

34mm Module with NPT IGBT and Fast recovery diode.

Feature

- 100A/600V, $V_{CE(sat)(typ.)} = 1.9V@100A$
- Low loss
- Excellent short circuit ruggedness

Applications

- Inverter welding
- Inductive heating
- Uninterrupted Power Supply(UPS)

Appearance



Maximum Ratings of IGBT ($T_{vj}=25^{\circ}C$ unless otherwise noted)

Items	Symbol	Conditions	Maximum Rating	Units
Collector-emitter voltage	V_{CES}		650	V
Gate-emitter voltage	V_{GES}		± 20	V
Collector current	I_C	$T_{vj}=25^{\circ}C$	130	A
		$T_{vj}=100^{\circ}C$	100	A
Pulsed collector current	I_{CM}	$t_p=1ms$	200	A
Short circuit current	I_{sc}	$V_{GE} \leq 15V, V_{CC}=300V, t_p=10\mu s$ $V_{CEmax}=V_{CES}-L_{sCE} \cdot di/dt$	450	A
Maximum power dissipation	P_D	$T_c=25^{\circ}C, T_{vj}=150^{\circ}C$	450	W

Electrical Characteristics of IGBT ($T_{vj}=25^{\circ}C$ unless otherwise noted)

Items	Symbol	Conditions	Min.	typ.	Max.	Units
Collector-emitter breakdown voltage	V_{CES}	$V_{GE}=0V, I_C=250\mu A$	600			V
Collector -emitter leakage current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V$			5.0	mA
Gate leakage current, forward	I_{GES}	$V_{GE}=30V, V_{CE}=0V$			400	nA
		$V_{GE}=-30V, V_{CE}=0V$			-400	nA
Gate threshold voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=1.5mA$	3.5		5.70	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=100A, T_{vj}=25^{\circ}C$		1.90		V
		$V_{GE}=15V, I_C=100A, T_{vj}=125^{\circ}C$		2.30		V
Integrated gate resistor	R_{Gint}	$f=1M; V_{pp}=1V$		tbd.		Ω
Input capacitance	C_{ies}	$V_{CE}=25V$		12.8		nF
Output capacitance	C_{oes}	$V_{GE}=0V$		0.82		nF
Reverse transfer capacitance	C_{res}	$f=1MHz$		0.18		nF
Total gate charge	Q_g	$V_{CC}=600V, V_{GE}=15V, I_C=75A$		tbd.		nC
Turn-on delay time	$t_{d(on)}$	$V_{CC}=300V$		28		ns
Rise time	t_r	$V_{GE}=\pm 15V$		12		ns
Turn-off delay time	$t_{d(off)}$	$I_C=100A$		130		ns
Fall time	t_f	$R_G=2.2\Omega$		20		ns
Turn-on energy loss per pulse	E_{on}	Inductive Load		0.80		mJ
Turn-off energy loss per pulse	E_{off}	$T_{vj}=25^{\circ}C$		2.40		mJ
Turn-on delay time	$t_{d(on)}$	$V_{CC}=300V$		50		ns
Rise time	t_r	$V_{GE}=\pm 15V$		15		ns
Turn-off delay time	$t_{d(off)}$	$I_C=100A$		150		ns
Fall time	t_f	$R_G=2.2\Omega$		30		ns
Turn-on energy loss per pulse	E_{on}	Inductive Load		1.00		mJ
Turn-off energy loss per pulse	E_{off}	$T_{vj}=125^{\circ}C$		2.90		mJ
Temperature under switching conditions	$T_{vj op}$		-55		150	$^{\circ}C$

Maximum Ratings of Diode

Items	Symbol	Conditions	Maximum Rating	Units
Repetitive peak reverse voltage	V_{RRM}	$T_{vj}=25^{\circ}\text{C}$	650	V
Diode continuous forward current	I_F	$T_{vj}=25^{\circ}\text{C}$	130	A
		$T_{vj}=100^{\circ}\text{C}$	100	A
Diode maximum forward current	I_{FM}	$t_p=1\text{ms}, T_{vj}=25^{\circ}\text{C}$	200	A

Electrical Characteristics of Diode ($T_{vj}=25^{\circ}\text{C}$ unless otherwise noted)

