

IGBT Modules

V_{CES} 1200V
 I_C 600A

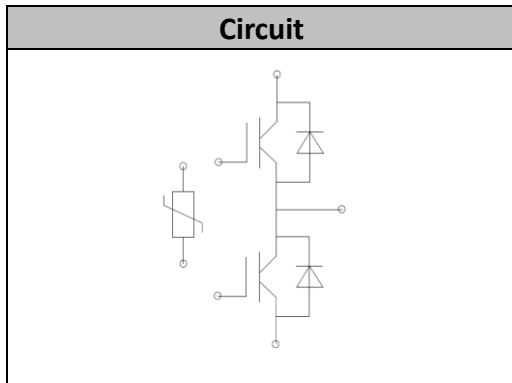


Applications

- Motion/servo 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	$T_C=100^{\circ}C$	600	A
Repetitive Peak Collector Current	I_{CRM}	$t_p=1ms$	1200	A
Gate-Emitter Voltage	V_{GES}	$T_{vj}=25^{\circ}C$	± 20	V
Total Power Dissipation	P_{tot}	$T_C=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	2027	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	$V_{CE(sat)}$	$I_C=600A$, $V_{GE}=15V$, $T_{vj}=25^{\circ}C$		1.74		V
		$I_C=600A$, $V_{GE}=15V$, $T_{vj}=150^{\circ}C$		2.10		
		$I_C=600A$, $V_{GE}=15V$, $T_{vj}=175^{\circ}C$		2.17		
Gate Charge	Q_G			6.9		μC
Internal Gate Resistance	R_{Gint}			0.86		Ω
Input Capacitance	C_{ies}	$V_{CE}=25V$, $V_{GE}=0V$, $f=1MHz$, $T_{vj}=25^{\circ}C$		198.3		nF
Reverse Transfer Capacitance	C_{res}			1.1		nF
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$, $T_{vj}=25^{\circ}C$			400	nA
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.1\Omega$ $T_{vj}=25^{\circ}C$		174		ns
Rise Time	t_r			101		ns
Turn-off Delay Time	$t_{d(off)}$			352		ns
Fall Time	t_f			181		ns
Energy Dissipation During Turn-on Time	E_{on}			81.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			49.1		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.1\Omega$ $T_{vj}=150^{\circ}C$		191		ns
Rise Time	t_r			114		ns
Turn-off Delay Time	$t_{d(off)}$			413		ns
Fall Time	t_f			302		ns
Energy Dissipation During Turn-on Time	E_{on}			104.8		mJ
Energy Dissipation During Turn-off Time	E_{off}			64.6		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.1\Omega$ $T_{vj}=175^{\circ}C$		191		ns
Rise Time	t_r			117		ns
Turn-off Delay Time	$t_{d(off)}$			426		ns
Fall Time	t_f			337		ns
Energy Dissipation During Turn-on Time	E_{on}			110.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			68.6		mJ
SC Data	I_{sc}	$t_p \leq 8\mu s$, $V_{GE}=15V$, $T_{vj}=150^{\circ}C$, $V_{CC}=600V$, $V_{CEM} \leq 1200V$		1976		A



● Diode

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}\text{C}$	1200	V
Continuous DC Forward Current	I_F		600	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1\text{ms}$	1200	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=600\text{A}, T_{vj}=25^{\circ}\text{C}$		2.29		V
		$I_F=600\text{A}, T_{vj}=150^{\circ}\text{C}$		2.17		
		$I_F=600\text{A}, T_{vj}=175^{\circ}\text{C}$		2.13		
Recovered Charge	Q_{rr}	$I_F=600\text{A}$ $V_R=600\text{V}$ $-di_F/dt=8700\text{A/us}$ $T_{vj}=25^{\circ}\text{C}$		36.7		μC
Peak Reverse Recovery Current	I_{rr}			126		A
Reverse Recovery Energy	E_{rec}			12.8		mJ
Recovered Charge	Q_{rr}	$I_F=600\text{A}$ $V_R=600\text{V}$ $-di_F/dt=8700\text{A/us}$ $T_{vj}=150^{\circ}\text{C}$		85.2		μC
Peak Reverse Recovery Current	I_{rr}			188		A
Reverse Recovery Energy	E_{rec}			30.8		mJ
Recovered Charge	Q_{rr}	$I_F=600\text{A}$ $V_R=600\text{V}$ $-di_F/dt=8700\text{A/us}$ $T_{vj}=175^{\circ}\text{C}$		95.8		μC
Peak Reverse Recovery Current	I_{rr}			198		A
Reverse Recovery Energy	E_{rec}			34.8		mJ



