

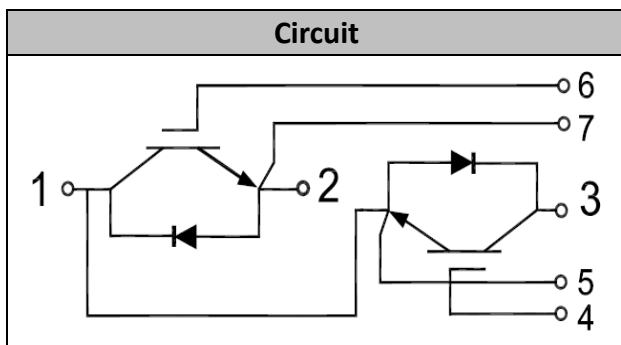


IGBT Modules

V_{CES}	1200V
I_c	200A

Applications

- High frequency drivers
- Solar inverters
- UPS (Uninterruptible Power Supplies)
- Electric welding machine



Features

- High speed IGBT in NPT technology
- Low switching losses
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- Maximum junction temperature 150°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	$T_c=80^{\circ}C$	200	A
Repetitive Peak Collector Current	I_{CRM}	$t_p=1ms$	400	A
Gate-Emitter Voltage	V_{GES}	$T_{vj}=25^{\circ}C$	± 20	V
Total Power Dissipation	P_{tot}	$T_c=25^{\circ}C$ $T_{vjmax}=150^{\circ}C$	1358	W

**Characteristic values**

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, $I_C=8mA$, $T_{vj}=25^{\circ}C$	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	$V_{CE(sat)}$	$I_C=200A$, $V_{GE}=15V$, $T_{vj}=25^{\circ}C$		3.0	3.5	V
		$I_C=200A$, $V_{GE}=15V$, $T_{vj}=125^{\circ}C$		3.8		
Gate Charge	Q_G			2.0		uC
Input Capacitance	C_{ies}	$V_{CE}=25V$, $V_{GE}=0V$, $f=1MHz$, $T_{vj}=25^{\circ}C$		13.2		nF
Reverse Transfer Capacitance	C_{res}			0.8		nF
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$, $T_{vj}=25^{\circ}C$			400	nA
Turn-on Delay Time	$t_{d(on)}$	$I_C=200A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_{GON}=5.1\Omega$ $R_{GOFF}=2.5\Omega$ $T_{vj}=25^{\circ}C$		105		ns
Rise Time	t_r			80		ns
Turn-off Delay Time	$t_{d(off)}$			285		ns
Fall Time	t_f			24		ns
Energy Dissipation During Turn-on Time	E_{on}			21.8		mJ
Energy Dissipation During Turn-off Time	E_{off}			7.0		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=200A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_{GON}=5.1\Omega$ $R_{GOFF}=2.5\Omega$ $T_{vj}=125^{\circ}C$		112		ns
Rise Time	t_r			86		ns
Turn-off Delay Time	$t_{d(off)}$			330		ns
Fall Time	t_f			29		ns
Energy Dissipation During Turn-on Time	E_{on}			31.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			10.2		mJ
SC Data	I_{sc}	$T_p \leq 10\mu s$, $V_{GE}=15V$, $T_{vj}=125^{\circ}C$, $V_{cc}=600V$, $V_{CEM} \leq 1200V$		1500		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		200	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1\text{ms}$	400	A