Items	Symbol	Conditions	Min.	typ.	Max.	Units
Diode forward voltage	V_F	$I_F=100\text{A}, T_{vj}=25^{\circ}\text{C}$		1.40	1.60	V
		$I_F=100\text{A}, T_{vj}=125^{\circ}\text{C}$		1.60	1.80	V
Diode reverse recovery time	t_{rr}	$V_{CE}=300\text{V}$		tbd.		ns
Diode peak reverse recovery current	I_{rr}	$I_F=100\text{A}$		150		A
Diode reverse recovery charge	Q_{rr}	$dI_F/dt=-4400\text{A}/\mu\text{s}$		8.00		nC
Reverse recovery energy	E_{rec}	$T_{vj}=25^{\circ}\text{C}$		2.20		mJ
Diode reverse recovery time	t_{rr}	$V_{CE}=300\text{V}$		tbd.		ns
Diode peak reverse recovery current	I_{rr}	$I_F=100\text{A}$		170		A
Diode reverse recovery charge	Q_{rr}	$dI_F/dt=-4400\text{A}/\mu\text{s}$		14.0		nC
Reverse recovery energy	E_{rec}	$T_{vj}=125^{\circ}\text{C}$		3.20		mJ

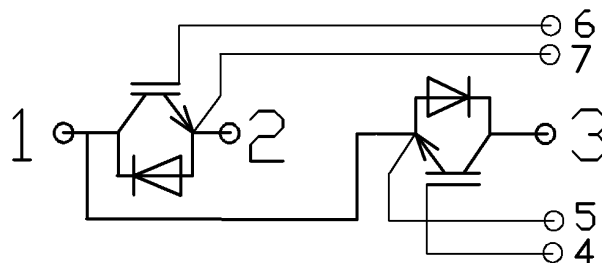
Thermal Characteristics

Items	Symbol	Min.	typ.	Max.	Units
Thermal resistance, junction to case for IGBT	$R_{th\ j-c}$			0.17	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction to case for Diode	$R_{th\ j-c}$			0.48	$^{\circ}\text{C}/\text{W}$
Thermal resistance, case to sink	$R_{th\ c-s}$		0.05		$^{\circ}\text{C}/\text{W}$

Module Characteristics

Items	Symbol	Conditions	Min.	typ.	Max.	Units
Material of module baseplate				Cu		
Internal isolation		terminal to terminal		Al_2O_3		
Isolation test voltage	V_{isol}	RMS, $f = 50\text{ Hz}$, $t = 1\text{ min.}$	2.5			kV
Stray inductance module	L_{sCE}			30		nH
Mounting torque for modul mounting	M	Screw M6	3.0		5.0	Nm
Terminal connection torque	M	Screw M5	4.0		6.0	Nm
Storage temperature range	T_{STG}		-55		150	$^{\circ}\text{C}$
Weight of Module	W_t			160		g

Internal Circuit:



Representative Characteristics

Fig 1. Output characteristic IGBT

$$I_C = f(V_{CE}), V_{GE} = 15V$$

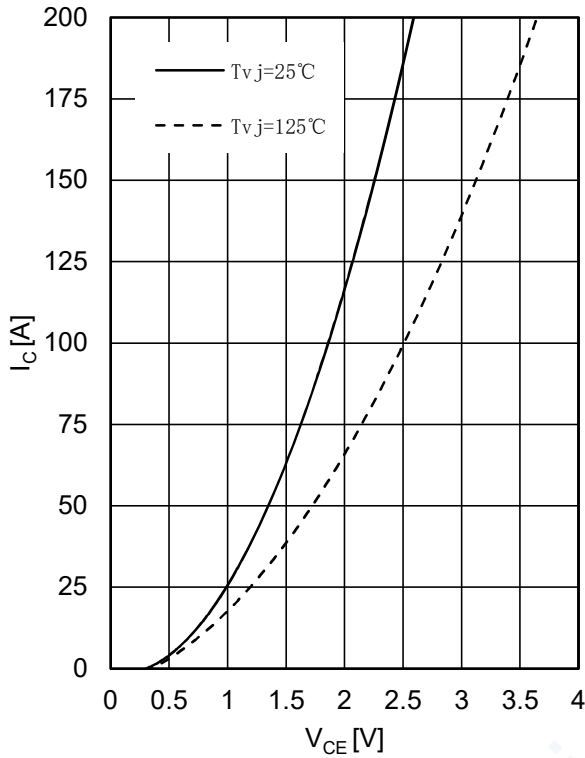


Fig 2. Transfer characteristic IGBT

$$I_C = f(V_{GE})$$

$$V_{CE} = 20V$$

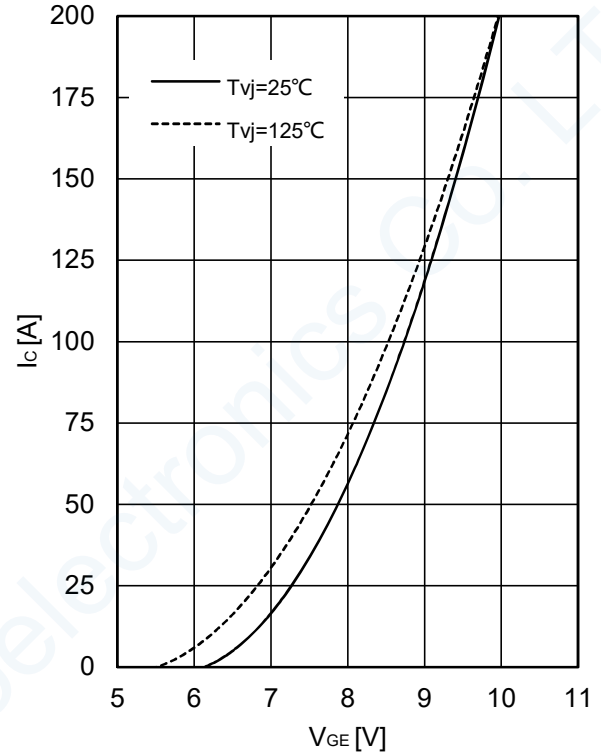


Fig 3. Switching losses IGBT

$$E_{on} = f(R_G), E_{off} = f(R_G)$$

$$V_{GE} = \pm 15V, I_C = 100A, V_{CE} = 300V$$

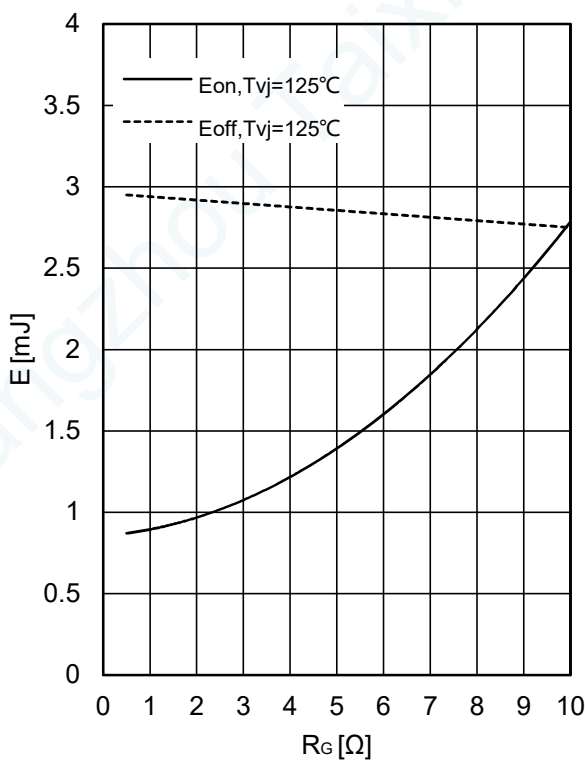


