



IGBT Modules

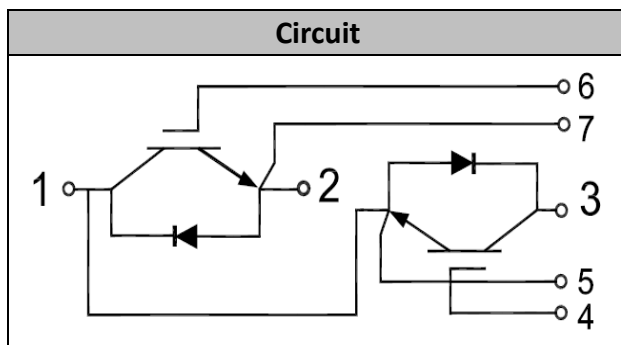
V _{CES}	1200V
I _C	150A

Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)
- Soft switching 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°C	1200	V
Continuous Collector Current	I _C	T _c =100°C	150	A
Repetitive Peak Collector Current	I _{CRM}	tp=1ms	300	A
Gate-Emitter Voltage	V _{GES}	T _{vj} =25°C	± 20	V
Total Power Dissipation	P _{tot}	T _c =25°C T _{vjmax} =175°C	968	W


Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, $I_C=5mA$, $T_{vj}=25^{\circ}C$	5.0	5.7	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	$V_{CE(sat)}$	$I_C=150A$, $V_{GE}=15V$, $T_{vj}=25^{\circ}C$		2.10	2.50	V
		$I_C=150A$, $V_{GE}=15V$, $T_{vj}=125^{\circ}C$		2.40		
Input Capacitance	C_{ies}	$V_{CE}=25V$, $V_{GE}=0V$, $f=1MHz$, $T_{vj}=25^{\circ}C$		9.5		nF
Reverse Transfer Capacitance	C_{res}			0.39		nF
Internal Gate Resistance	R_{gint}			2.5		Ω
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$, $T_{vj}=25^{\circ}C$			400	nA
Turn-on Delay Time	$t_{d(on)}$	$I_C=150A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=5.1\Omega$ $T_{vj}=25^{\circ}C$		165		ns
Rise Time	t_r			48		ns
Turn-off Delay Time	$t_{d(off)}$			296		ns
Fall Time	t_f			94		ns
Energy Dissipation During Turn-on Time	E_{on}			10.78		mJ
Energy Dissipation During Turn-off Time	E_{off}			8.25		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=150A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=5.1\Omega$ $T_{vj}=125^{\circ}C$		183		ns
Rise Time	t_r			57		ns
Turn-off Delay Time	$t_{d(off)}$			405		ns
Fall Time	t_f			108		ns
Energy Dissipation During Turn-on Time	E_{on}			16.3		mJ
Energy Dissipation During Turn-off Time	E_{off}			12.1		mJ
SC Data	I_{sc}	$T_p \leq 10\mu s$, $V_{GE}=15V$, $T_{vj}=150^{\circ}C$, $V_{cc}=600V$, $V_{CEM} \leq 1200V$		500		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		150	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1\text{ms}$	300	A

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=150\text{A}, T_{vj}=25^{\circ}\text{C}$		2.0		V
		$I_F=150\text{A}, T_{vj}=125^{\circ}\text{C}$		2.0		
Recovered Charge	Q_{rr}	$I_F=150\text{A}$		12.8		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600\text{V}$ $-di_F/dt=2200\text{A}/\mu\text{s}$		135		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=25^{\circ}\text{C}$		7.28		mJ
Recovered Charge	Q_{rr}	$I_F=150\text{A}$		24.6		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600\text{V}$ $-di_F/dt=2200\text{A}/\mu\text{s}$		162		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=125^{\circ}\text{C}$		12.3		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	$T_{\text{vj op}}$		-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			0.155	K/W
		per Diode			0.292	
Thermal Resistance Case-to Sink	$R_{\theta \text{ CS}}$	Conductive grease applied		0.05		K/W
Module Electrodes Torque	M_t	Recommended(M5)	2.5		5.0	N·m
Module-to-Sink Torque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			150		g

