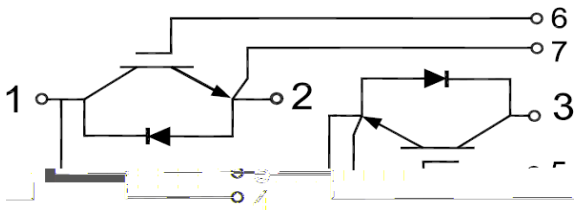
IGBT Modules

VCES	1200V
IC	150A

Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)
- Soft switching welding machine

Circuit



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℃

● IGBT

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	V_{GE}=0V, I_C =1mA, T_{vj}=25℃	1200	V
Continuous Collector Current	I_C	T_c=100℃	150	A
Repetitive Peak Collector Current	I_{CRM}	tp=1ms	300	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_c=25℃ T_{vjmax}=175℃	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℃	5.0	5.7	6.5	V
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=1200V,V_{GE}=0V, T_{vj}=25			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	Ic=150A,V_{GE}=15V, T_{vj}=25℃		1.90	2.20	V
		Ic=150A,V_{GE}=15V, T_{vj}=125℃		2.20		
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE} =0V, f=1MHz, T_{vj}=25		9.8		nF
Reverse Transfer Capacitance	C_{res}			0.48		nF
Internal Gate Resistance	R_{gint}			2.5		Ω
Gate-Emitter leakage current	I_{GES}	V_{CE}=0 V, V_{GE}=20V,T_{vj} = 25℃			400	nA
Turn-on Delay Time	$t_{d(on)}$	I_C=150 A V_{CE}=600 V V_{GE}=± 15V R_G=5.1Ω T_{vj}=25℃		185		ns
Rise Time	t_r			55		ns
Turn-off Delay Time	$t_{d(off)}$			360		ns
Fall Time	t_f			115		ns
Energy Dissipation During Turn-on Time	E_{on}			15.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			11.6		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=150 A V_{CE}=600 V V_{GE}=± 15V R_G=5.1Ω T_{vj}=125℃		200		ns
Rise Time	t_r			60		ns
Turn-off Delay Time	$t_{d(off)}$			420		ns
Fall Time	t_f			120		ns
Energy Dissipation During Turn-on Time	E_{on}			23.2		mJ
Energy Dissipation During Turn-off Time	E_{off}			17.0		mJ
SC Data	I_{sc}	T_p≤10us, V_{GE}=15V, Tvj=150℃,V_{cc}=600V, V_{CEM}≤1200V		500		A

Diode

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit

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	℃
Operating Junction Temperature	$T_{vj\ op}$		-40		150	℃
Storage Temperature	T_{stg}		-40		125	℃
Thermal Resistance Junction-to Case	$R_{\theta JC}$	per IGBT			0.155	K/W
		per Diode			0.29	
Thermal Resistance Case-to Sink	$R_{\theta CS}$	Conductive grease applied		0.05		K/W
Module ElectrodesTorque	M_t	Recommended(M5)	2.5		5.0	N·m
Module-to-SinkTorque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			150		g

