

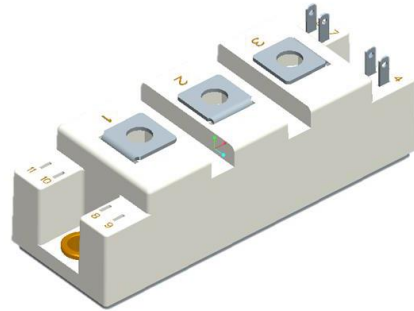
FEATURES

- V_{CEsat} with positive temperature coefficient
- Low switching losses
- Low inductance case
- Isolated copper baseplate using DBC technology

Preliminary Data

$V_{CES} = 1200V$

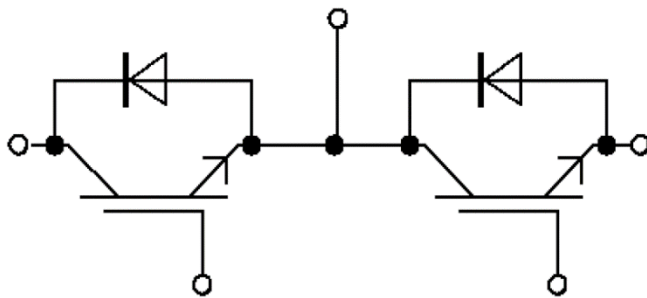
$I_{C\ nom} = 100A / I_{CRM} = 200A$



APPLICATION

- Welding Machine
- Switching Mode Power Supplies

Equivalent Circuit Schematic



IGBT, Inverter

Maximum Rated Values

Parameter	Conditions	Symbol	Values	Units
Collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	1200	V
Continuous DC collector current	$T_C = 100^{\circ}\text{C}$, $T_{vj} \text{ max} = 175^{\circ}\text{C}$	I_C	100	A
Repetitive peak collector current	$t_p = 1 \text{ ms}$	I_{CRM}	200	A
Total power dissipation	$T_C = 25^{\circ}\text{C}$, $T_{vj} \text{ max} = 175^{\circ}\text{C}$	P_{tot}	577	W
Gate-emitter peak voltage		V_{GES}	± 20	V

Characteristic Values

Parameter	Conditions	Symbol	Values			Units
			Min.	Typ.	Max.	
Collector-emitter saturation voltage	$I_C = 100\text{A}$, $V_{GE} = 15 \text{ V}$ $T_{vj} = 25^{\circ}\text{C}$	V_{CESat}		1.85		V
Gate threshold voltage	$I_C = 1.5 \text{ mA}$, $V_{CE} = V_{GE}$ $T_{vj} = 25^{\circ}\text{C}$	V_{GEth}		5.7		V
Gate charge	$V_{GE} = -15 / 15 \text{ V}$	Q_G		0.7		μC
Input capacitance	$f = 1 \text{ MHz}$, $T_{vj} = 25^{\circ}\text{C}$, $V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$	C_{ies}		5.8		nF
Reverse transfer capacitance		C_{res}		0.21		nF
Collector-emitter cut-off current	$V_{CE} = 1200 \text{ V}$, $V_{GE} = 0 \text{ V}$, $T_{vj} = 25^{\circ}\text{C}$	I_{CES}			1.0	mA
Gate-emitter leakage current	$V_{CE} = 0 \text{ V}$, $V_{GE} = 20 \text{ V}$, $T_{vj} = 25^{\circ}\text{C}$	I_{GES}			200	nA
Turn-on delay time, inductive load	$I_C = 100\text{A}$, $V_{CE} = 600 \text{ V}$ $V_{GE} = -15 / 15 \text{ V}$, $R_G = 5.1\Omega$ $T_{vj} = 25^{\circ}\text{C}$	$t_{d on}$		0.24		μs
Rise time, inductive load		t_r		0.12		μs
Turn-off delay time, inductive load		$t_{d off}$		0.32		μs
Fall time, inductive load		t_f		0.18		μs
Turn-on energy loss per pulse		E_{on}		9.78		mJ
Turn-off energy loss per pulse		E_{off}		4.11		mJ
Thermal resistance, junction to case		per IGBT	R_{thJC}			0.26
Thermal resistance, case to heatsink	per IGBT $\lambda_{Paste} = 1 \text{ W}/(\text{m}\cdot\text{K})$ / $\lambda_{grease} = 1 \text{ W}/(\text{m}\cdot\text{K})$	R_{thCH}		0.076		K/W
Temperature under switching conditions		$T_{vj op}$	-40		150	$^{\circ}\text{C}$

Diode, Inverter

Maximum Rated Values

Parameter	Conditions	Symbol	Values	Units
Repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	1200	V
Continuous DC forward current		I_F	100	A
Repetitive peak forward current	$t_p = 1 \text{ ms}$	I_{FRM}	200	A