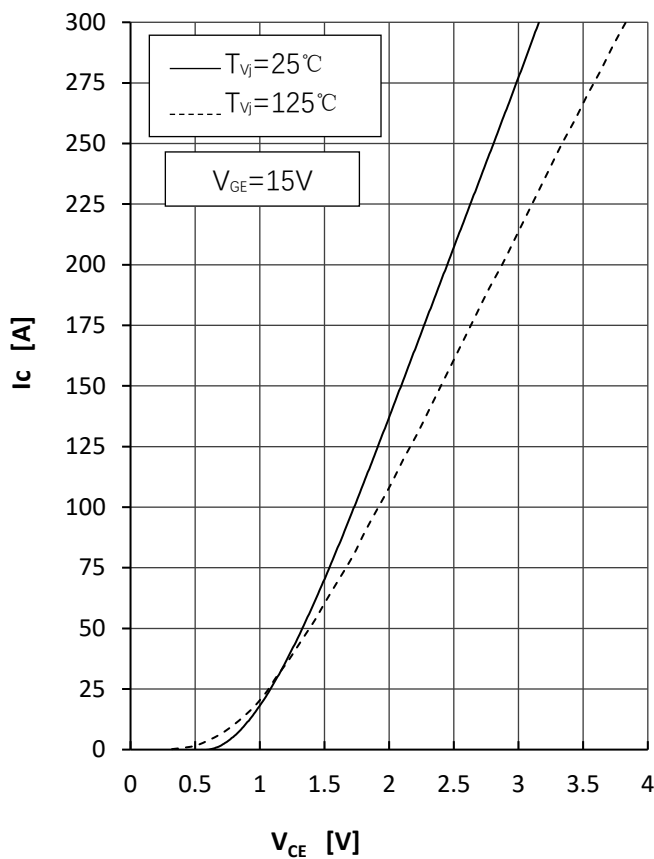


Fig1.IGBT Output Characteristics

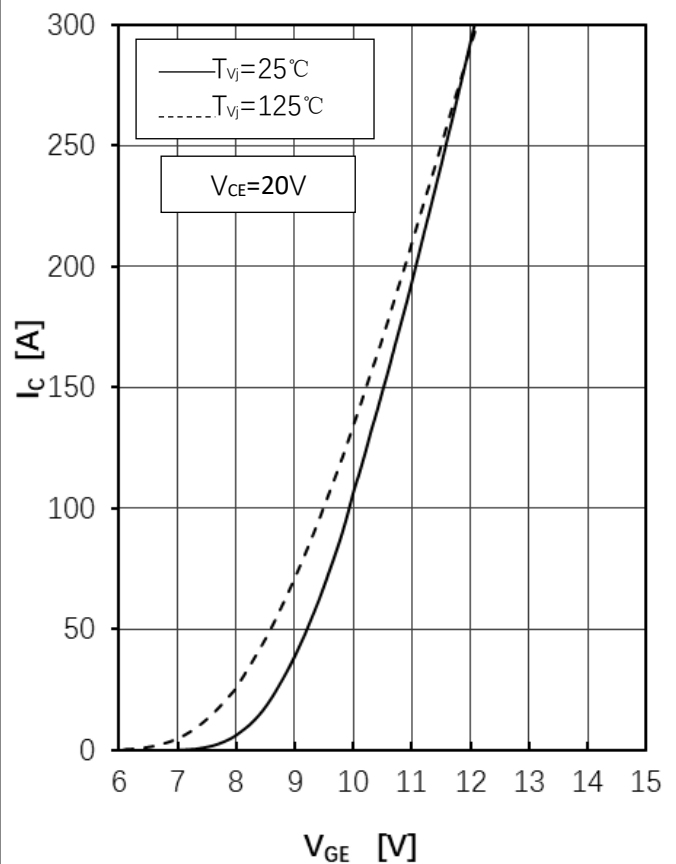