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=200\text{A}, T_{vj}=25^{\circ}\text{C}$		1.90	2.3	V
		$I_F=200\text{A}, T_{vj}=125^{\circ}\text{C}$		1.95		
Recovered Charge	Q_{rr}	$I_F=200\text{A}$		11.5		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600\text{V}$ $-di_F/dt=2500\text{A}/\mu\text{s}$		105		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=25^{\circ}\text{C}$		6.8		mJ
Recovered Charge	Q_{rr}	$I_F=200\text{A}$		20.8		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600\text{V}$ $-di_F/dt=2500\text{A}/\mu\text{s}$		124		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=125^{\circ}\text{C}$		13.8		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}				150	$^{\circ}\text{C}$
Operating Junction Temperature	$T_{\text{vj op}}$		-40		125	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40		125	$^{\circ}\text{C}$
Thermal Resistance Junction-to Case	$R_{\theta \text{ JC}}$	per IGBT			0.09	K/W
		per Diode			0.19	
Thermal Resistance Case-to Sink	$R_{\theta \text{ CS}}$	Conductive grease applied		0.046		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

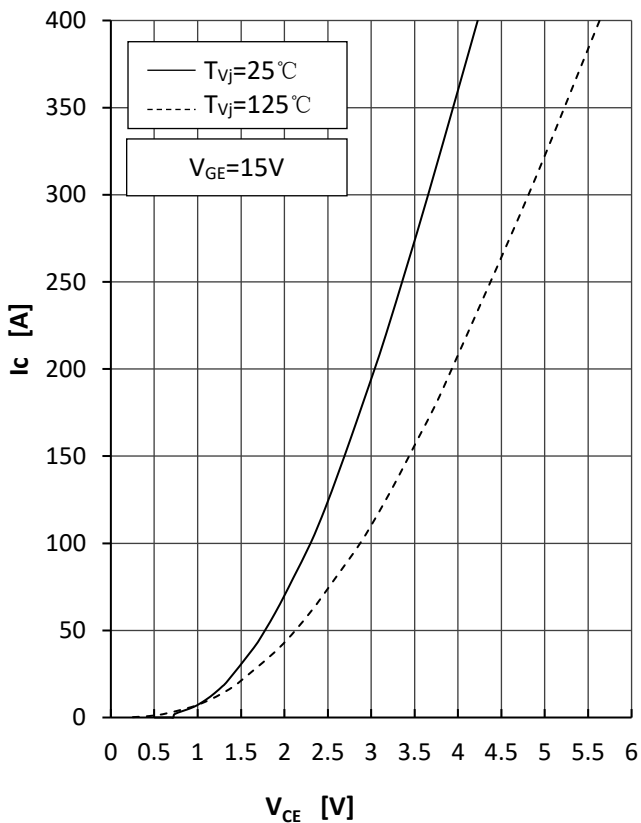


Fig1.IGBT Output Characteristics

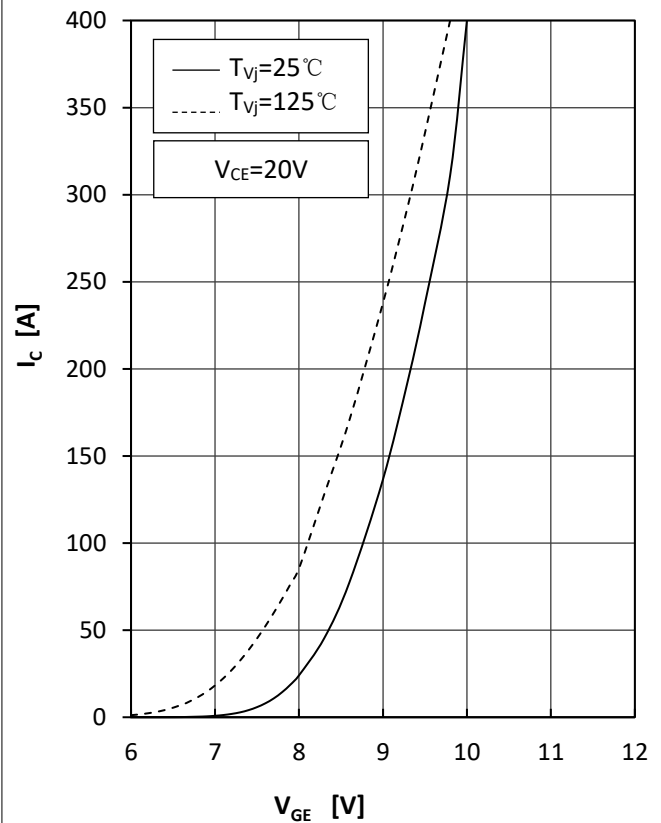


Fig2.IGBT Transfer Characteristics

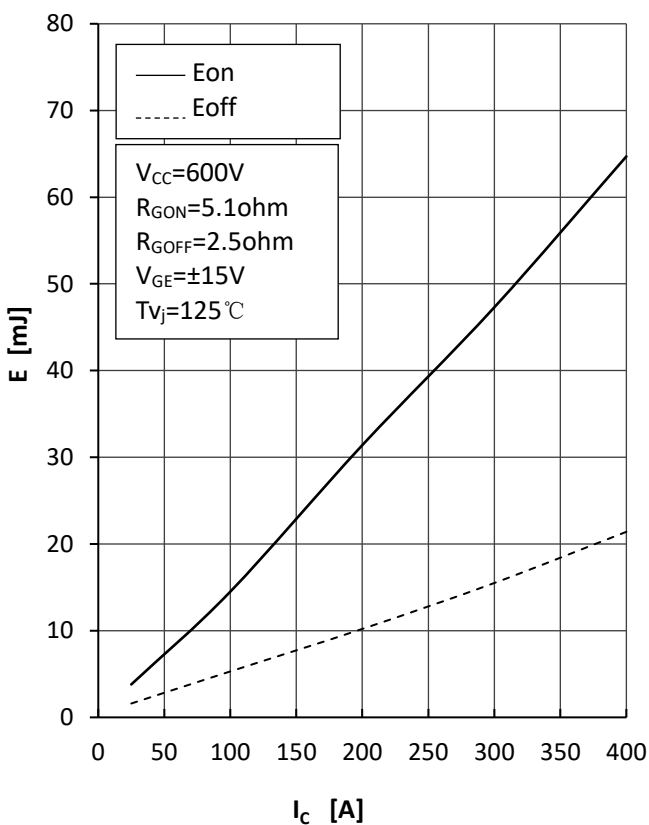


Fig3.IGBT Switching Loss vs.Ic