Characteristic Values

Parameter	Conditions	Symbol	Values			Units
			Min.	Typ.	Max.	
Forward voltage	$I_F = 100 \text{ A}, V_{GE} = 0 \text{ V}$ $T_{vj} = 25^{\circ}\text{C}$	V_F		1.7		V
Peak reverse recovery current	$I_F = 100 \text{ A}, -di_F/dt = 2400 \text{ A}/\mu\text{s}$ $V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}$ $RG = 5.1\Omega$ $T_{vj} = 25^{\circ}\text{C}$	I_{RR}		140		A
Recovered charge		Q_{RR}		7		μC
Reverse recovery energy		E_{rec}		1.75		mJ
Thermal resistance, junction to case	per diode	R_{thJC}			0.52	K/W
Thermal resistance, case to heatsink	per diode $I_{paste} = 1 \text{ W}/(\text{m}\cdot\text{K}) / I_{grease} = 1 \text{ W}/(\text{m}\cdot\text{K})$	R_{thCH}		0.16		K/W
Temperature under switching conditions		$T_{vj op}$	-40		150	$^{\circ}\text{C}$

Module

Maximum Rated Values

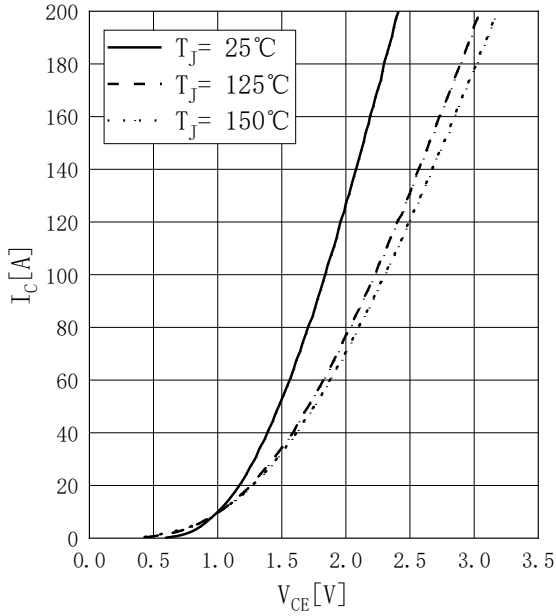
Parameter	Conditions	Symbol	Values	Units
Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	2.5	kV
Internal isolation	basic insulation (class 1, IEC 61140)		Al ₂ O ₃	
Creepage distance	terminal to heatsink terminal to terminal		17	mm
			20	
Clearance	terminal to heatsink terminal to terminal		17	mm
			9.5	
Comperative tracking index		CTI	>200	

Characteristic Values

Parameter	Conditions	Symbol	Values			Units
			Min.	Typ.	Max.	
Stray inductance module and fixture		L _{SCE}		35		nH
Module lead resistance, terminals - chip	TC = 25°C, per switch	R _{CC'+EE}		0.7		mΩ
Storage temperature		T _{stg}	-40		125	°C
Mounting force per clamp		F	3		5	N
Weight		G		164		g

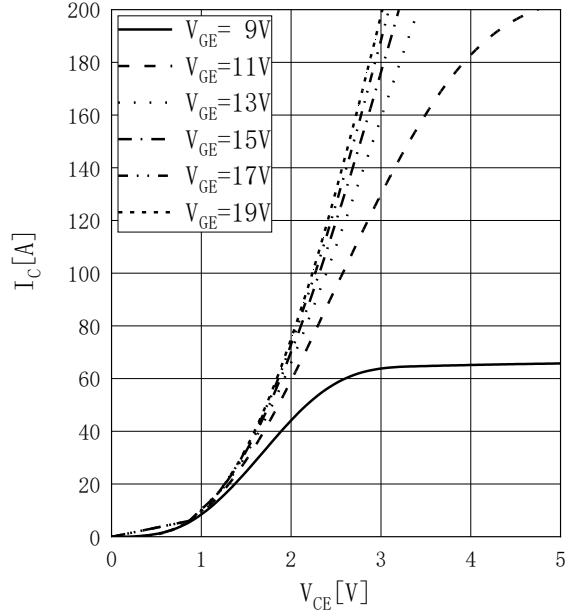
Output characteristic IGBT, Inverter (typical)