Fig2.IGBT Transfer Characteristics

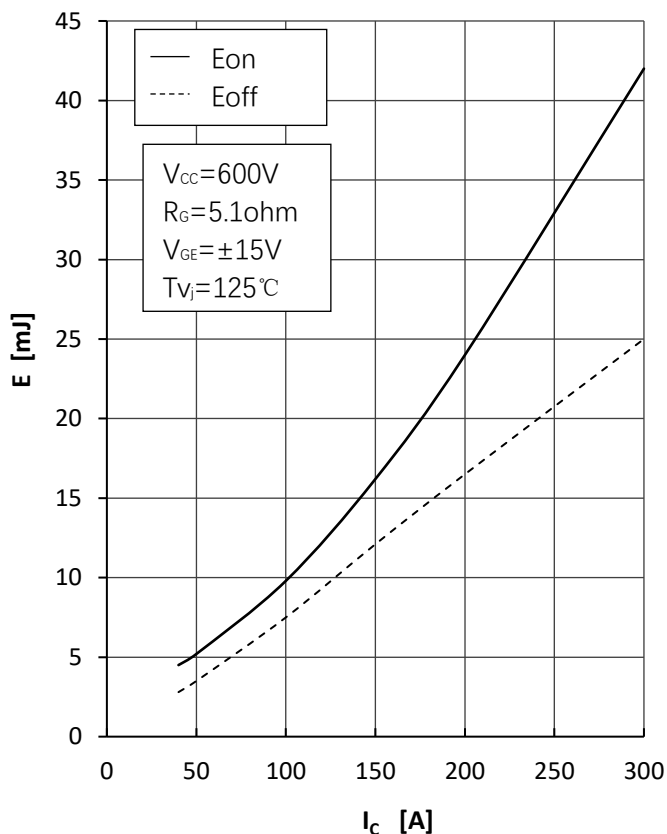


Fig3.IGBT Switching Loss vs. I_c

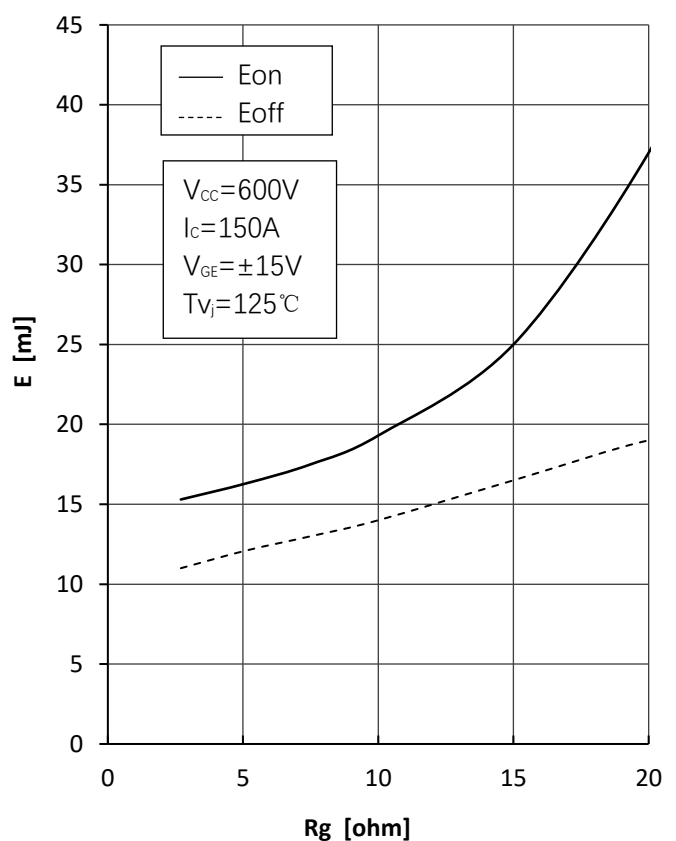
