

IGBT Modules

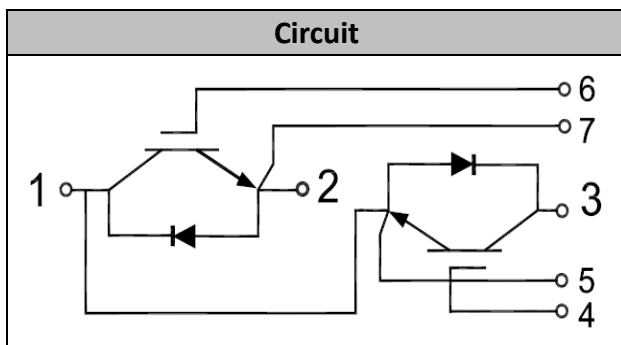
V_{CES}	1200V
I_c	600A

Applications

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

Features

- Low $V_{CE(sat)}$ with Trench technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- 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}	$T_C=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	2580	W



Characteristic Values

Parameter	Symbol	Conditions	Value			Unit	
			Min.	Typ.	Max.		
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=18mA, T_{vj}=25^{\circ}C$	5.0	5.8	6.5	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	$V_{CE(sat)}$	$I_C=600A, V_{GE}=15V, T_{vj}=25^{\circ}C$		1.65	2.00	V	
		$I_C=600A, V_{GE}=15V, T_{vj}=125^{\circ}C$		1.90			
		$I_C=600A, V_{GE}=15V, T_{vj}=150^{\circ}C$		2.00			
Gate Charge	Q_G			5.8		uC	
Internal Gate Resistor	R_{Gint}			0.56		Ω	
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz, T_{vj}=25^{\circ}C$		98.5		nF	
Reverse Transfer Capacitance	C_{res}			0.89		nF	
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA	
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1\Omega$ $T_{vj}=25^{\circ}C$		139		ns	
Rise Time	t_r			56		ns	
Turn-off Delay Time	$t_{d(off)}$			255		ns	
Fall Time	t_f			289		ns	
Energy Dissipation During Turn-on Time	E_{on}			41.1		mJ	
Energy Dissipation During Turn-off Time	E_{off}			38.5		mJ	
Turn-on Delay Time	$t_{d(on)}$		$I_C=600A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1\Omega$ $T_{vj}=150^{\circ}C$		156		ns
Rise Time	t_r				64		ns
Turn-off Delay Time	$t_{d(off)}$				291		ns
Fall Time	t_f				451		ns
Energy Dissipation During Turn-on Time	E_{on}			68.2		mJ	
Energy Dissipation During Turn-off Time	E_{off}			56.4		mJ	
SC Data	I_{sc}	$t_p \leq 10\mu s, V_{GE}=15V,$ $V_{CEM} \leq 1200V$ $T_{vj}=150^{\circ}C, V_{CC}=600V,$			2400		A



● Diode

Absolute Maximum Ratings

	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}C$	1200	V
Continuous DC Forward Current	I_F		600	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1ms$	1200	A
I^2t -value	I^2t	$V_R=0V, t_p=10ms, T_{vj}=125^{\circ}C$	35000	A ² s
		$V_R=0V, t_p=10ms, T_{vj}=150^{\circ}C$	32000	