Fig 4. Switching losses IGBT

$$E_{on} = f(I_C), E_{off} = f(I_C)$$

$$V_{GE} = \pm 15V, R_G = 2.2\Omega, V_{CE} = 300V$$

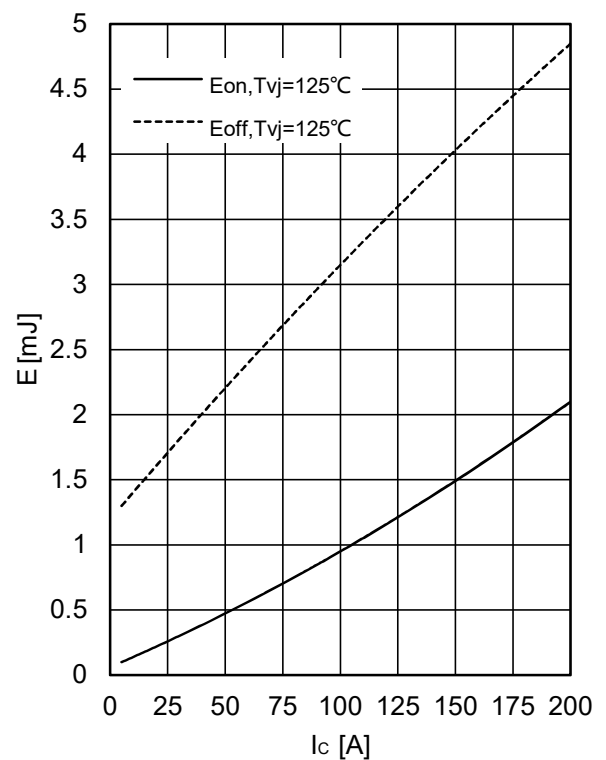


Fig 7. Reverse bias safe operating area IGBT,

$$I_C = f(V_{CE})$$

$$V_{GE} = \pm 15V, R_{Goff} = 2.2\Omega, T_{vj} = 125^\circ C$$

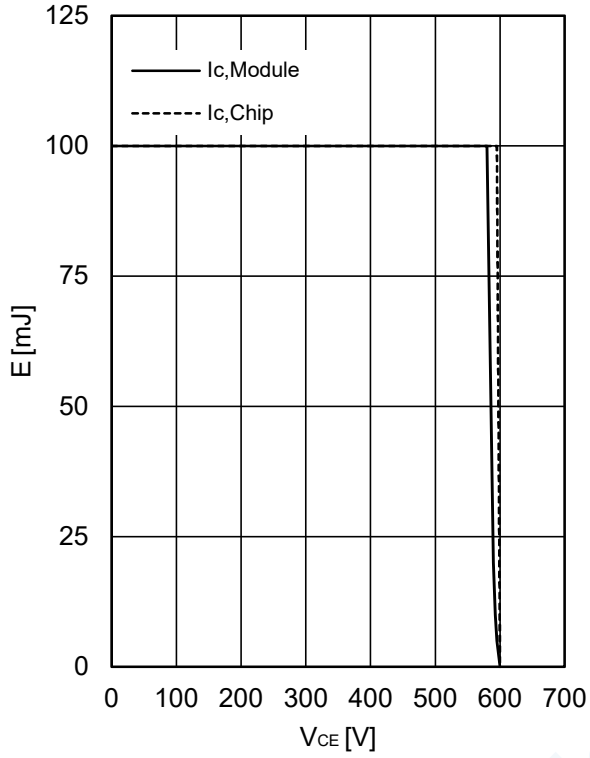
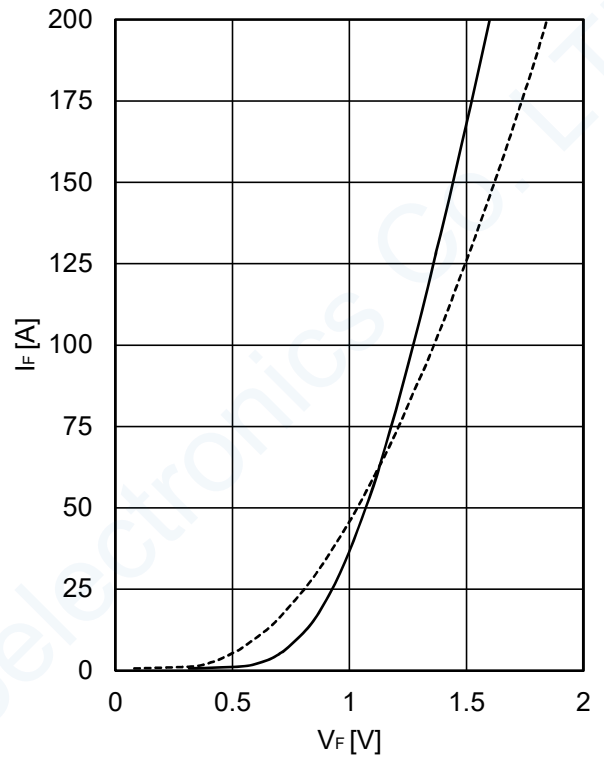


