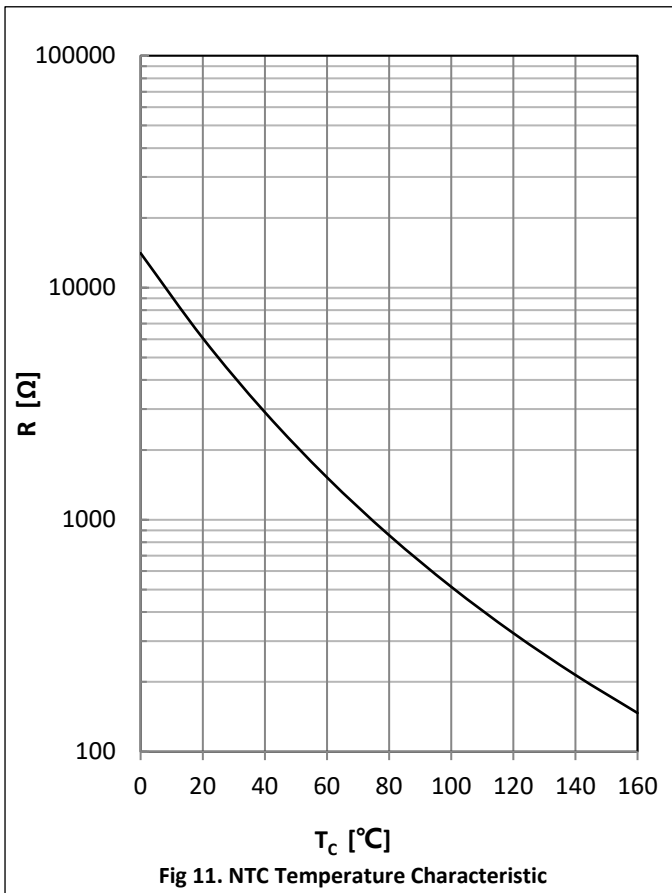
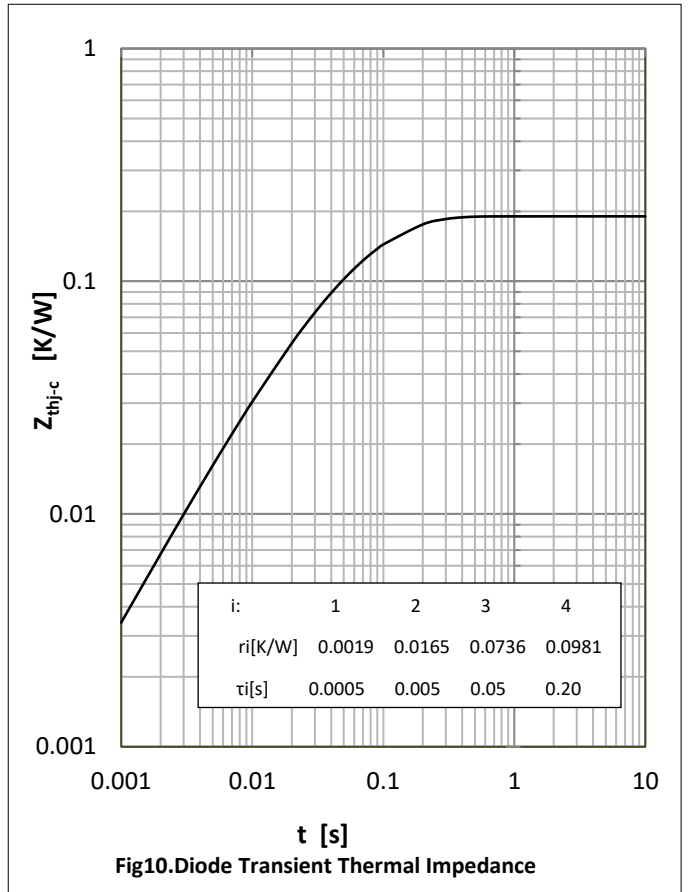
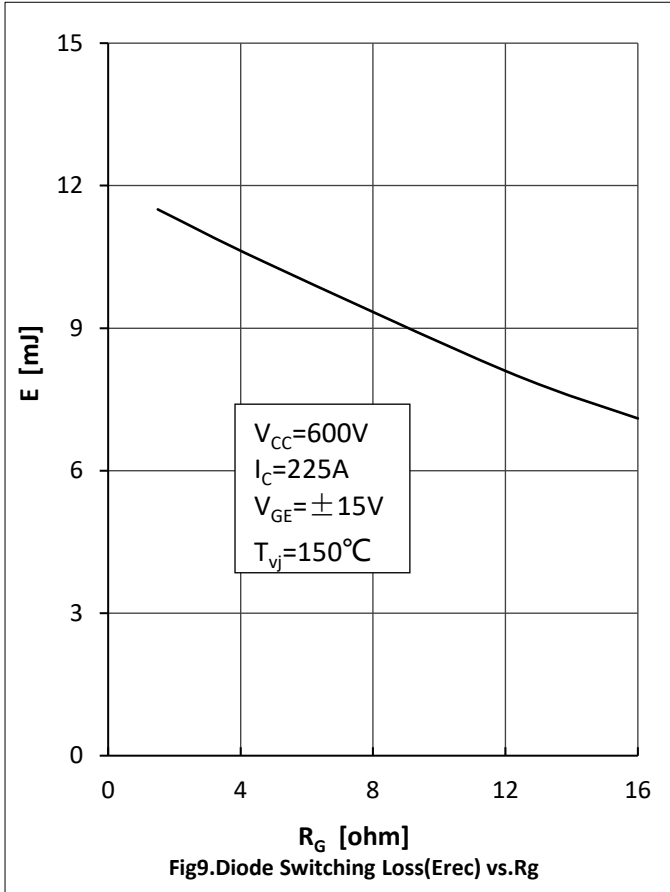