Characteristic Values

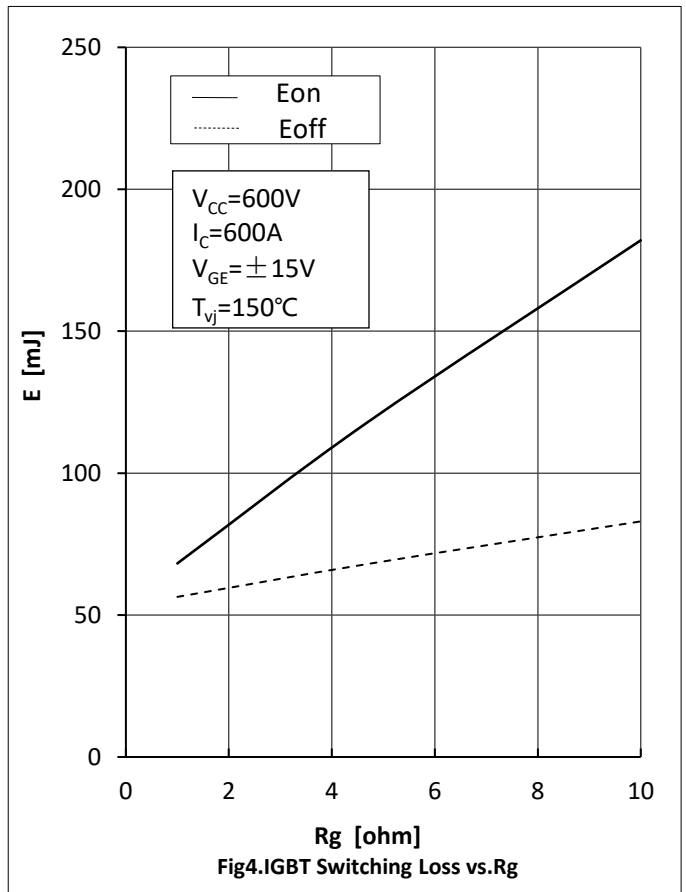
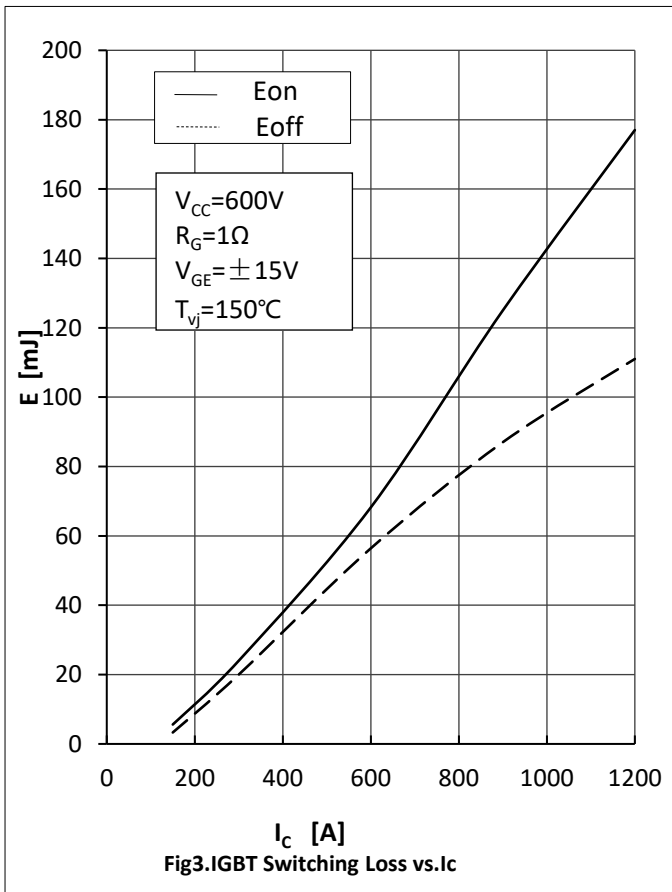
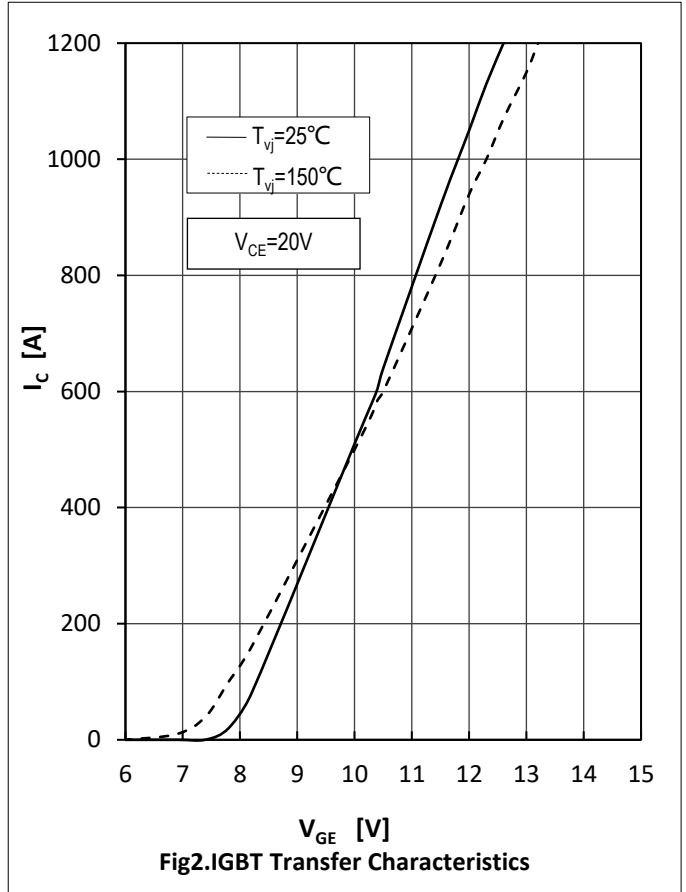
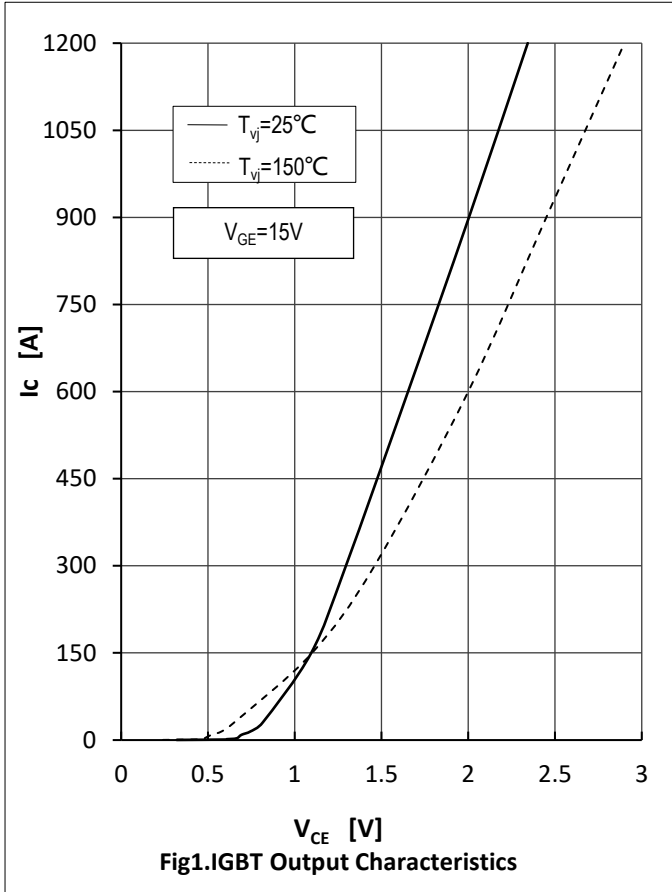
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=600A, T_{vj}=25^{\circ}C$		1.55	2.10	V
		$I_F=600A, T_{vj}=125^{\circ}C$		1.46		
		$I_F=600A, T_{vj}=150^{\circ}C$		1.41		
Recovered Charge	Q_{rr}	$I_F=600A$		43.1		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600V$ $-di_F/dt=5000A/\mu s$		365		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=25^{\circ}C$		24.5		mJ
Recovered Charge	Q_{rr}	$I_F=600A$		72.5		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600V$ $-di_F/dt=5000A/\mu s$		561		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=150^{\circ}C$		42.5		mJ