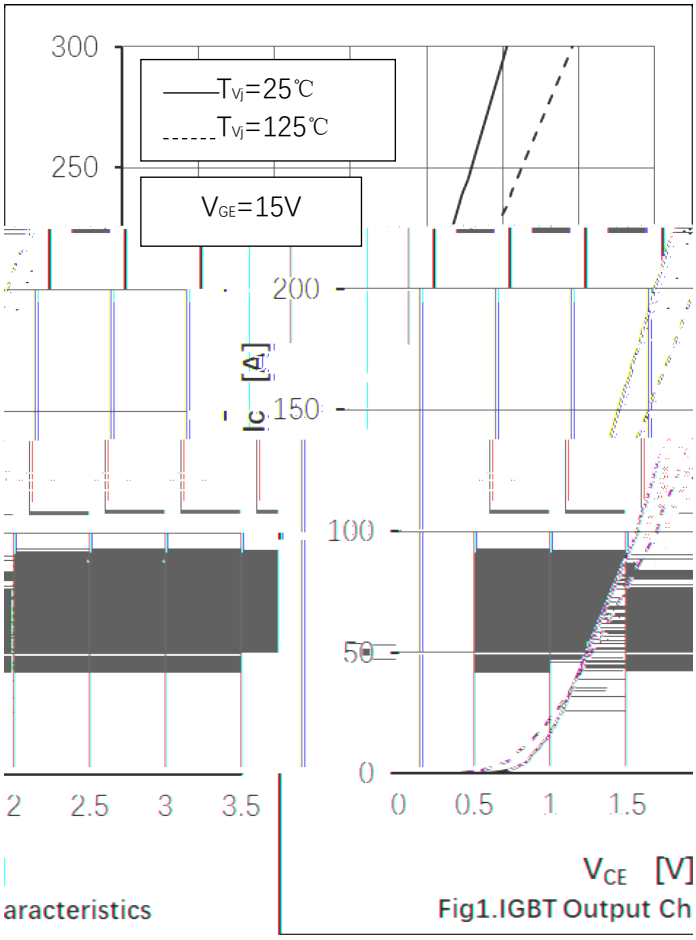


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Fig1.IGBT Output Ch

——Tvj=25℃
------Tvj=125℃

V 53V

——— Eon
------ Eoff

VCC=600V
RG=5.1ohm
VGE=±15V
Tvj=125℃

——— Eon
------ Eoff

VCC=600V
Ic=150A
VGE=±15V
Tvj=125℃

I_C, Module

	4	5		7
	3I3434	3I3111	3I3173	3I3723
τ	3I34	3I35	3I31	3I4

——T_{Vj}=25℃
------T_{Vj}=125℃

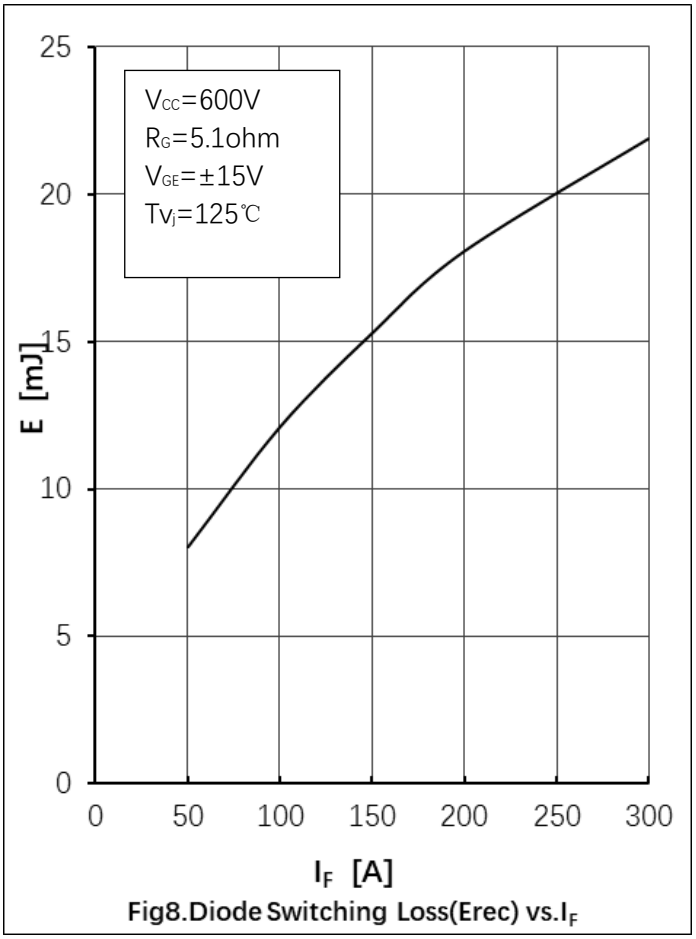
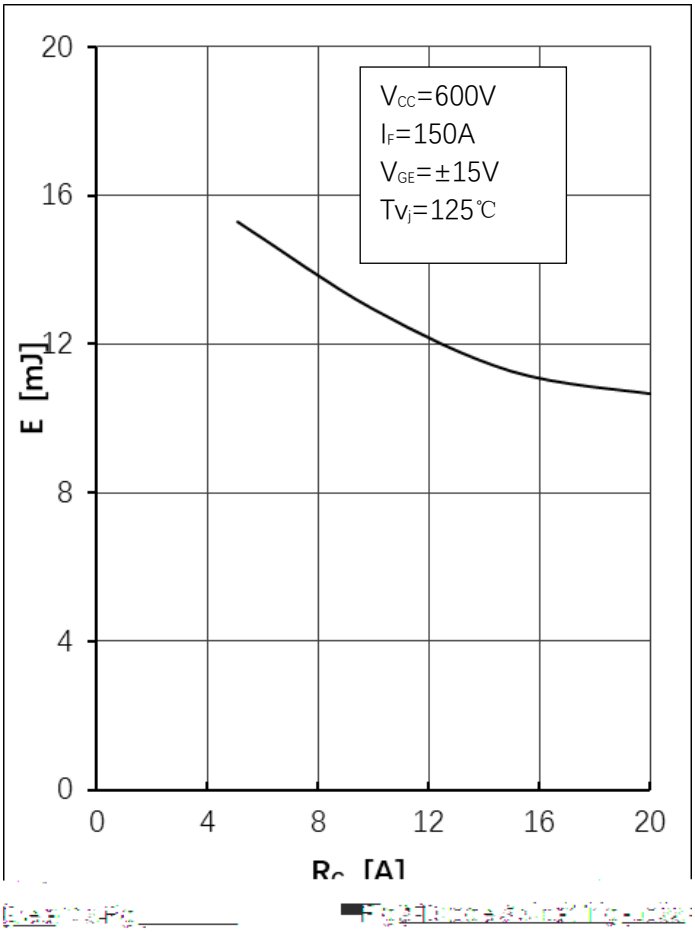