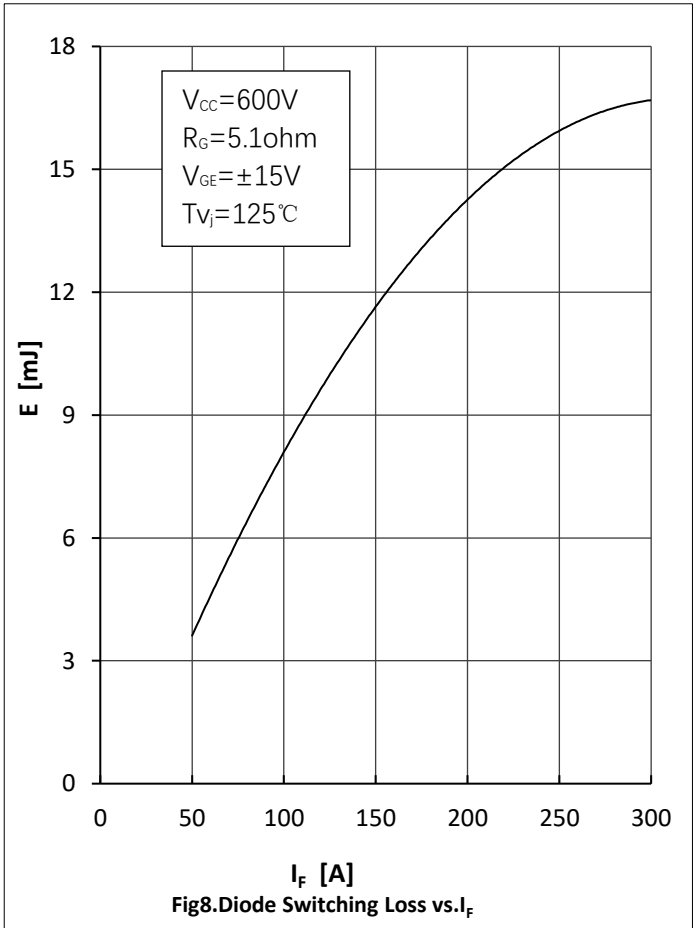
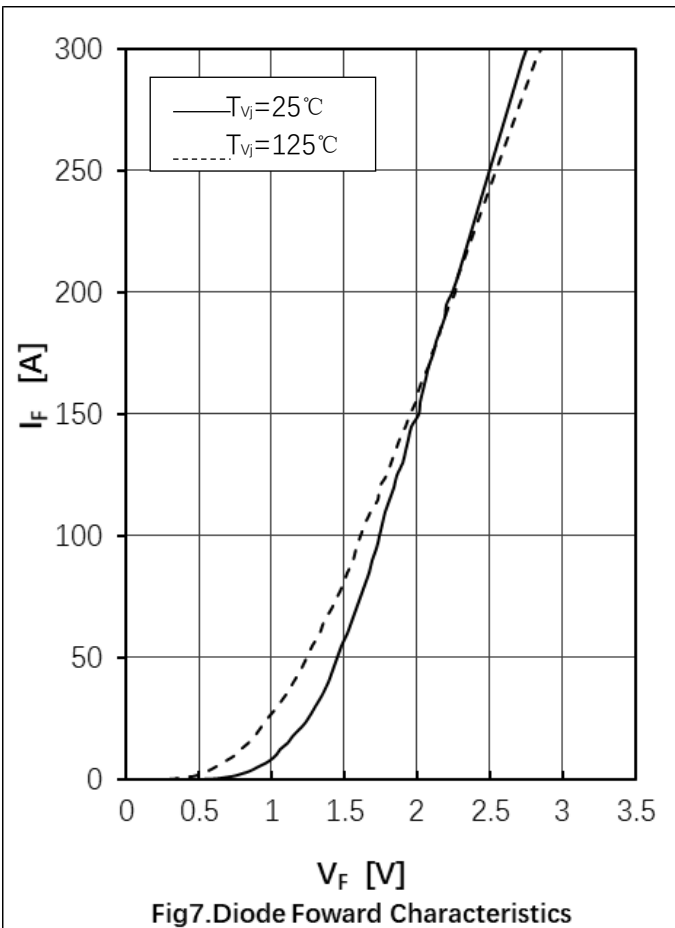
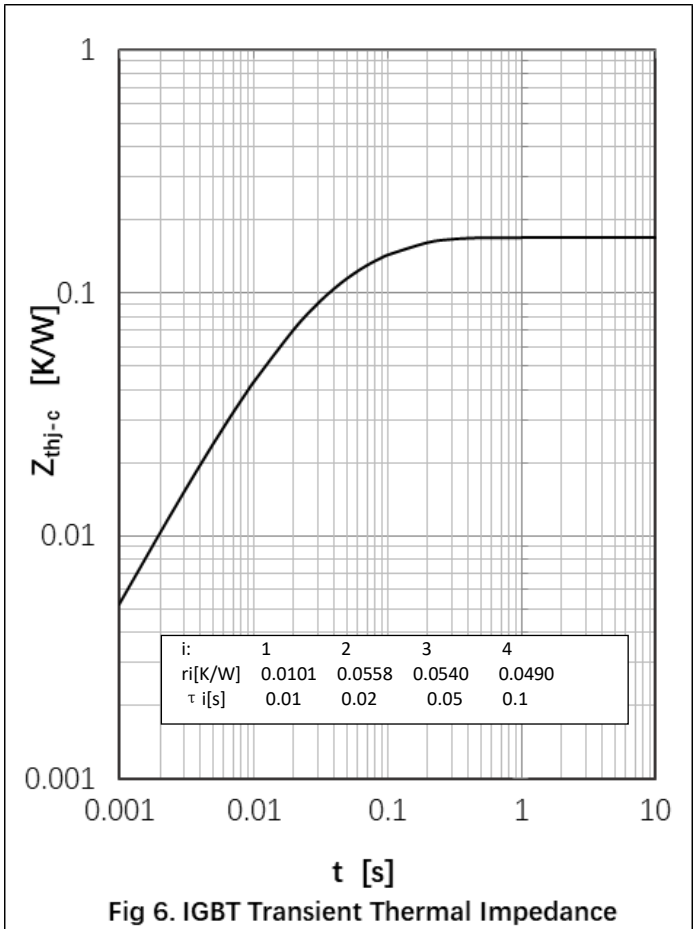