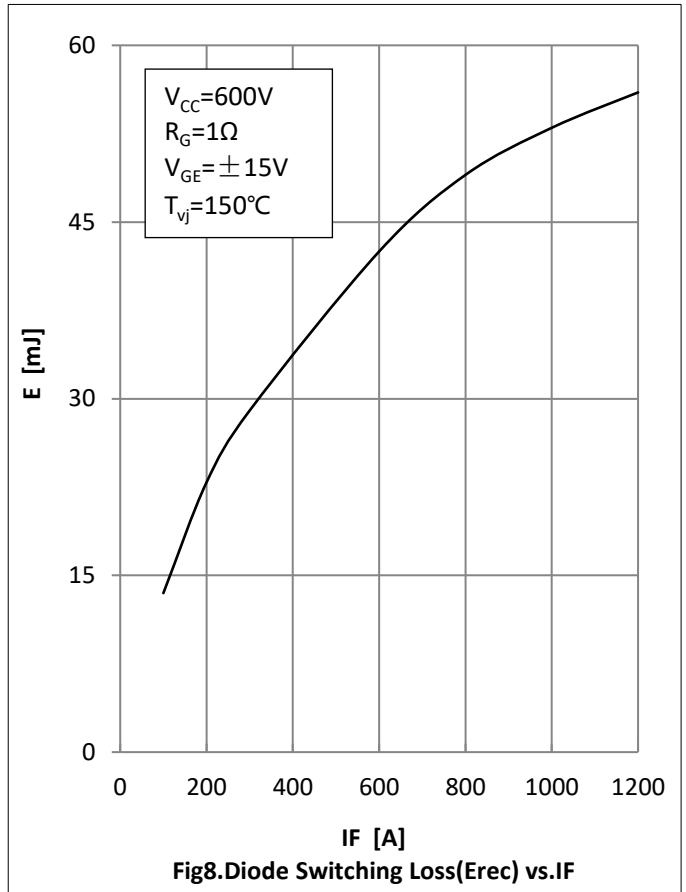
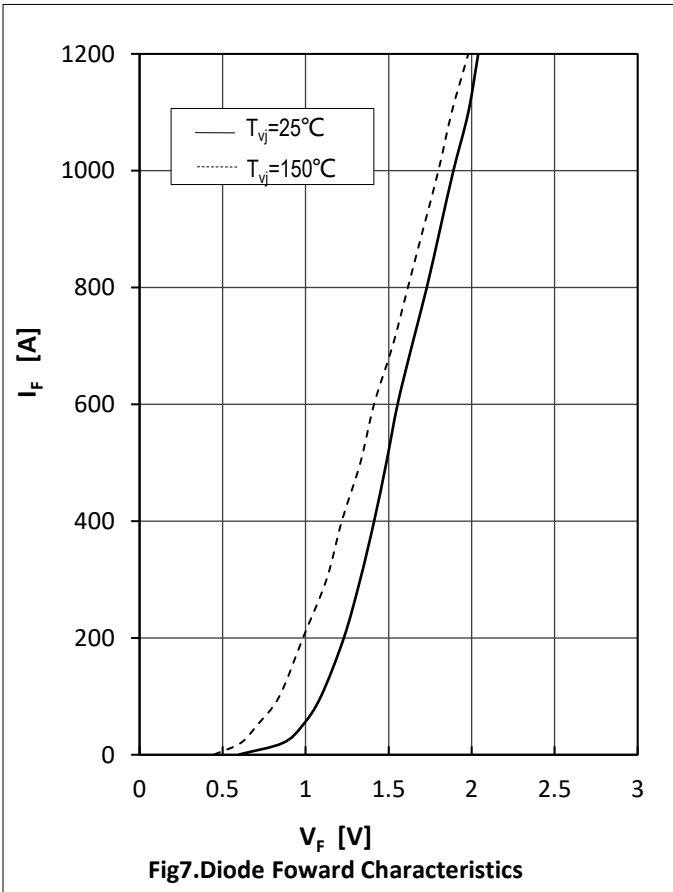