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



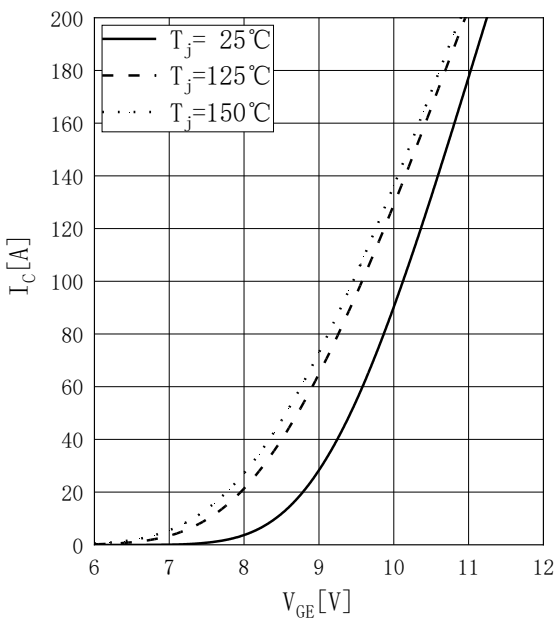
Output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
 $T_J = 150^\circ C$



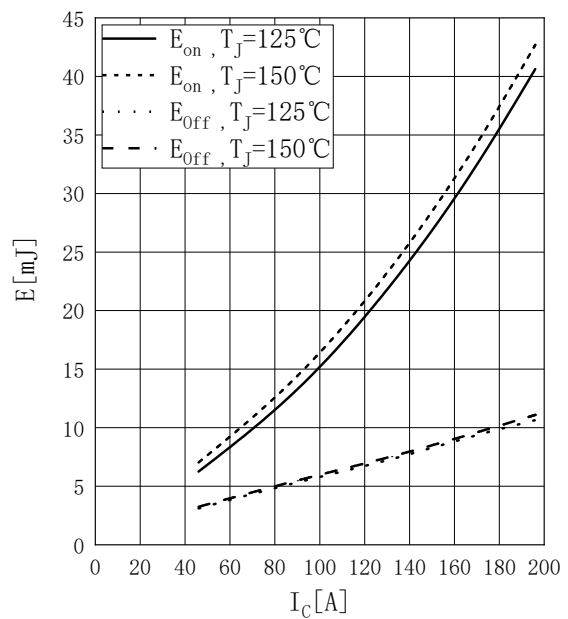
Transfer characteristic IGBT, Inverter (typical)

$I_C = f(V_{GE})$
 $V_{CE} = 20V$



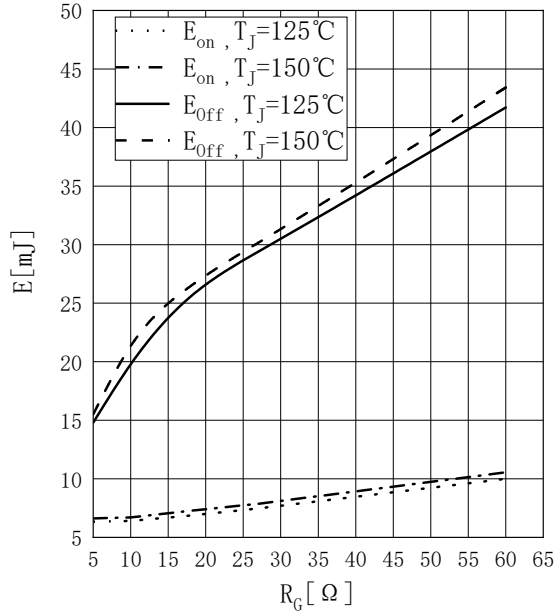
Switching losses IGBT, Inverter (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15V$, $R_{Gon} = 5.1\Omega$, $R_{Goff} = 5.1\Omega$, $V_{CE} = 600V$



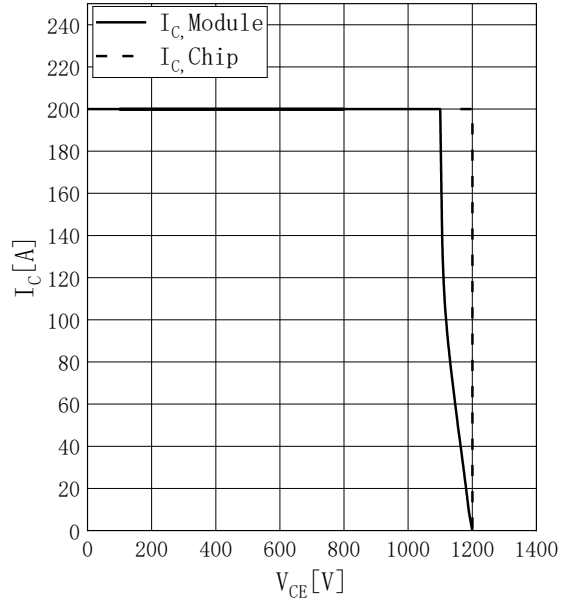
Switching losses IGBT, Inverter (typical)