Fig8.Diode Switching Loss(Erec) vs.I_F



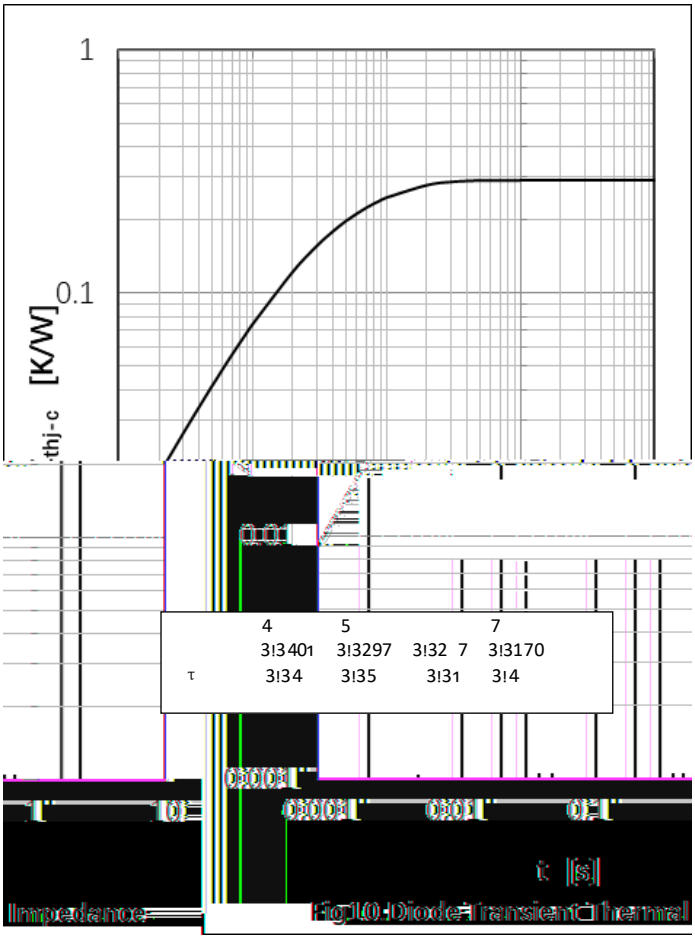
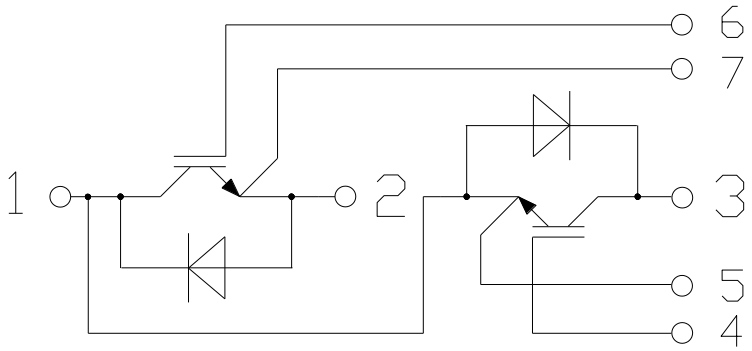


Fig10 Diode Transient Thermal Impedance

Circuit Diagram



Package Outline Information

Dimensions in Millimeters