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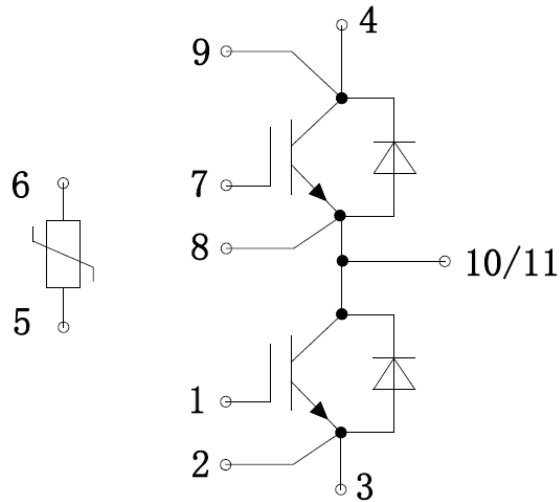
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COMPLIANT



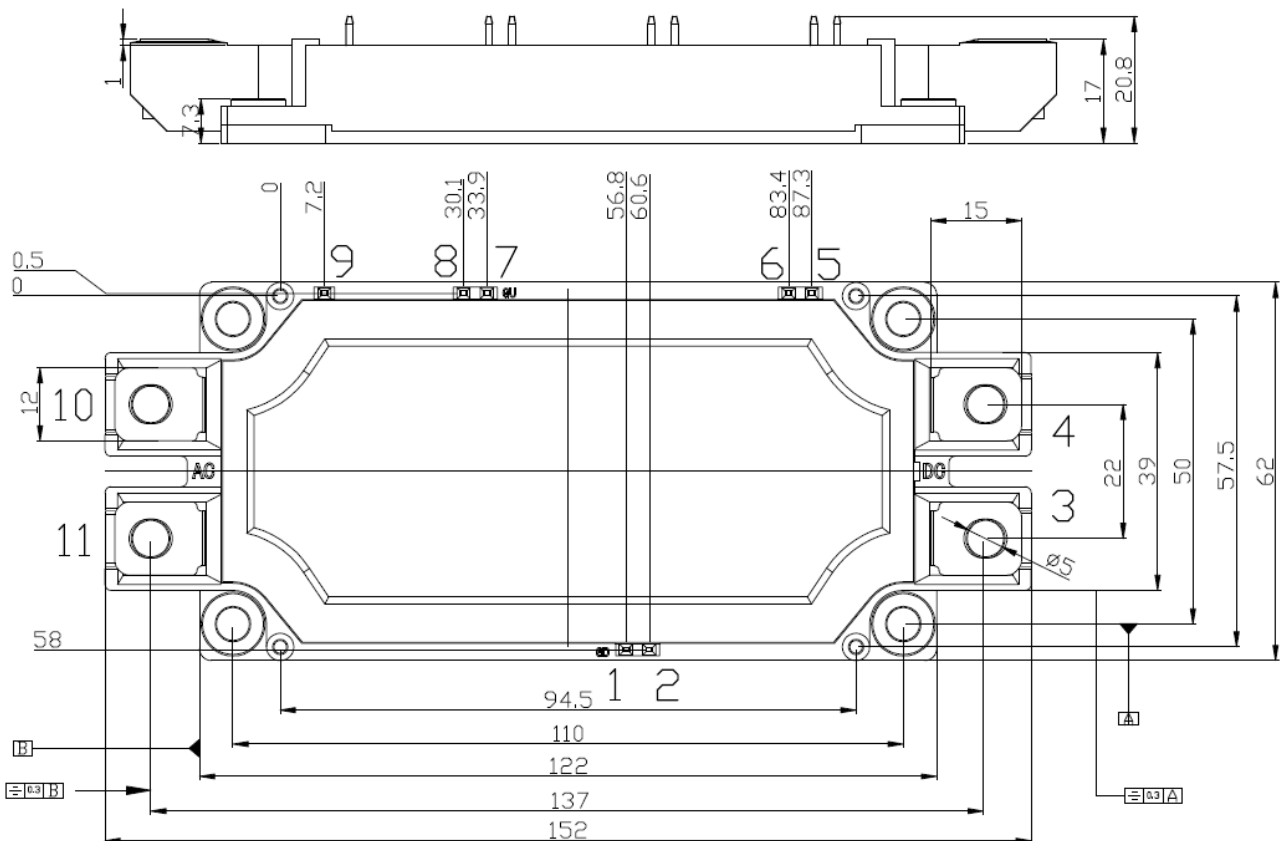




## ● Circuit Diagram



## ● Package Outline Information







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