

Descriptions

This is 1200V 100A IGBT Power Module in a Isolation Type Package

Features

- VCE=1200V IC=100A
- LOW $V_{CE(sat)}$
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175°C
- Isolation Type Package

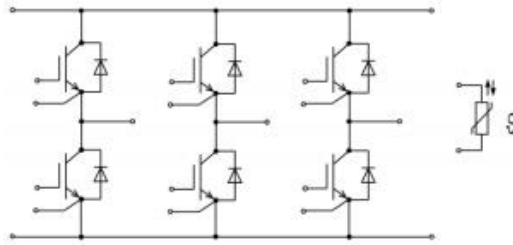
Application

- The inverter
- Motor control and drives

Package Type & Internal Circuit



L4



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	$V_{Ec}=0\text{ V}, I_c=1\text{ mA}, T_{vj}=25\text{ }^\circ\text{C}$	1200	V
I_c	Continuous Collector Current	$T_c=100\text{ }^\circ\text{C}$	100	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_c$	200	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25\text{ }^\circ\text{C}$	± 30	V
P_{tot}	Total Power Dissipation	$T_c=25\text{ }^\circ\text{C}, T_{vjmax}=150\text{ }^\circ\text{C}$	430	W

Characteristics Values (Diode Rectifier)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100A, V_{GE}=15V, T_{vj}=25^\circ C$		1.8	2.3	V
		$I_C=100A, V_{GE}=15V, T_{vj}=150^\circ C$		2.0	2.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=5.0mA, V_{CE}=V_{GE}, T_{vj}=25^\circ C$	5.2	6	6.5	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^\circ C$			20	μA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0V, V_{GE}=15V, T_{vj}=25^\circ C$			200	nA
r_G	Integrated gate resister		-	4.2	-	Ω
C_{ies}	Input Capacitance		-	9.65	-	nF
C_{oes}	Output Capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	-	492	-	pF
C_{res}	Reverse Transfer Capacitance		-	328	-	pF
$t_{d(on)}$	Turn-on Delay Time, Inductive Load				106	
t_r	Rise Time, Inductive Load			40		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load	$I_C=100A, V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=2\Omega$ $T_{vj}=25^\circ C$			330	ns
t_f	Fall Time, Inductive Load				240	ns
E_{on}	Turn-on Energy Loss per Pulse				2.6	mJ
E_{off}	Energy Loss per Pulse				8.3	mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load				120	ns
t_r	Rise Time, Inductive Load			43	ns	
$t_{d(off)}$	Turn-off Delay Time, Inductive Load	$I_C=100A, V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=2\Omega$ $T_{vj}=150^\circ C$			421	ns
t_f	Fall Time, Inductive Load				327	ns
E_{on}	Turn-on Energy Loss per Pulse				5.1	mJ
E_{off}	Energy Loss per Pulse				14.9	mJ
R_{thJC}	Thermal resistance, junction to case		per IGBT			0.29
$T_{vj op}$	Temperature under switching conditions		-40		150	$^\circ C$
I_{SC}	SC data	$V_{GE} \leq 15V, V_{CC} = 600V$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ $t_p \leq 10\mu s, T_{vj} = 150^\circ C$		400		A

Maximum Rated Values (Diode Rectifier)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj}=25\text{ }^{\circ}\text{C}$		1200		V
I_F	Continuous DC Forward Current	$T_C=100\text{ }^{\circ}\text{C}$		100		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		200		A
I^2t	I^2t Value	$V_R=0V, t_p=10\text{ ms}, T_{vj}=150\text{ }^{\circ}\text{C}$		1200		A^2s

Characteristics Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=100A, V_{CE}=0V, T_{vj}=25\text{ }^{\circ}\text{C}$		2.0	2.3	V
		$I_F=100A, V_{CE}=0V, T_{vj}=150\text{ }^{\circ}\text{C}$		2.2	2.5	V
t_{rr}	Reverse Recovery time	$I_F=100A, V_R=600V -$ $di/dt=1200A/us, T_{vj}$ $=25\text{ }^{\circ}\text{C}$		200		ns
Q_r	Recovered Charge			4		μC
E_{rec}	Reverse Recovery Energy			1.3		mJ
t_{rr}	Reverse Recovery time	$I_F=100A, V_R=600V -$ $di/dt=1200A/us, T_{vj}$ $=150\text{ }^{\circ}\text{C}$		350		ns
Q_r	Recovered Charge			8		μC
E_{rec}	Reverse Recovery Energy			2.7		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.65	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$