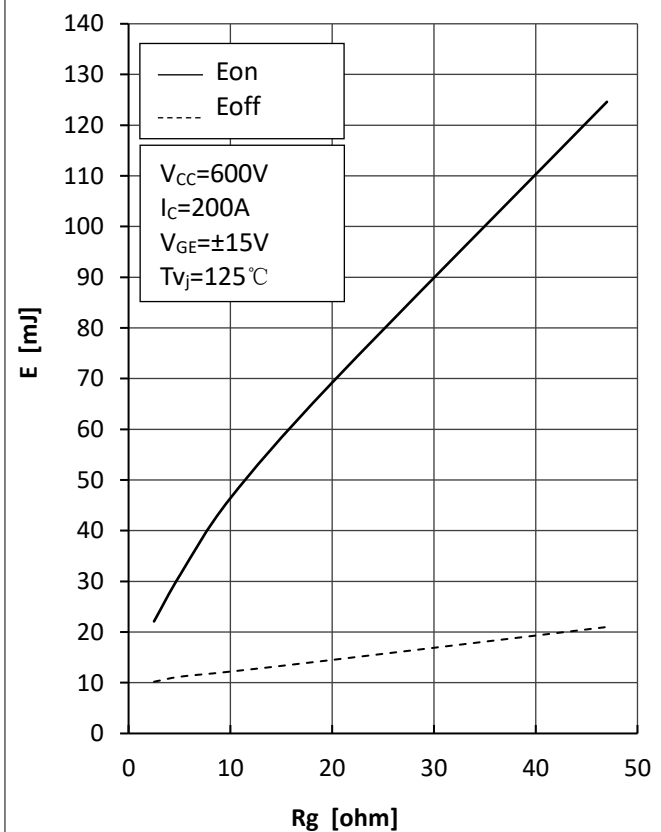
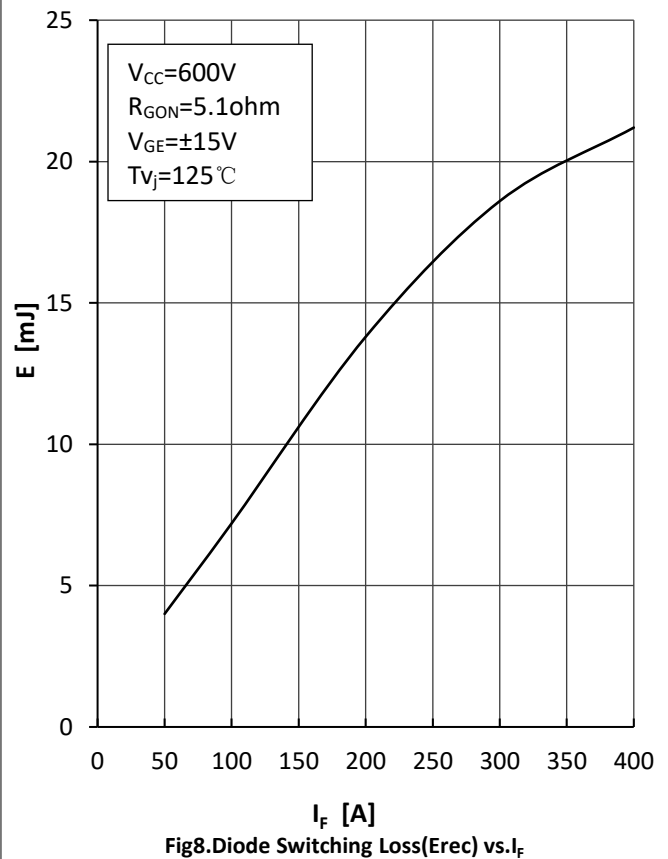
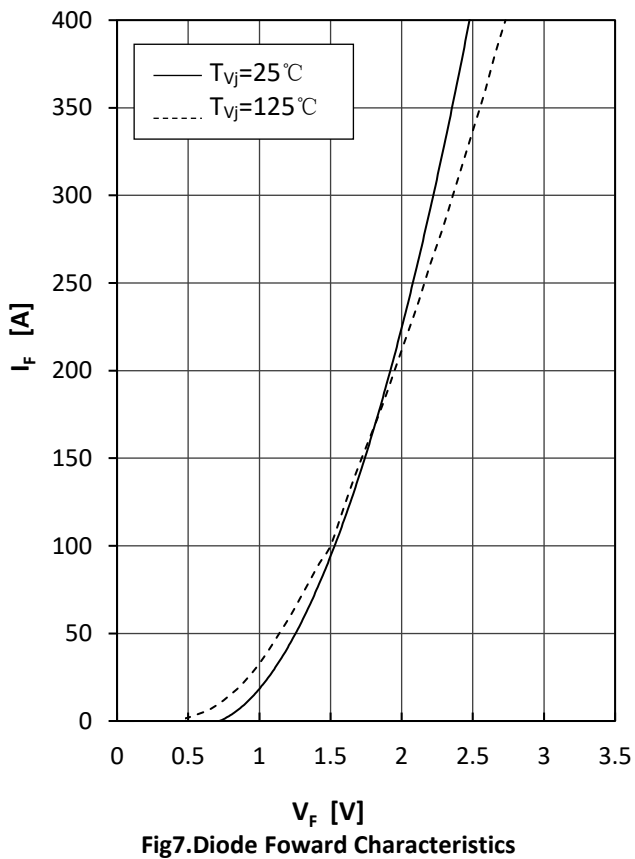
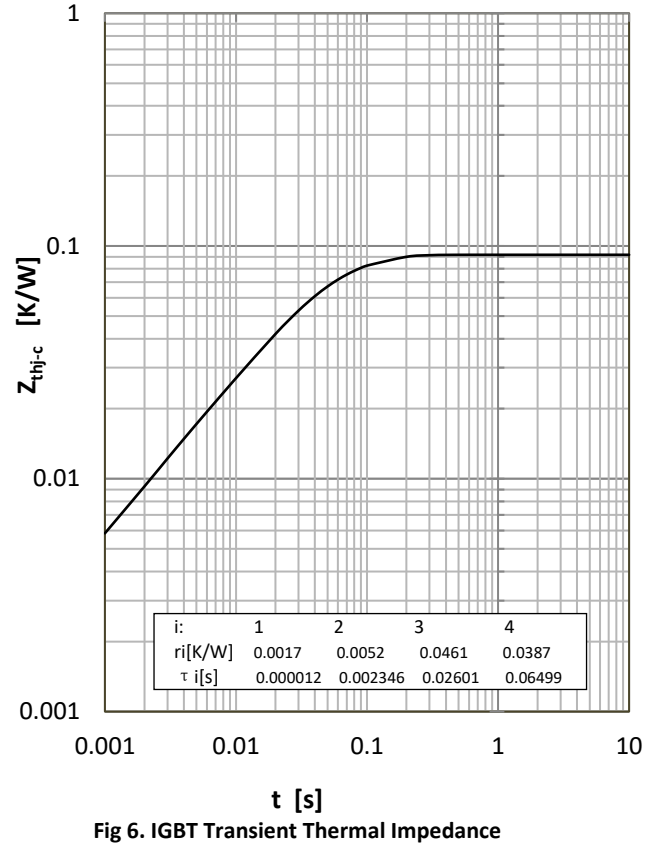
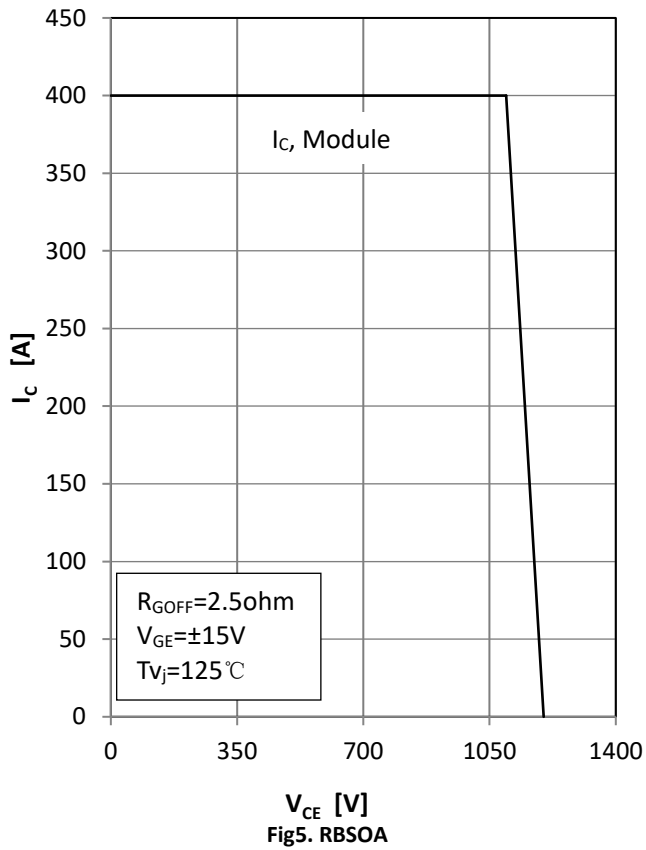
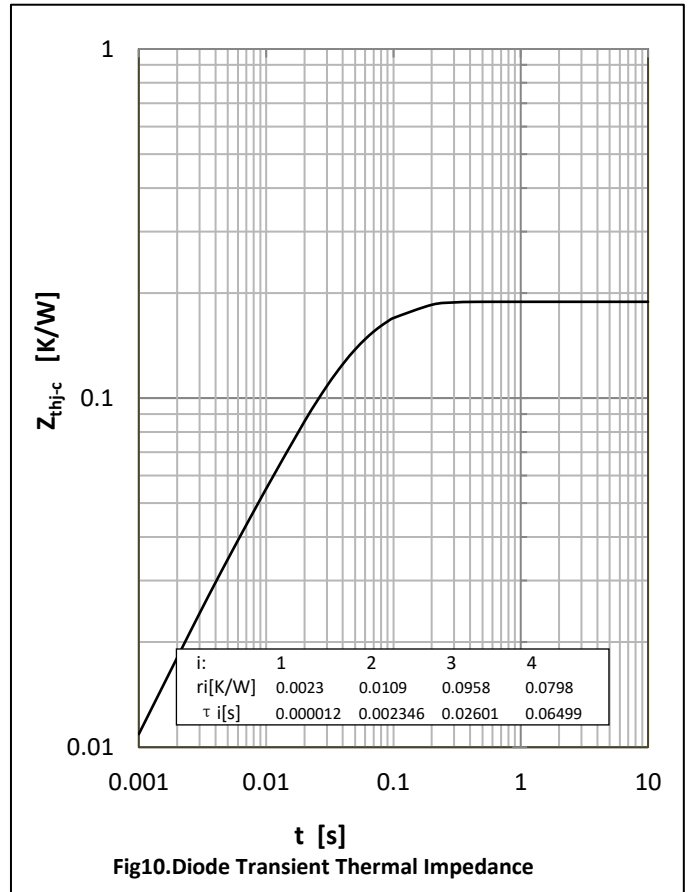
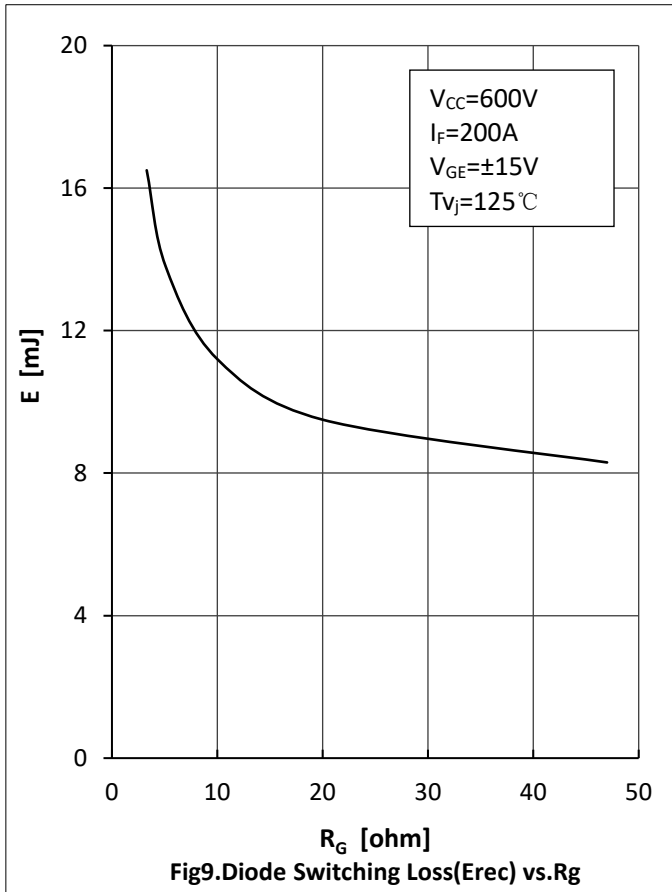


Fig4.IGBT Switching Loss vs.Rg





[illegible]