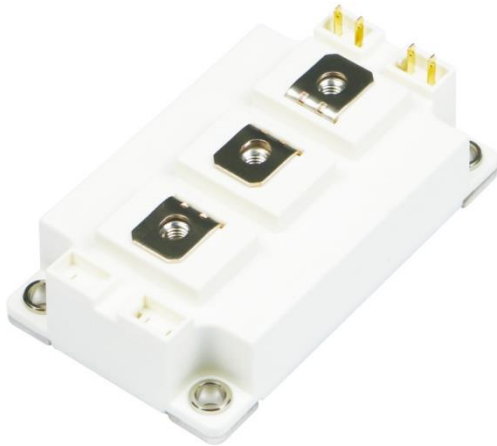


IGBT Modules



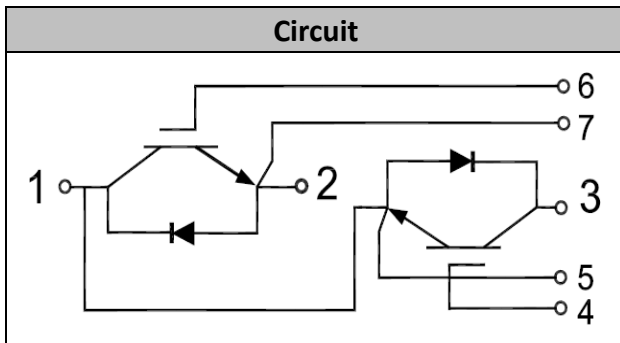
V_{CES} 1200V
 I_c 450A

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	$T_c=100^{\circ}C$	450	A
Repetitive Peak Collector Current	I_{CRM}	$tp=1ms$	900	A
Gate-Emitter Voltage	V_{GES}	$T_{vj}=25^{\circ}C$	± 20	V
Total Power Dissipation	P_{tot}	$T_c=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	2307	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	$V_{CE(sat)}$	$I_C=450A, V_{GE}=15V, T_{vj}=25^{\circ}C$		1.90	2.25	V
		$I_C=450A, V_{GE}=15V, T_{vj}=125^{\circ}C$		2.15		