NTC-Thermistor (Characteristic Values)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R ₂₅	Rated resistance	T _c =25 °C		5		KΩ
ΔR/R	Deviation of R100	T _c =100 °C	-5		5	%
P ₂₅	Power dissipation	T _c =25 °C		20		mW
B _{25/50}	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298,15K))]$		3380		K
B _{25/100}	B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298,15K))]$		3450		K

Module Characteristics

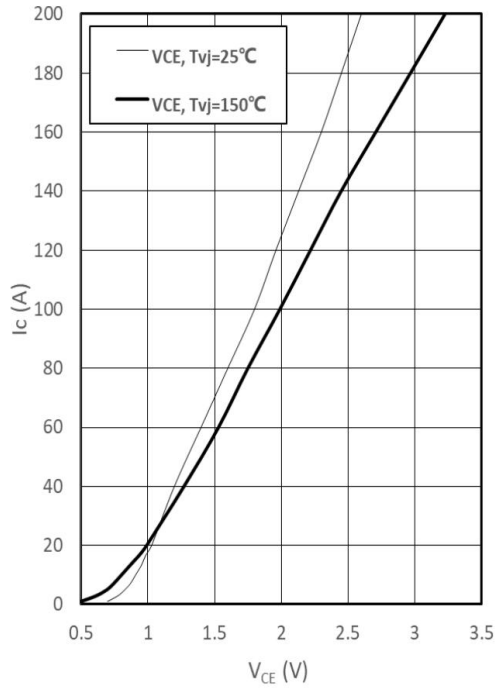
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{isol}	Isolation voltage	t=1min,f=50Hz	2500			V
T _{stg}	Storage Temperature		-40		150	°C
F	Mounting Force per Clamp		40		80	N
G	Weight of Module			40		g

Typical Characteristics

Output characteristic of IGBT, Inverter (typical)

$I_C = f(V_{CE})$

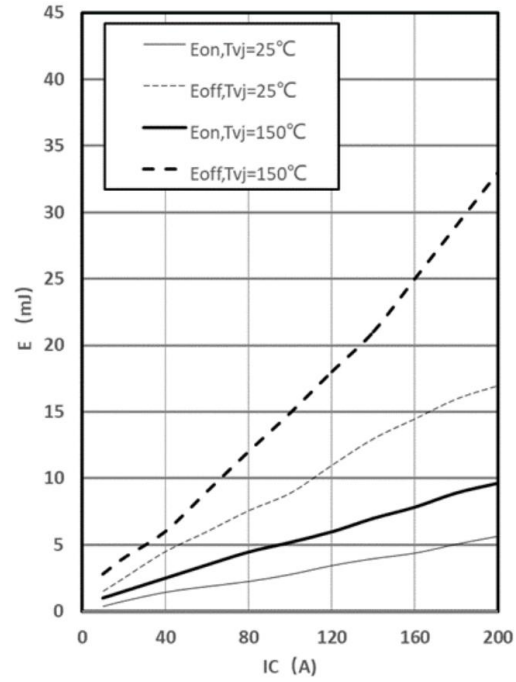
$V_{GE} = 15V$



Switching losses IGBT, Inverter (typical)

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

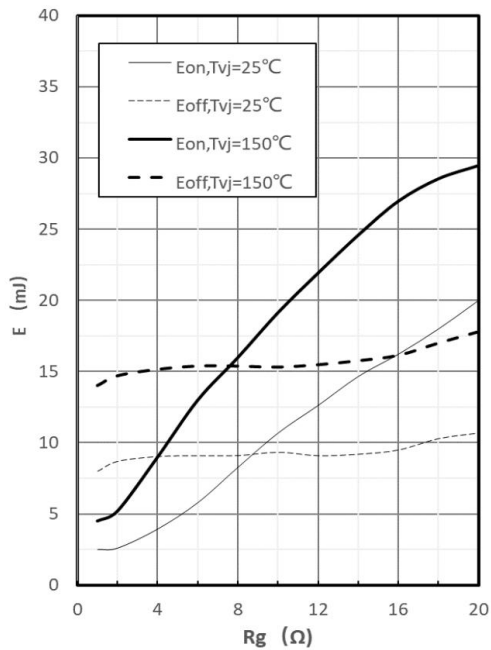
$V_{GE} = \pm 15V, R_G = 2\Omega, V_{CE} = 600V$