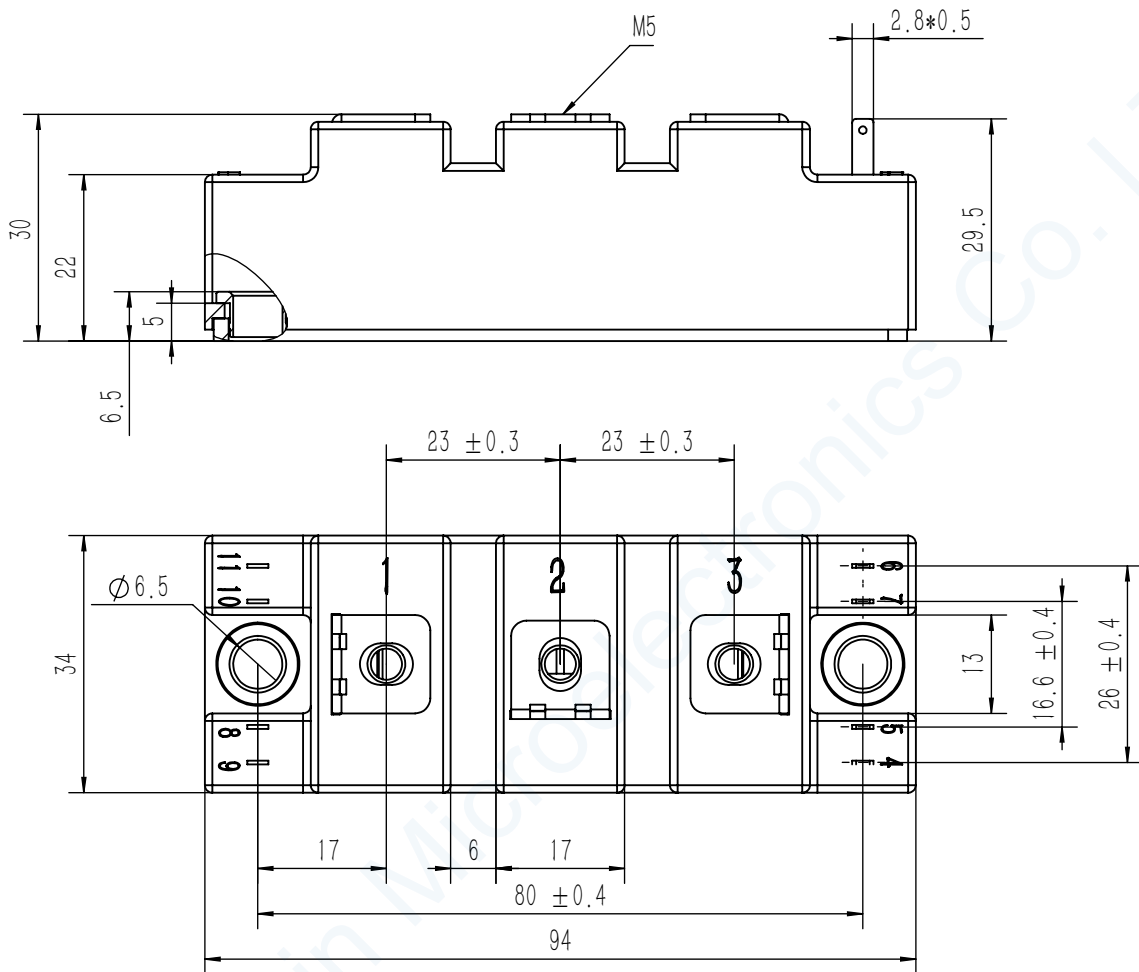
Fig 8. Forward characteristic of Diode

$$I_F = f(V_F)$$



Package Dimensions

Dimensions in Millimeters



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