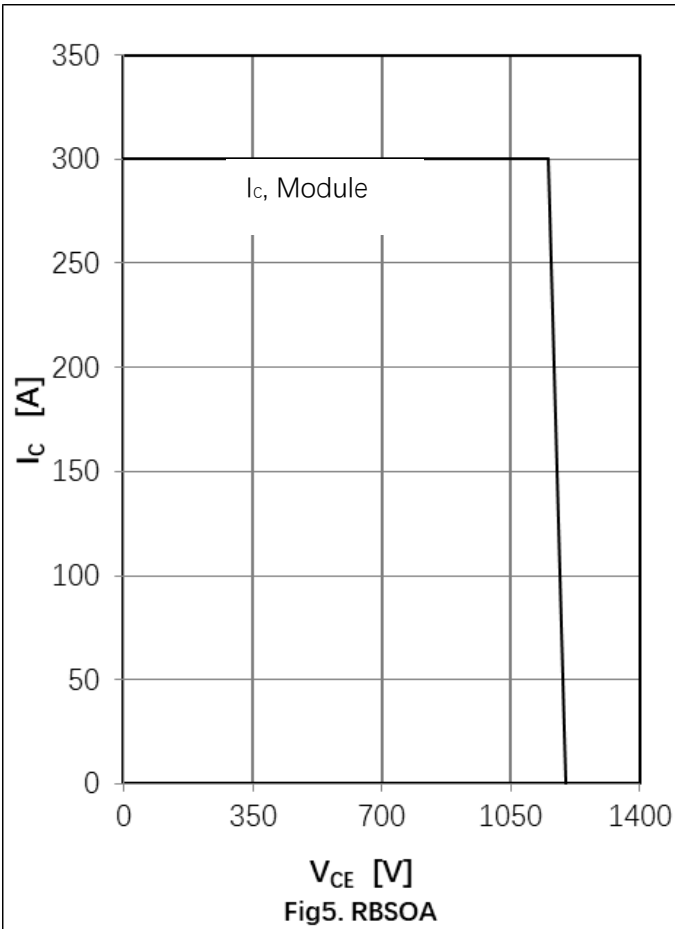
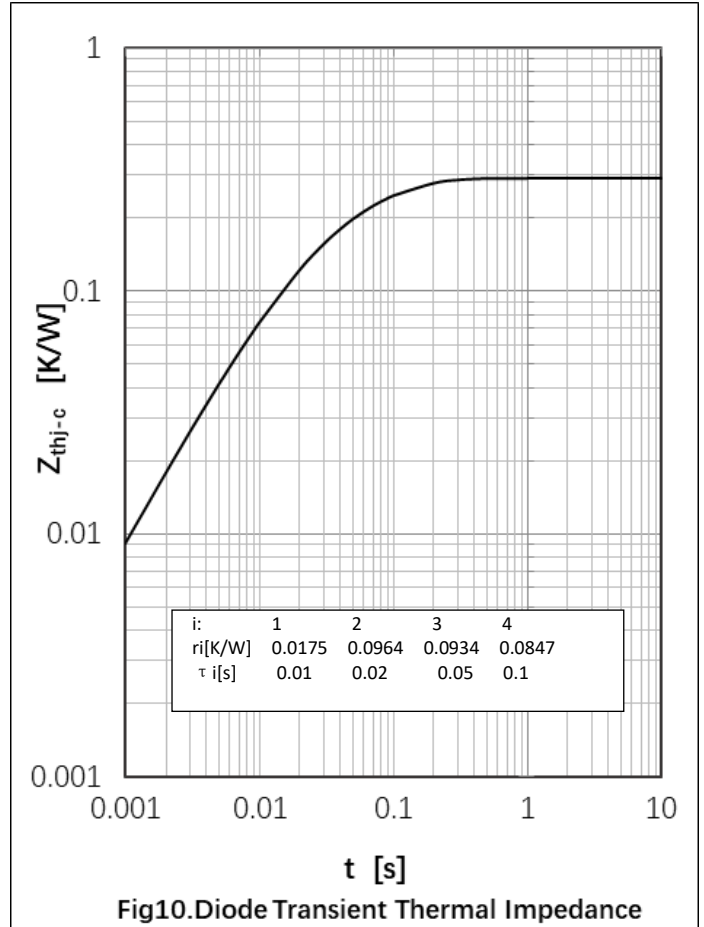
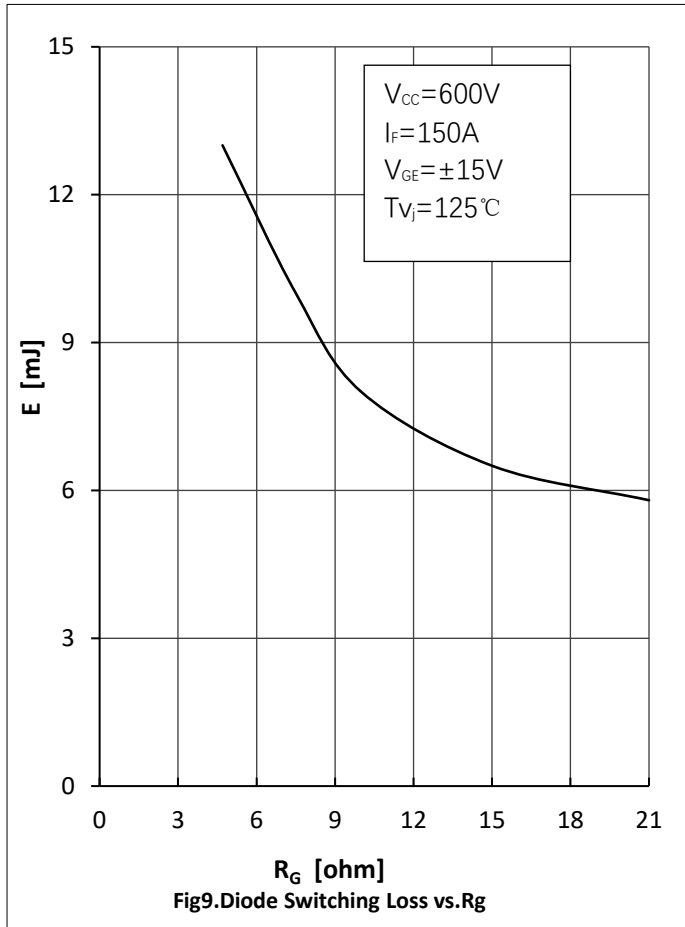
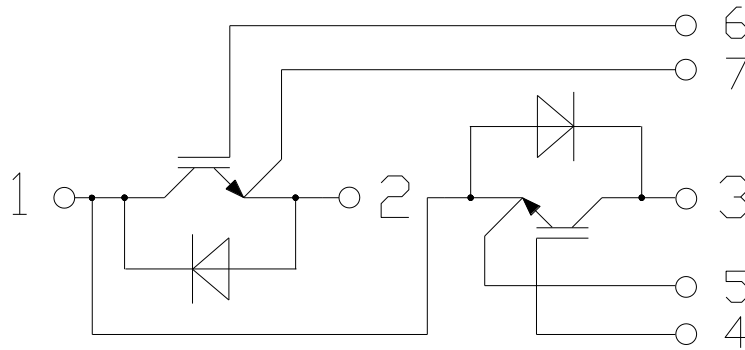


Fig4.IGBT Switching Loss vs. R_g





- **Circuit Diagram**



● Package Outline Information

Dimensions in Millimeters