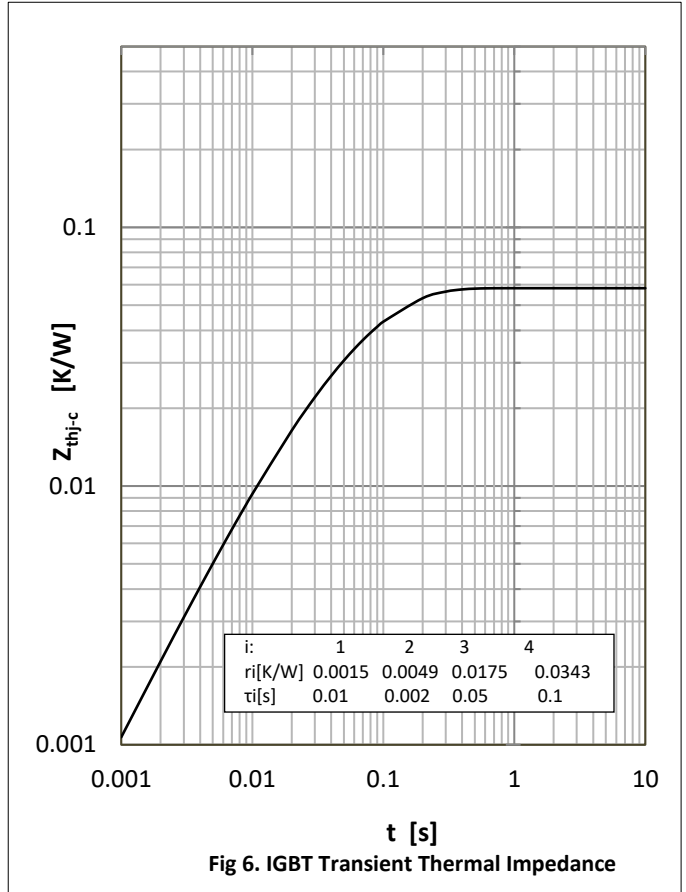
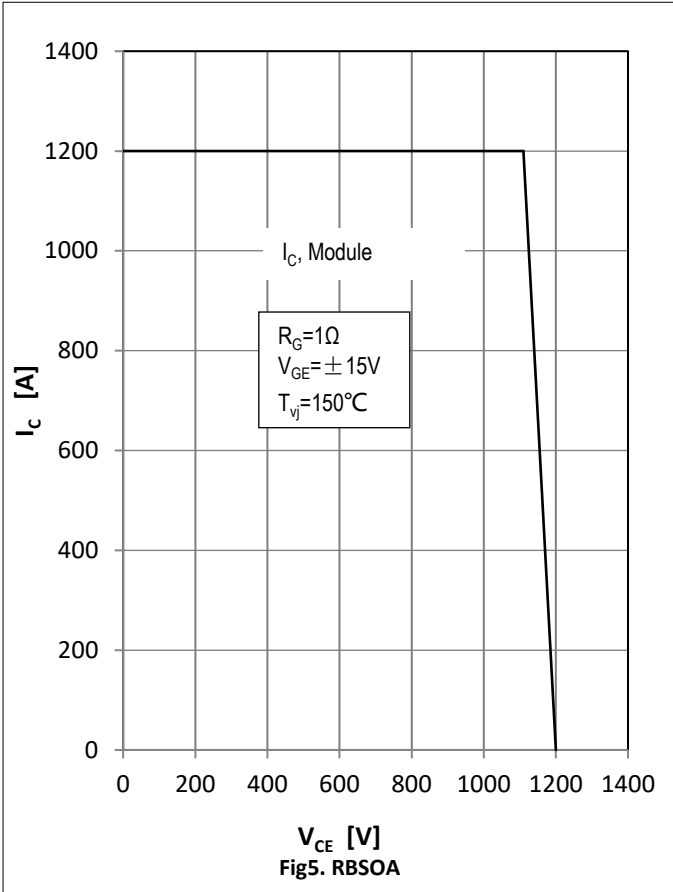