● NTC-Thermistor

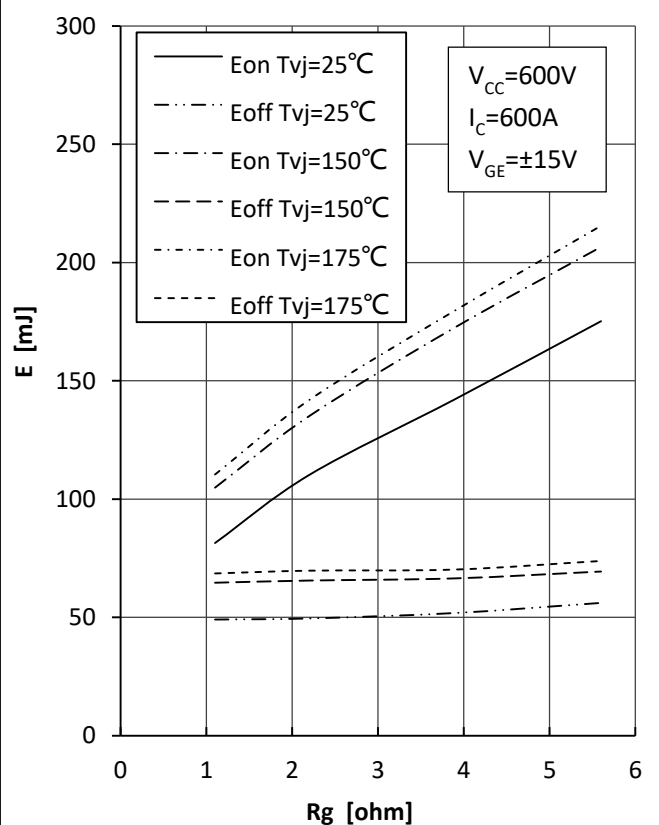
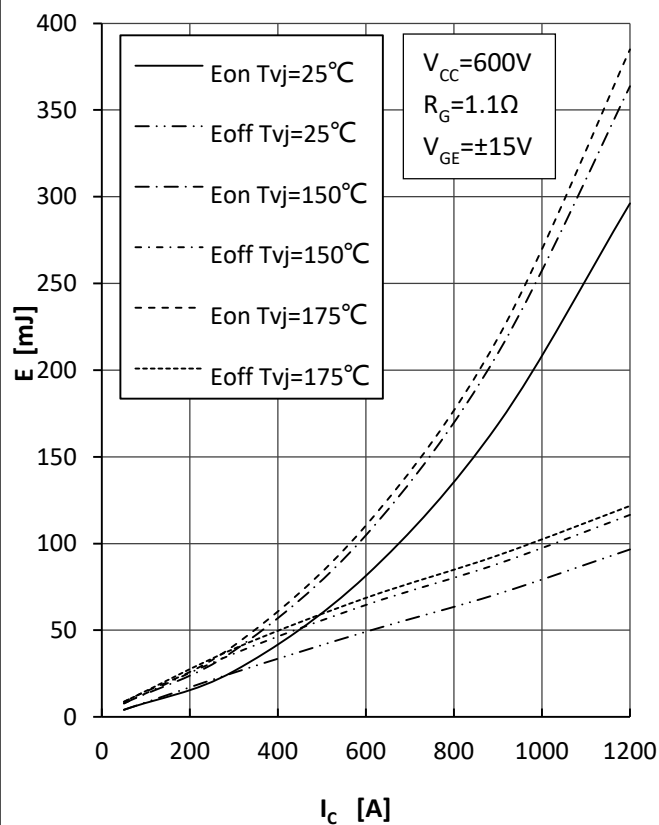