Switching losses IGBT, Inverter (typical)

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

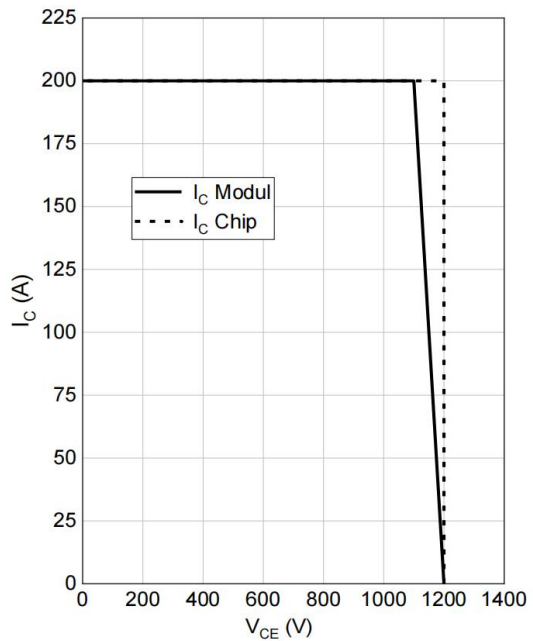
$V_{GE} = \pm 15V, I_C = 100A, V_{CE} = 600V$



RBSOA IGBT, Inverter (typical)