		$I_C=450A, V_{GE}=15V, T_{vj}=150^{\circ}C$		2.20		
Gate Charge	Q_G			3.62		μC
Internal Gate Resistance	R_{Gint}			1.67		Ω
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz, T_{vj}=25^{\circ}C$		25		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	$t_{d(on)}$	$I_C=450A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.8\Omega$ $T_{vj}=25^{\circ}C$		161		ns
Rise Time	t_r			52		ns
Turn-off Delay Time	$t_{d(off)}$			502		ns
Fall Time	t_f			96		ns
Energy Dissipation During Turn-on Time	E_{on}			23.2		mJ
Energy Dissipation During Turn-off Time	E_{off}			28.5		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=450A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.8\Omega$ $T_{vj}=125^{\circ}C$		192		ns
Rise Time	t_r			63		ns
Turn-off Delay Time	$t_{d(off)}$			536		ns
Fall Time	t_f			135		ns
Energy Dissipation During Turn-on Time	E_{on}			31.5		mJ
Energy Dissipation During Turn-off Time	E_{off}			44.3		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=450A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.8\Omega$ $T_{vj}=150^{\circ}C$		197		ns
Rise Time	t_r			68		ns
Turn-off Delay Time	$t_{d(off)}$			543		ns
Fall Time	t_f			137		ns
Energy Dissipation During Turn-on Time	E_{on}			34.6		mJ