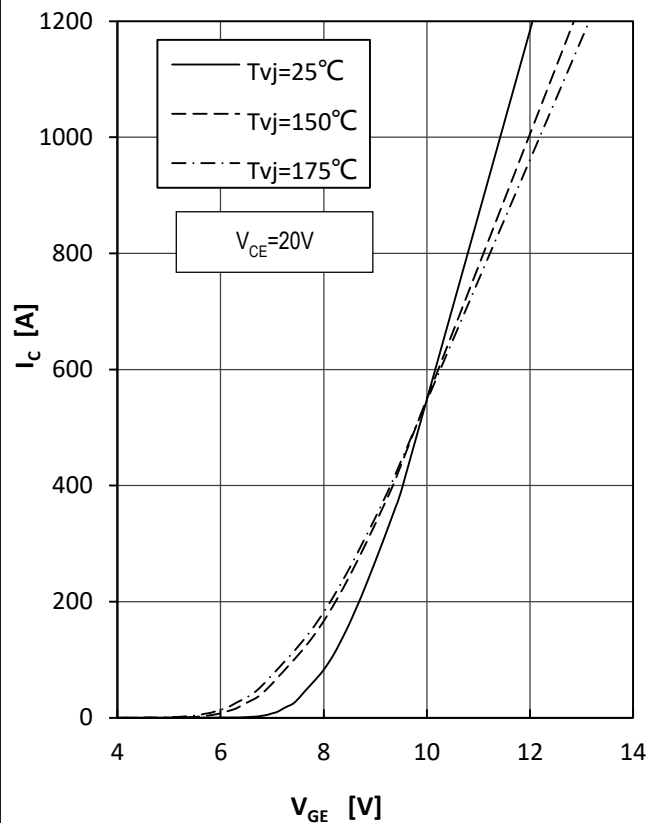
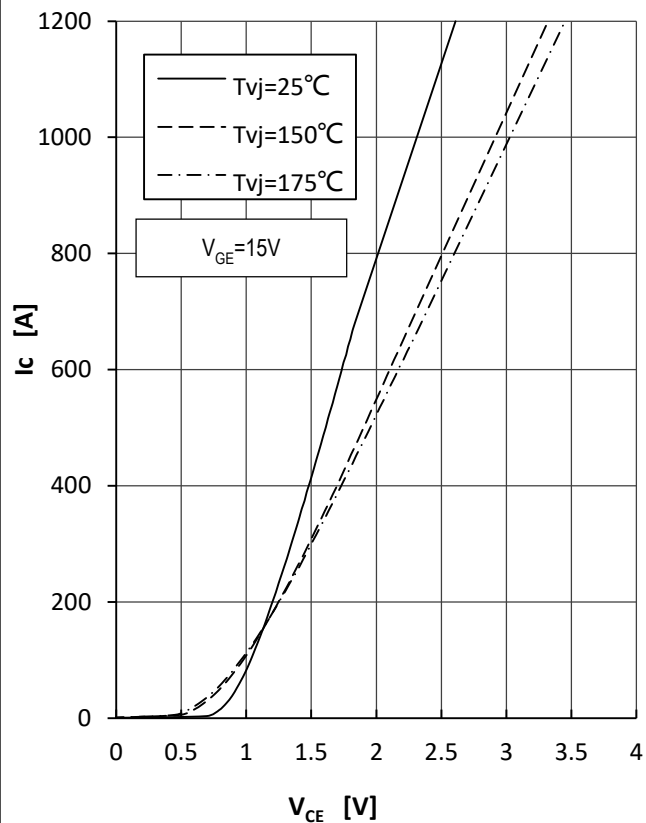
Characteristic Values