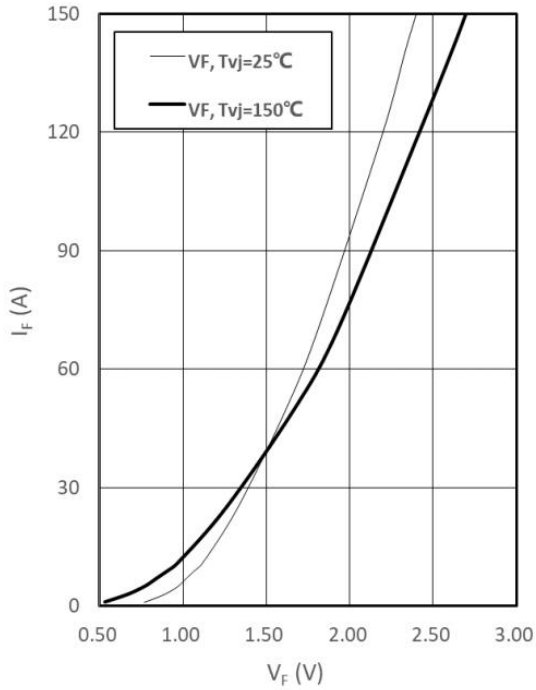
$I_C = f(V_{CE})$

$V_{GE} = \pm 15V, R_G = 2\Omega, T_{vj} = 150^\circ C$

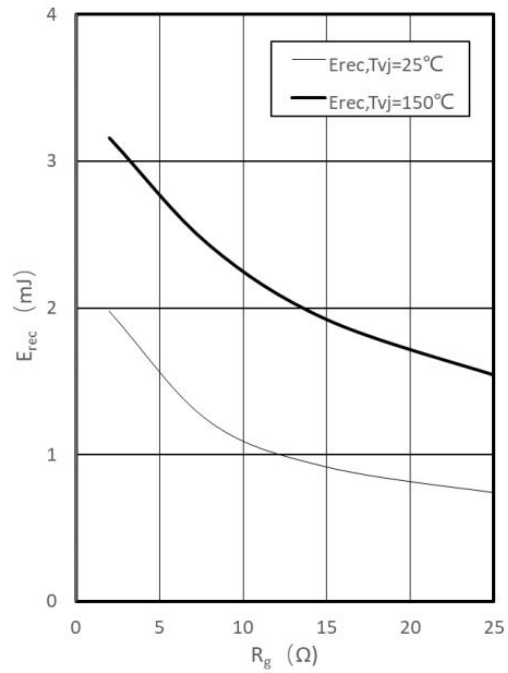


Typical Characteristics

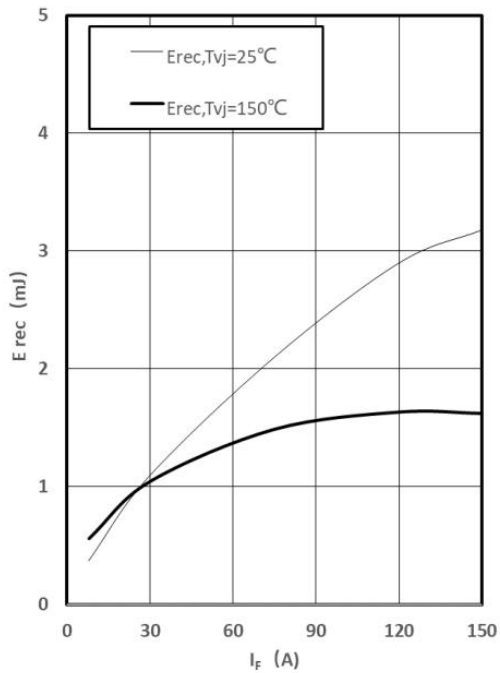
Forward characteristic of Diode, Inverter (typical)
 $I_F = f(V_F)$



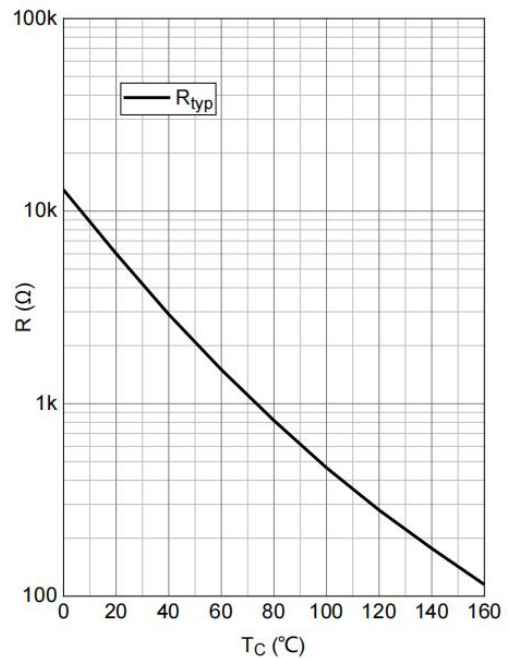
Switching losses Diode, Inverter (typical)
 $E_{rec} = f(R_G)$
 $I_F = 100\text{ A}, V_{CE} = 600\text{ V}$



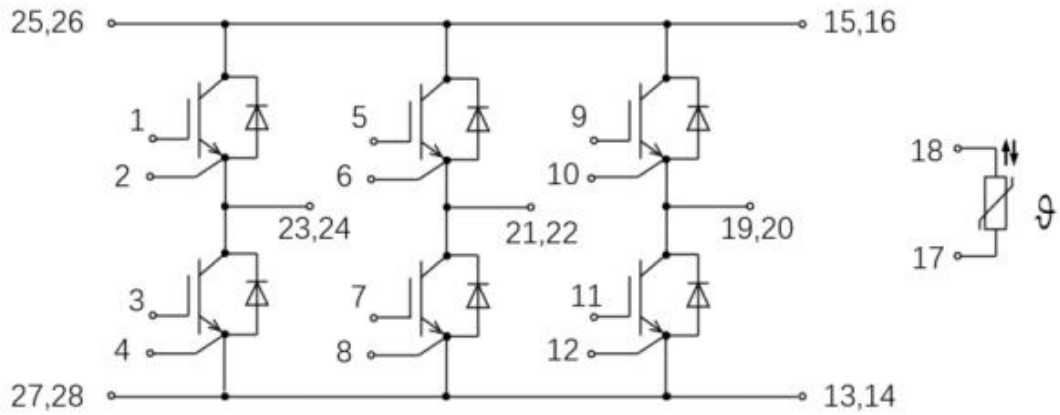
Switching losses Diode, Inverter (typical)
 $E_{rec} = f(I_F)$
 $R_{Gon} = 2\ \Omega, V_{CE} = 600\text{ V}$



NTC-Thermistor-temperature characteristic (typical)
 $R = f(T)$



Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)