Energy Dissipation During Turn-off Time	E_{off}			48.1		mJ
SC Data	I_{sc}	$T_p \leq 10\mu s, V_{GE}=15V,$ $T_{vj}=150^{\circ}C, V_{cc}=900V,$ $V_{CEM} \leq 1200V$		2250		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		450	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1ms$	900	A
I ² t-value	I ² t	$V_R=0, t_p=10ms, T_j=125^{\circ}C$	32000	A ² s
		$V_R=0, t_p=10ms, T_j=150^{\circ}C$	30000	

Characteristic values

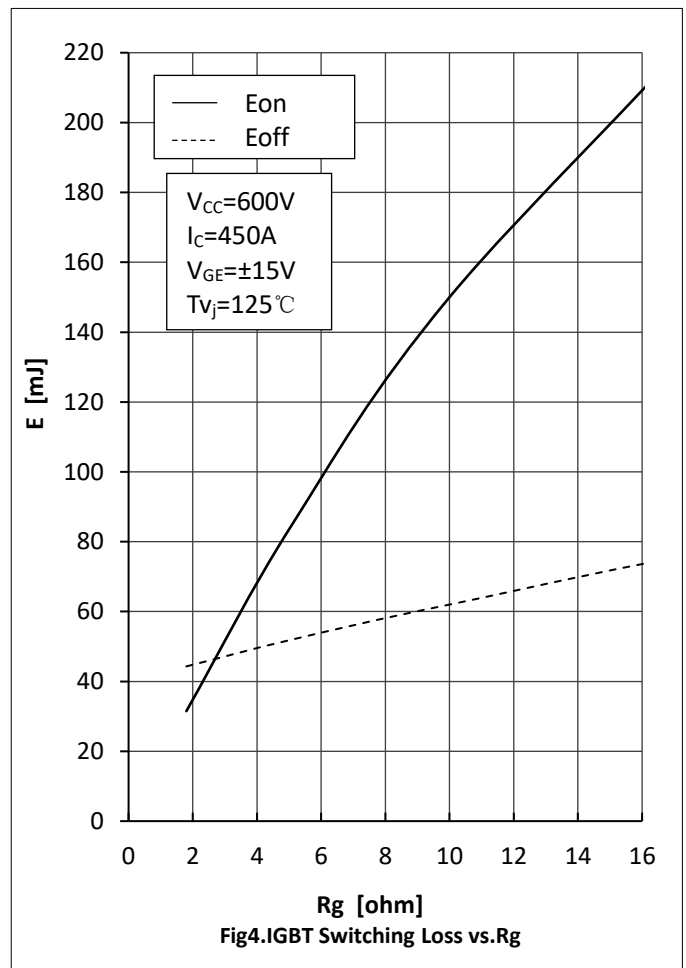
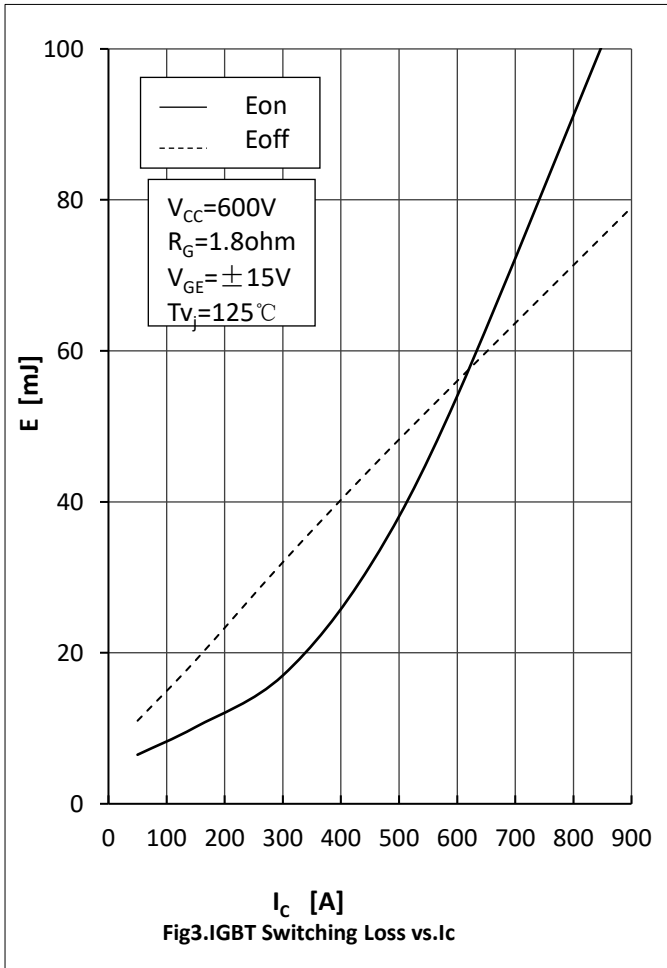
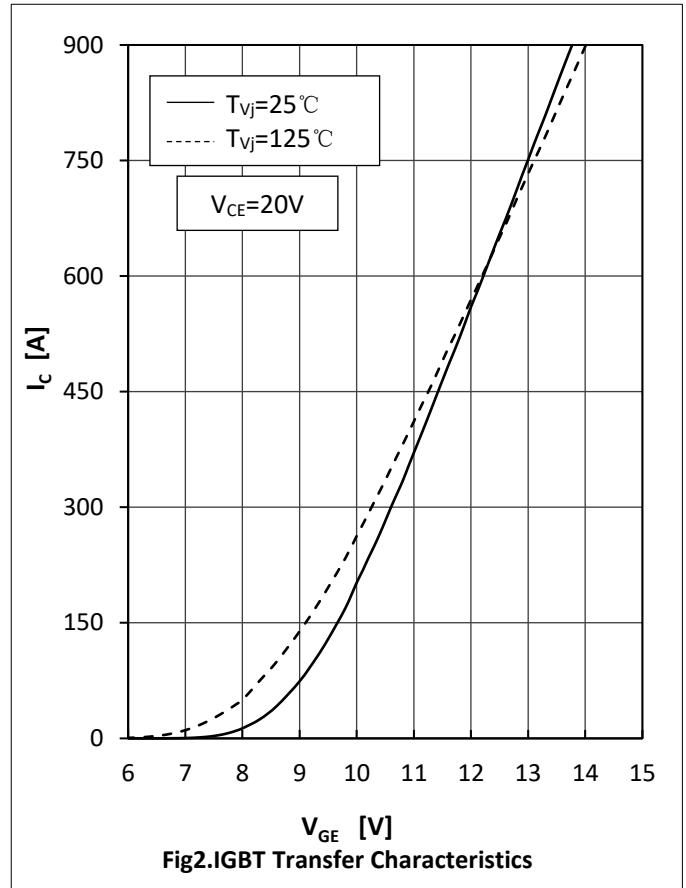
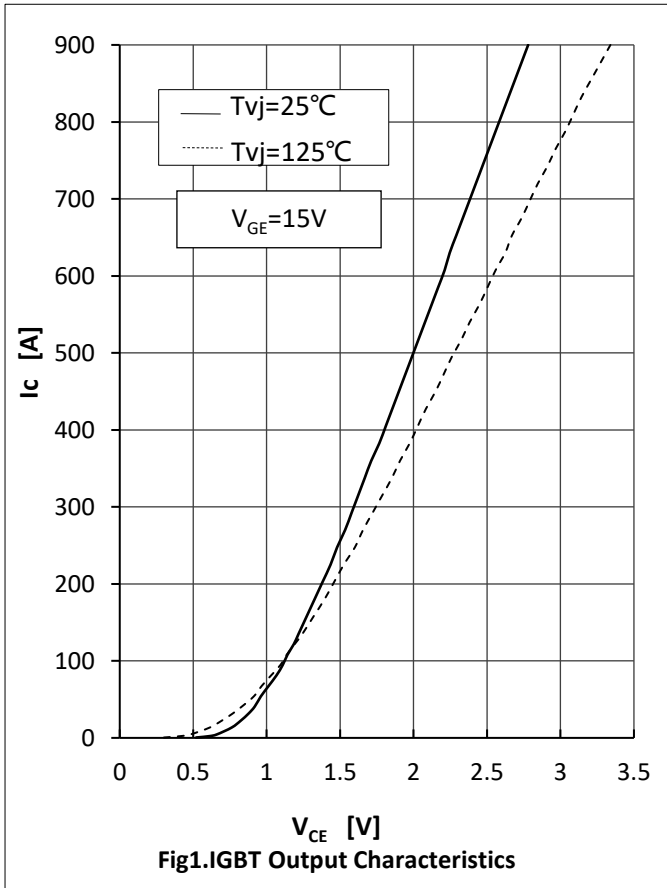