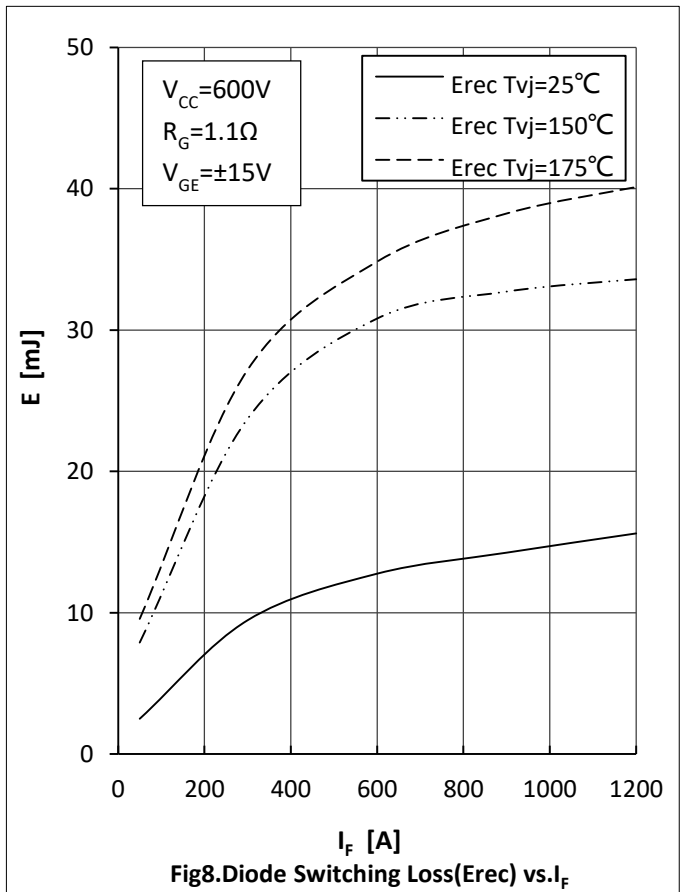
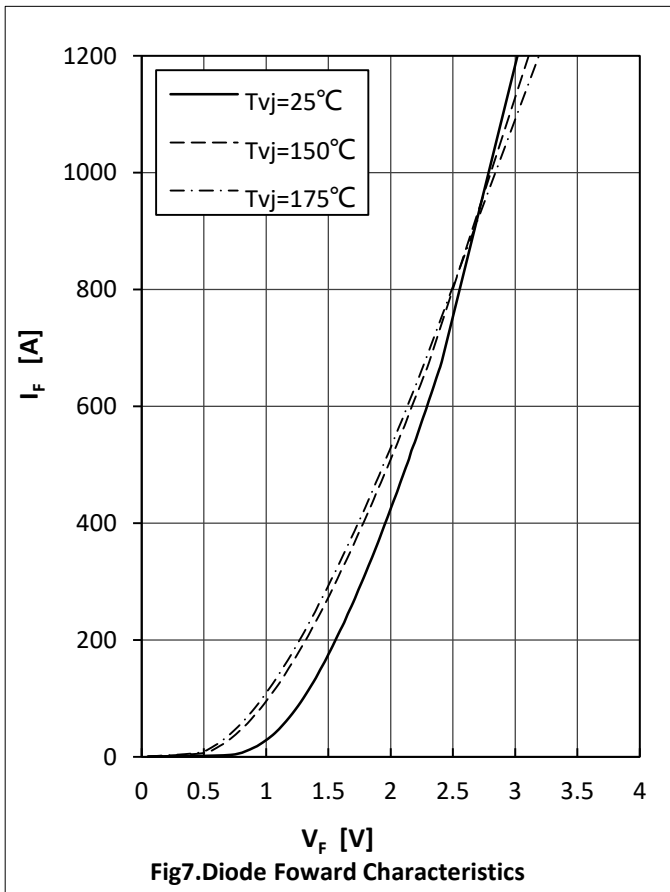
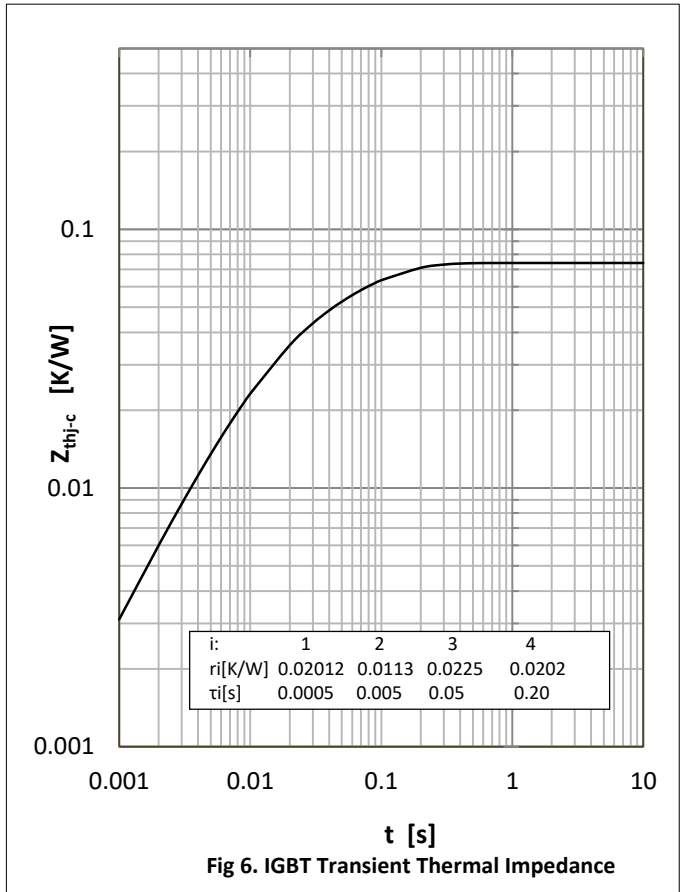
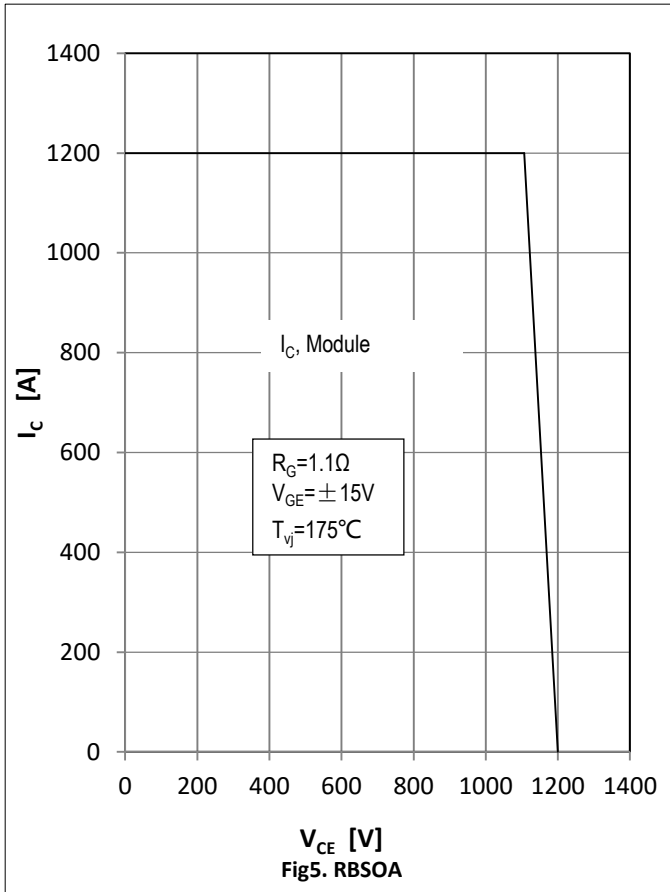
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Rated Resistance	R ₂₅			5.0		kΩ
Deviation of R100	ΔR/R	T _C =100, R ₁₀₀ =493.3Ω	-5		5	%
Power Dissipation	P ₂₅				20.0	mW
B-value	B _{25/50}	$R_2 = R_{25} \exp[B_{25/50}(1/T_2 - 1/(298.15K))]$		3375		K