$E_{on}=f(R_G), E_{off}=f(R_G)$
 $V_{GE}=\pm 15V, I_C=100A, V_{CE}=600V$



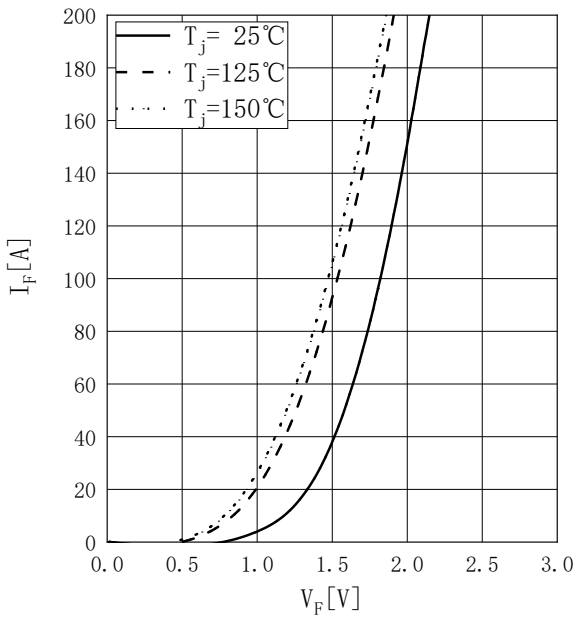
Reverse bias safe operating area IGBT, Inverter (RBSOA)

$I_C=f(V_{CE}),$
 $V_{GE}=\pm 15V, R_{Goff}=5.1\Omega, T_J=150^\circ C$

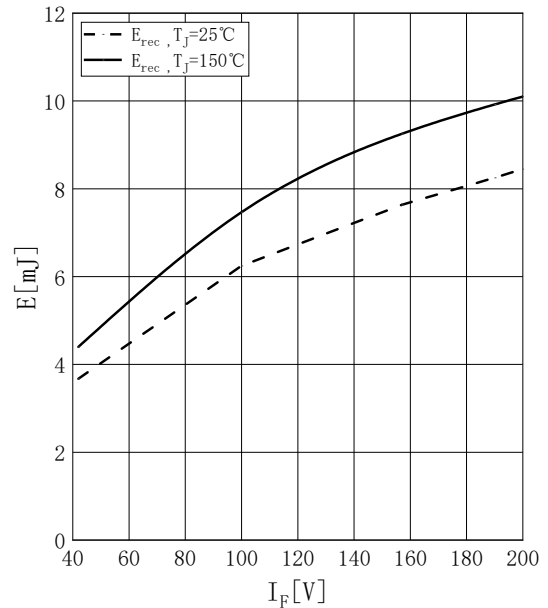


Forward characteristic of Diode, Inverter (typical) Switching losses Diode, Inverter (typical)

$I_F=f(V_F)$



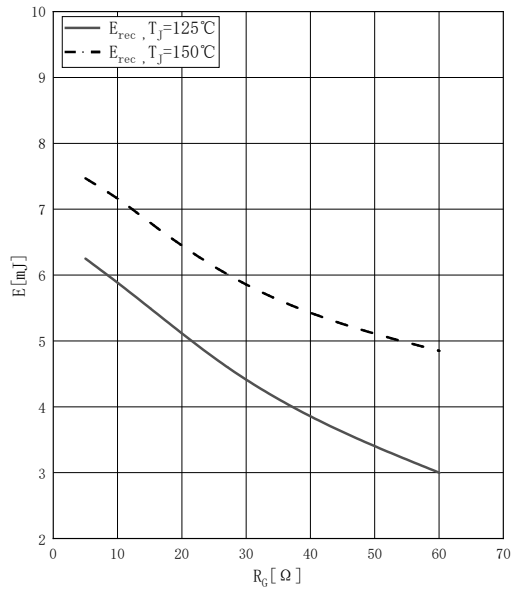
$E_{rec}=f(I_F)$
 $R_{Gon}=5.1\Omega, V_{CE}=600V$



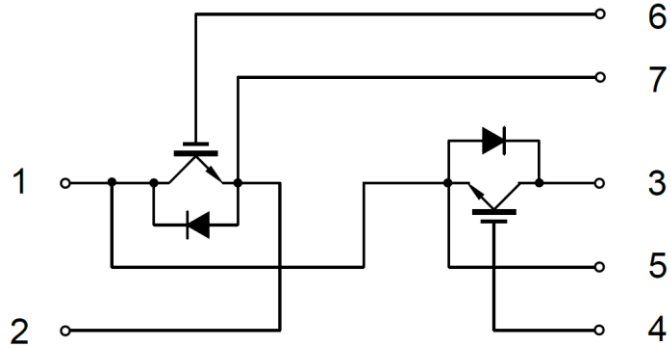
Switching losses Diode, Inverter (typical)

$$E_{rec} = f(R_G)$$

$$I_F = 100A, V_{CE} = 600V$$



Circuit diagram



Package outlines (mm)