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=450A, T_{vj}=25^{\circ}C$		2.10		V
		$I_F=450A, T_{vj}=125^{\circ}C$		2.15		
		$I_F=450A, T_{vj}=150^{\circ}C$		2.17		
Recovered Charge	Q_{rr}	$I_F=450 A$		45		uC
Peak Reverse Recovery Current	I_{rr}	$V_R=600V$ $-di_F/dt=6500A/us$		383		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=25^{\circ}C$		21.2		mJ
Recovered Charge	Q_{rr}	$I_F=450 A$		86		uC
Peak Reverse Recovery Current	I_{rr}	$V_R=600V$ $-di_F/dt=6500A/us$		453		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=125^{\circ}C$		37.2		mJ
Recovered Charge	Q_{rr}	$I_F=450 A$		91		uC
Peak Reverse Recovery Current	I_{rr}	$V_R=600V$ $-di_F/dt=6500A/us$		461		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=150^{\circ}C$		41.5		mJ

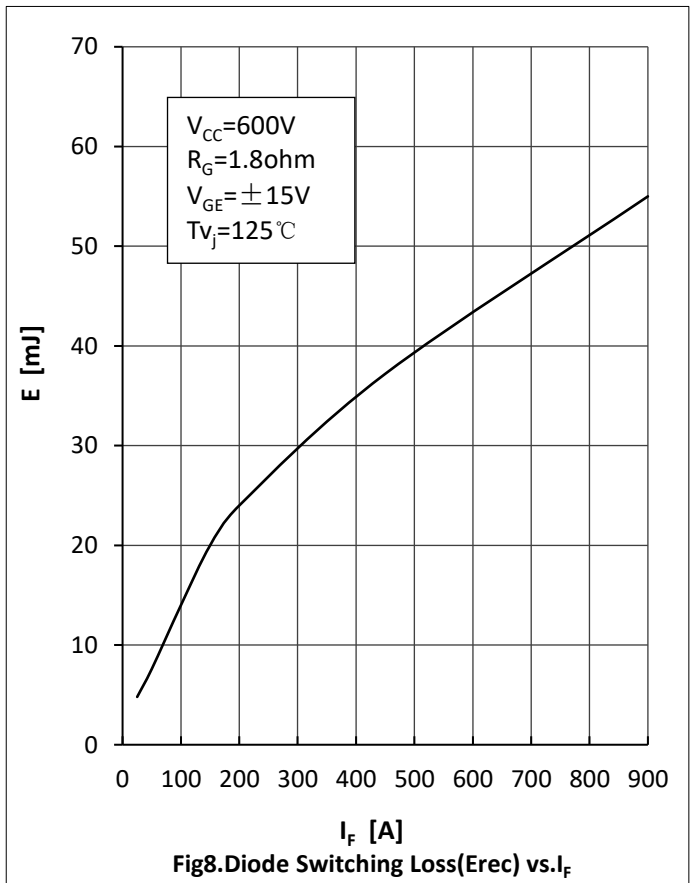
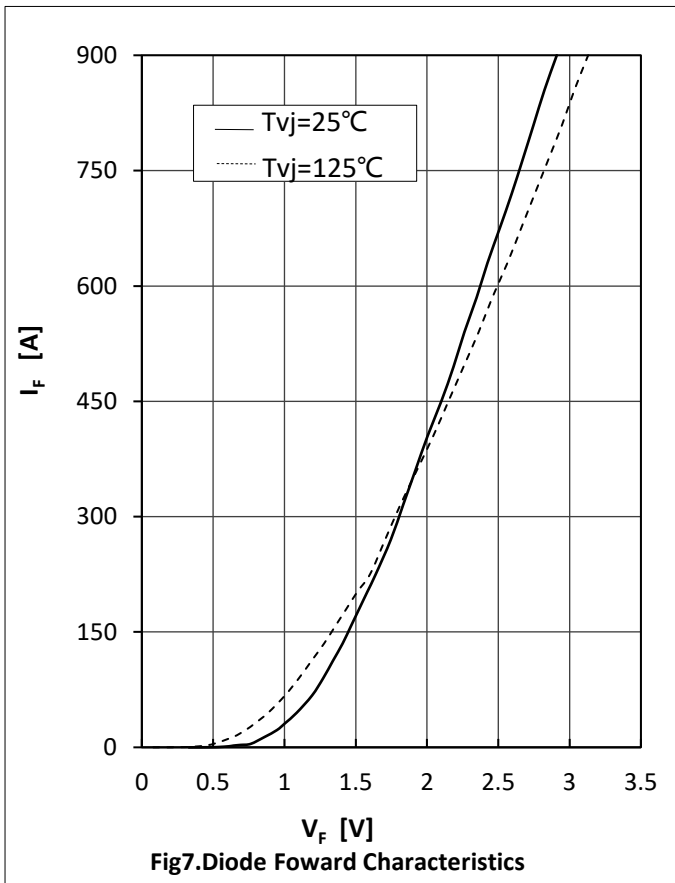
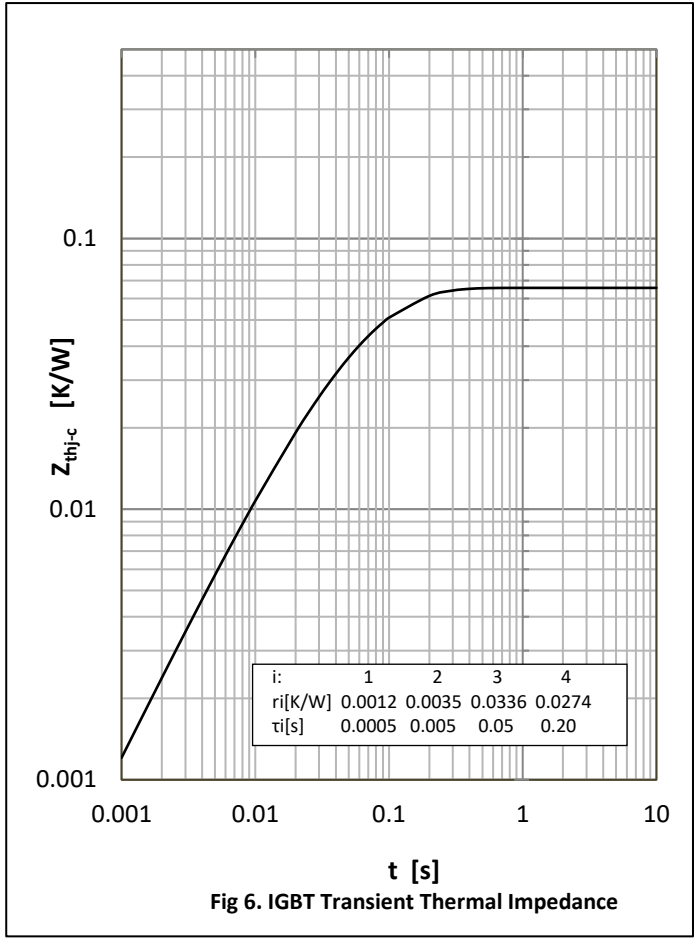
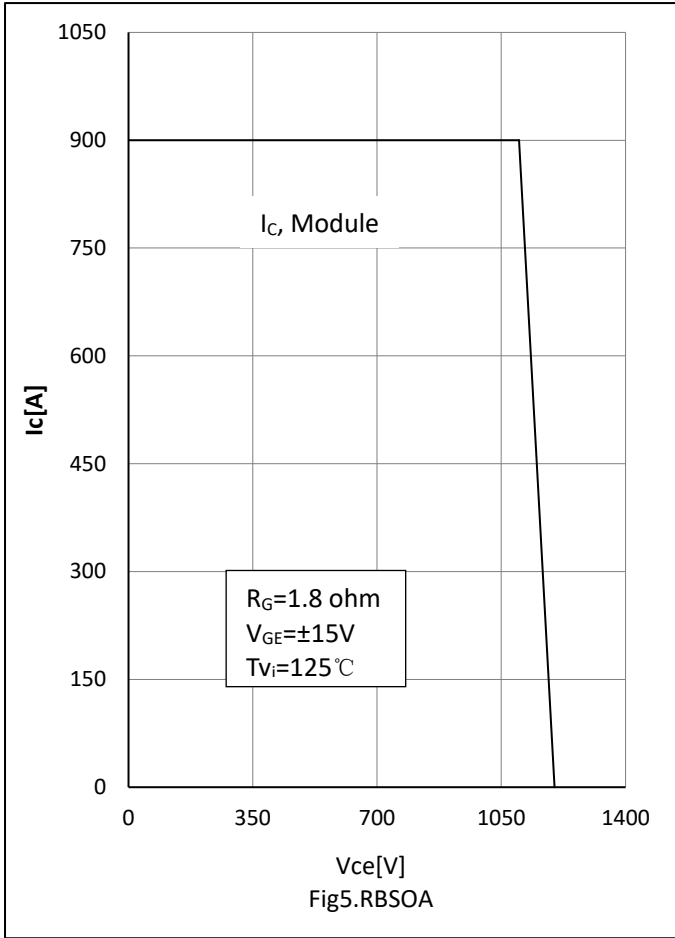


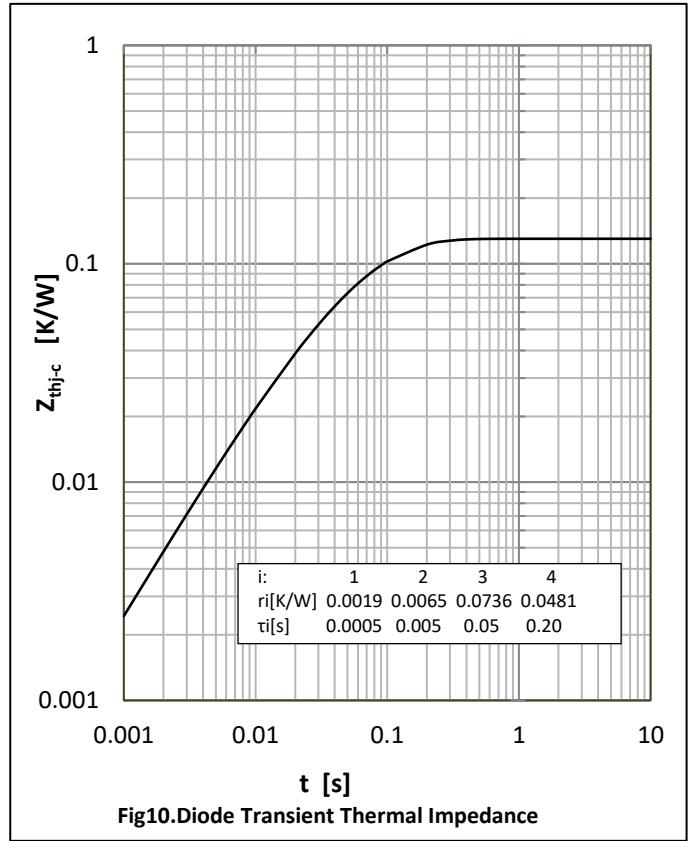
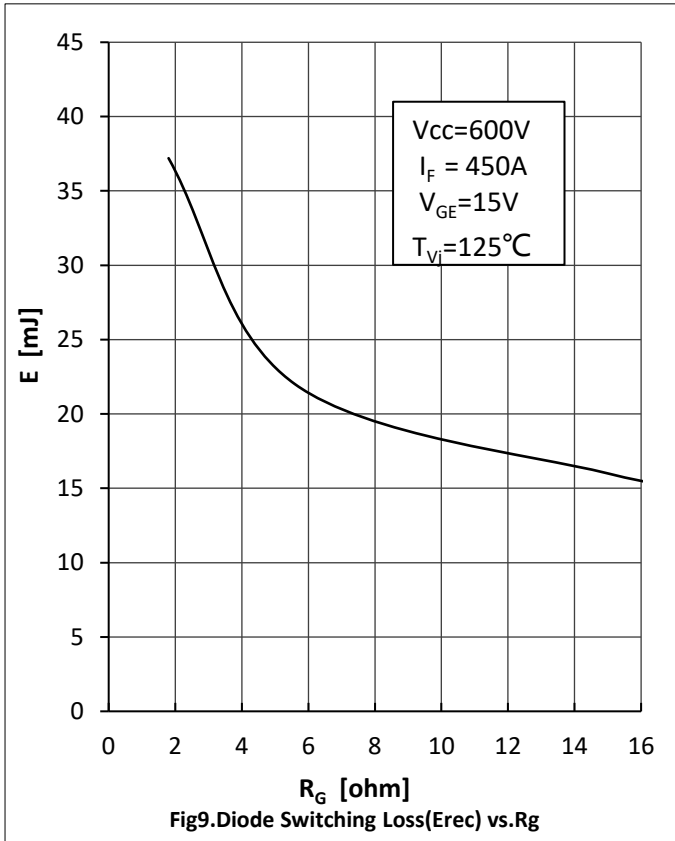
● Module Characteristics

$T_C=25^{\circ}\text{C}$ unless otherwise specified

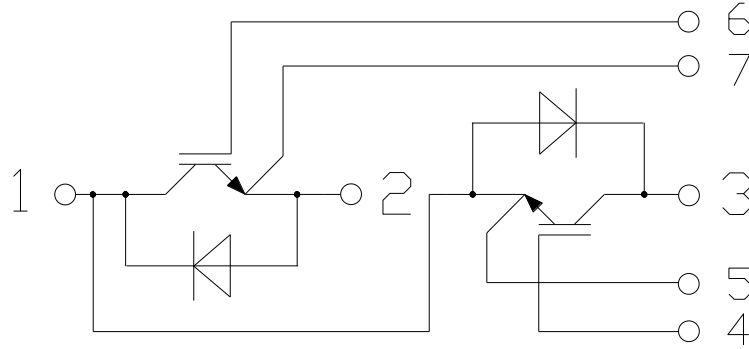
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation voltage	V_{isol}	$t=1\text{min}, f=50\text{Hz}$	2500			V
Maximum Junction Temperature	T_{jmax}				175	$^{\circ}\text{C}$
Operating Junction Temperature	T_{vjop}		-40		150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40		125	$^{\circ}\text{C}$
Thermal Resistance Junction-to Case	$R_{\theta\text{JC}}$	per IGBT			0.065	K/W
		per Diode			0.13	
Comparative Tracking Index	CTI			>400		
Thermal Resistance Case-to Sink	$R_{\theta\text{CS}}$	Conductive grease applied		0.033		K/W
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







● Circuit Diagram



● Package Outline Information

Dimensions in Millimeters