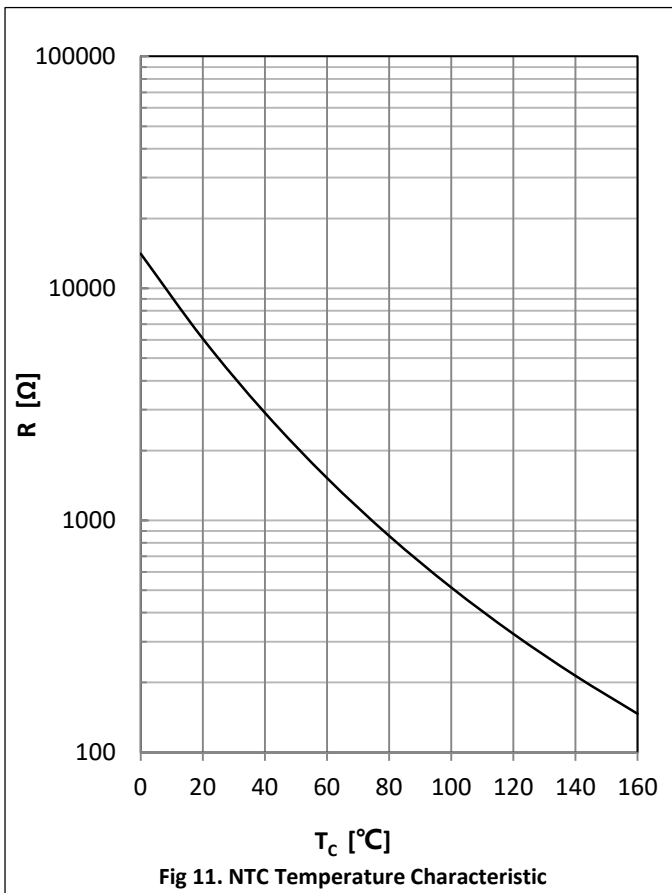
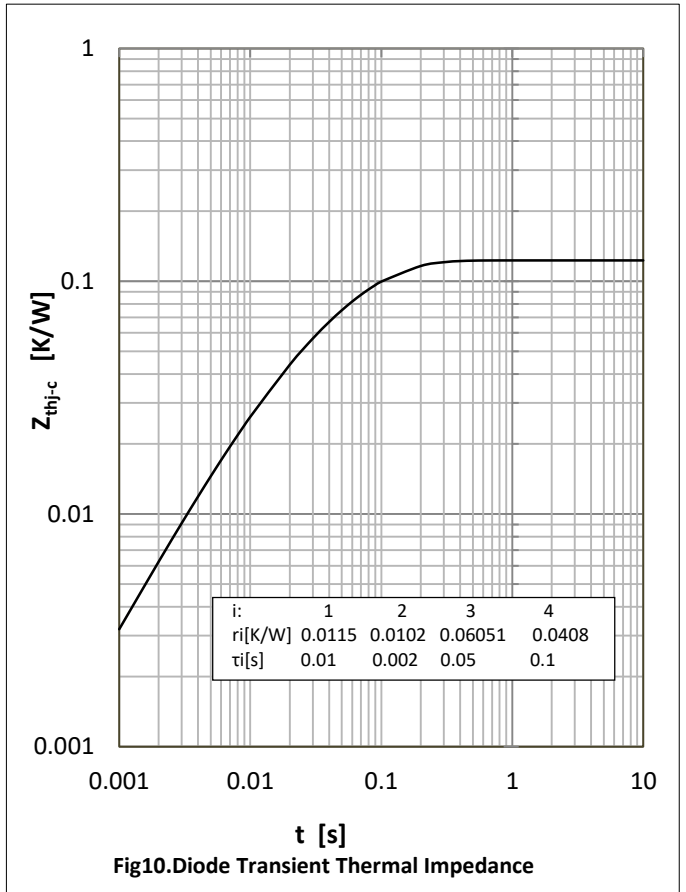
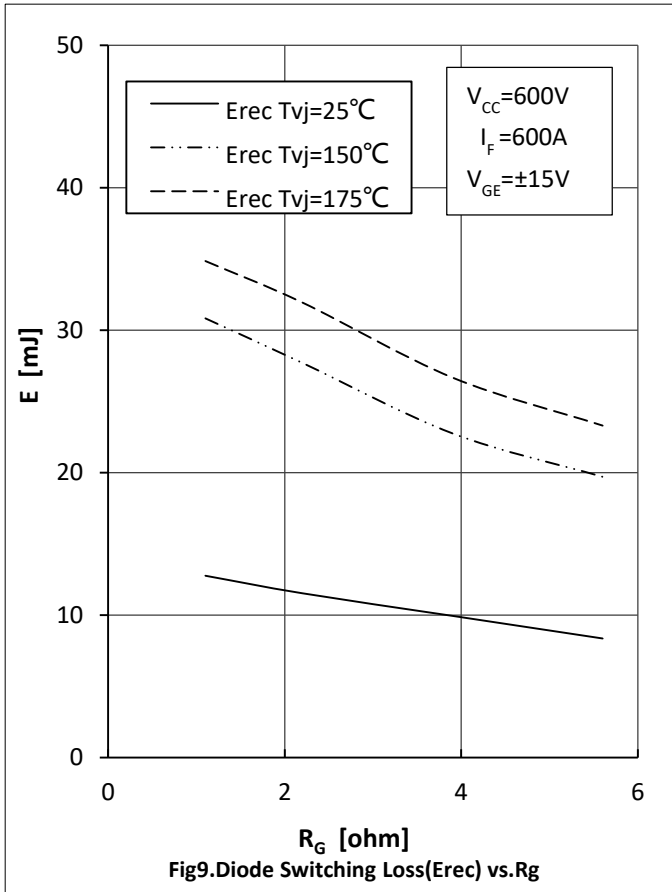
● Module Characteristics