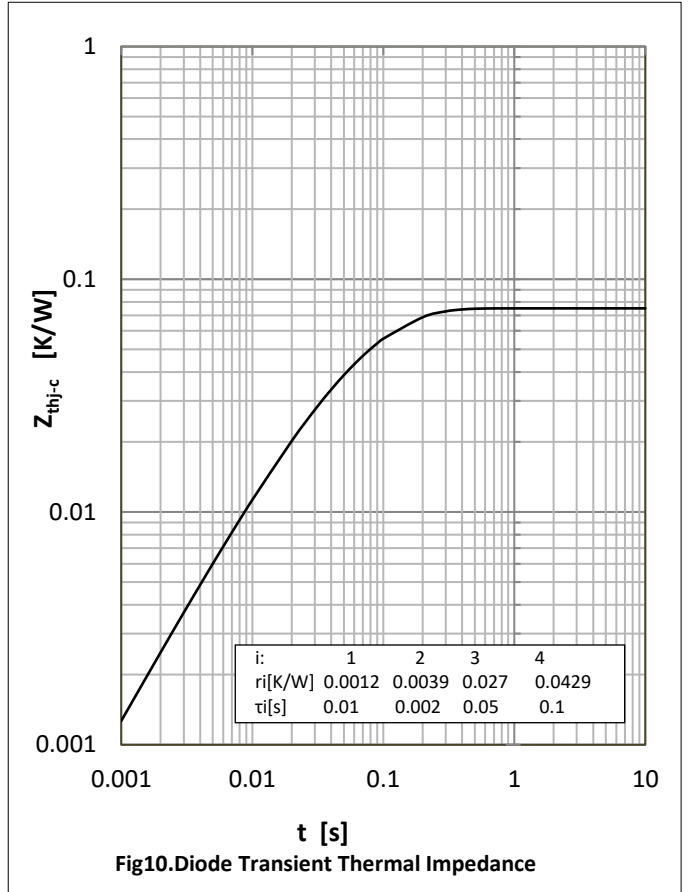
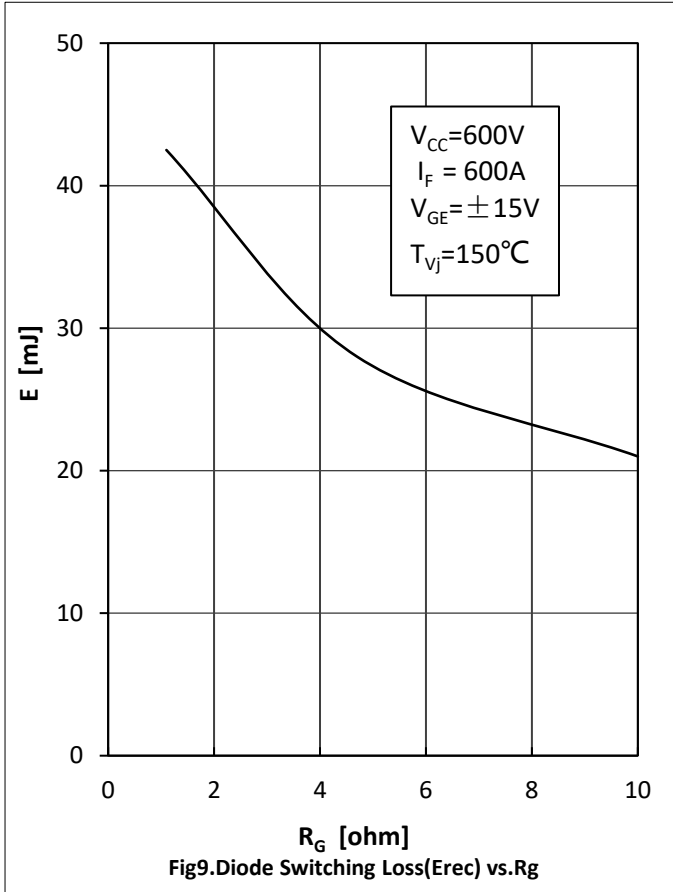
● Module Characteristics

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		175	°C
Storage Temperature	T _{stg}		-40		125	°C
Thermal Resistance Junction to Case	R _{eJC}	per IGBT			0.058	K/W
		per Diode			0.075	
Thermal Resistance Case to Sink	R _{eCS}	Conductive grease applied		0.035		K/W
Comparative Tracking Index	CTI		400			
Module Electrodes Torque	M _t	Recommended(M6)	3.0		5.0	N·m
Module to Sink Torque	M _s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			315		g









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