T_C=25°C unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation Voltage	V _{isol}	t=1min, f=50Hz	2500			V
Maximum Junction Temperature	T _{jmax}				175	°C
Operating Junction Temperature	T _{vj op}		-40		150	°C
Storage Temperature	T _{stg}		-40		125	°C
Thermal Resistance Junction to Case	R _{θJC}	per IGBT			0.074	K/W
		per Diode			0.123	
Thermal Resistance Case to Sink	R _{θCS}	Conductive grease applied		0.009		K/W
Comparative Tracking Index	CTI		200			
Module Electrodes Torque	M _t	Recommended(M6)	4.0		5.0	N·m
Module to Sink Torque	M _s	Recommended(M5)	3.0		6.0	N·m
Weight of Module	G			345		g

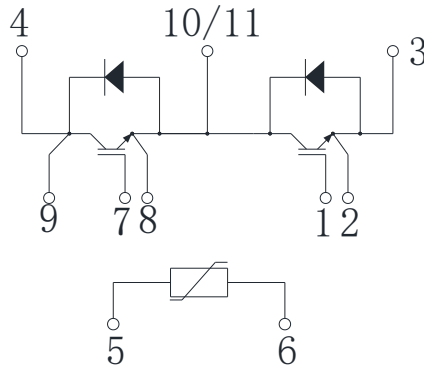




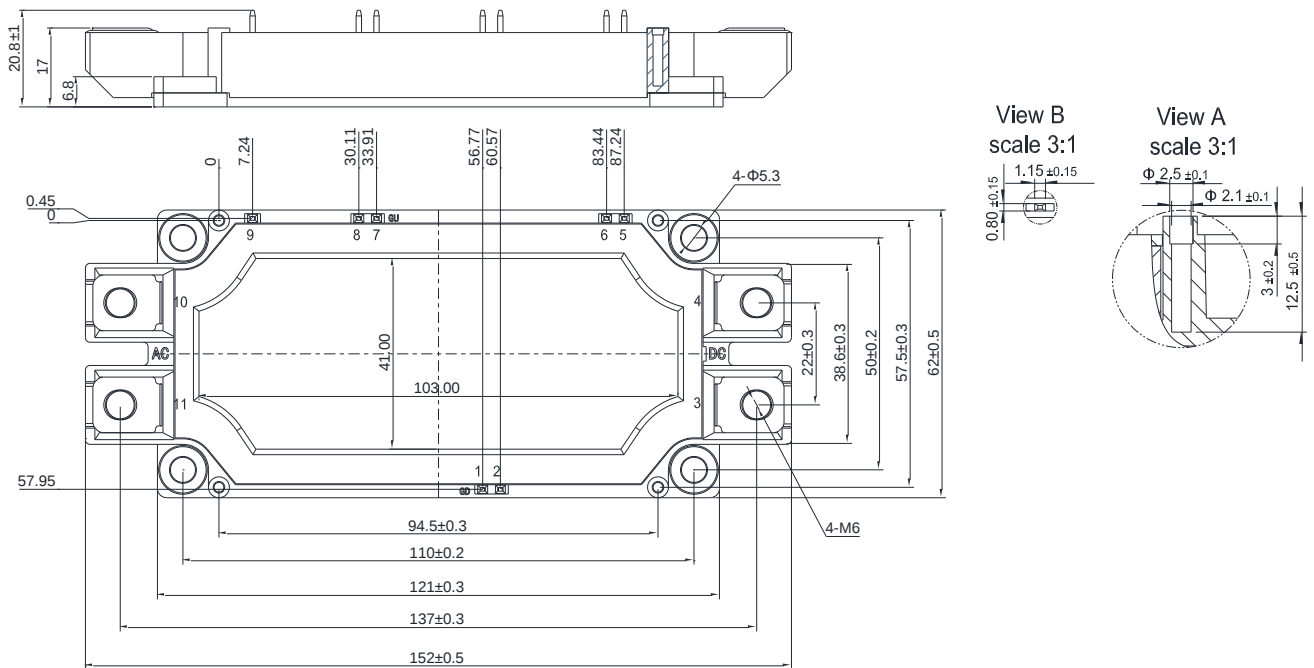




● Circuit Diagram



● Package Outline Information





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