

Descriptions

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

Features

- $V_{CE}=1200V$ $I_C=100A$
- LOW $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature $175^{\circ}C$
- Isolation Type Package

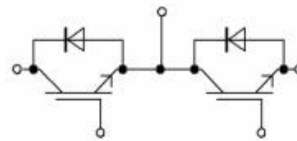
Application

- The inverter
- Motor control and drives

Package Type & Internal Circuit



L1



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	$V_{EC}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
I_C	Continuous Collector Current	$T_C=100^{\circ}C$	100	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	200	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25^{\circ}C$	± 30	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=150^{\circ}C$	500	W

Characteristics Values (IGBT Inverter)

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		
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=100A, V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=2\Omega$ $T_{vj}=25^\circ C$		106		ns		
t_r	Rise Time, Inductive Load			40		ns		
$t_{d(off)}$	Turn-off Delay Time, Inductive Load				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		$I_C=100A, V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=2\Omega$ $T_{vj}=150^\circ C$		120		ns	
t_r	Rise Time, Inductive Load					43		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load					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	K/W		
$T_{vj op}$	Temperature under switching conditions		-40		150	$^\circ C$		
I_{SC}	SC data	$V_{GE} \leq 15V, V_{CC} = 600V$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ $t_p \leq 10\mu s, T_{vj} = 150^\circ C$		427		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	$t_p=1\text{ ms}$		400		A
$I_{\theta t}$	$I_{\theta t}$ Value	$VR=0\text{ V}, tP=10\text{ ms}, T_{vj}=125\text{ }^{\circ}\text{C}$		2000		A ² s

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=100\text{ A}, V_{CE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		2.3	2.7	V
		$I_F=100\text{ A}, V_{CE}=0\text{ V}, T_{vj}=150\text{ }^{\circ}\text{C}$		2.2	2.5	V
t_{rr}	Reverse Recovery time	$I_F=100\text{ A}, V_R=600\text{ V} -$ $di/dt=1600\text{ A/us}$		210		ns
Q_r	Recovered Charge			7		μC
E_{rec}	Reverse Recovery Energy	$T_{vj}=25\text{ }^{\circ}\text{C}$		2.2		mJ
t_{rr}	Reverse Recovery time	$I_F=100\text{ A}, V_R=600\text{ V} -$ $di/dt=1600\text{ A/us}$		360		ns
Q_r	Recovered Charge			16.9		μC
E_{rec}	Reverse Recovery Energy	$T_{vj}=150\text{ }^{\circ}\text{C}$		6		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.52	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$

Module Characteristics

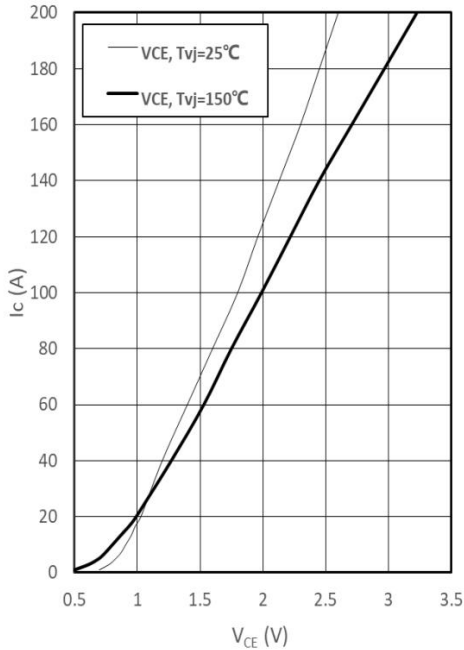
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{isol}	Isolation voltage	$t=1\text{ min}, f=50\text{ Hz}$	2500			V
T_{stg}	Storage Temperature		-40		150	$^{\circ}\text{C}$
M_t	Module Electrodes Torque	Recommended(M5)	2.5		5.0	N·m
M_s	Module-to-Sink Torque	Recommended(M6)	3.0		6.0	N·m
G	Weight of Module			160		g

Typical Characteristics

Output characteristic of IGBT, Inverter (typical)

$I_c = f(V_{CE})$

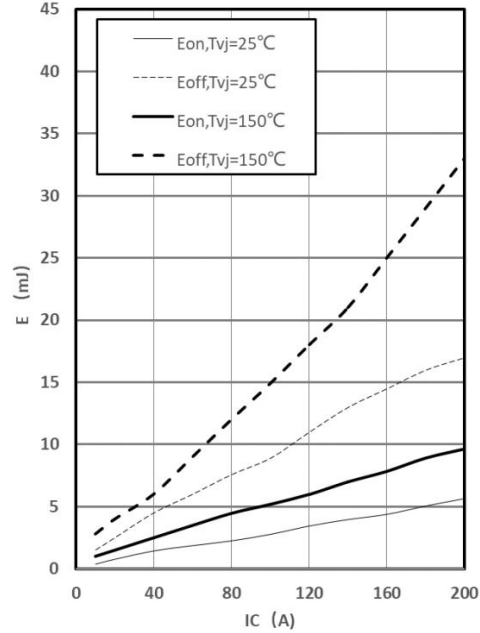
$V_{GE} = 15V$



Switching losses of IGBT, Inverter (typical)

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

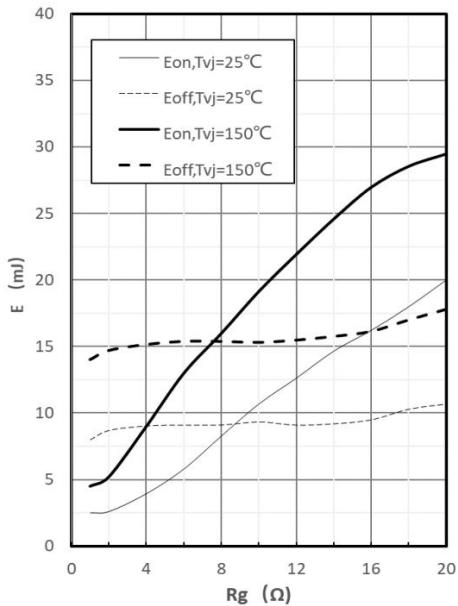
$V_{GE} = \pm 15V, R_G = 2\Omega, V_{CE} = 600V$



Switching losses of IGBT, Inverter (typical)

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

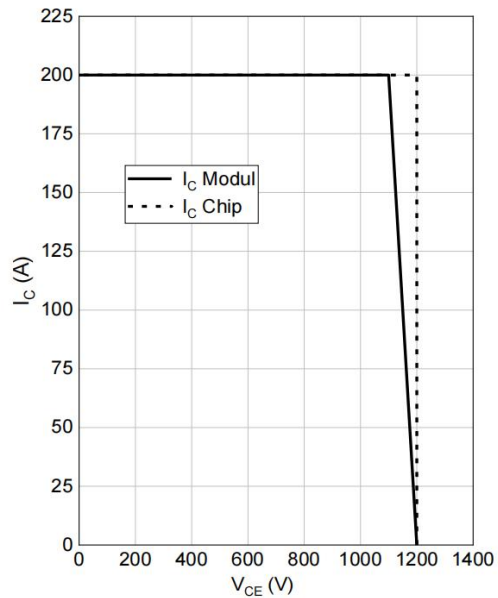
$V_{GE} = \pm 15V, I_c = 100A, V_{CE} = 600V$



RBSOA IGBT, Inverter (typical)

$I_c = f(V_{CE})$

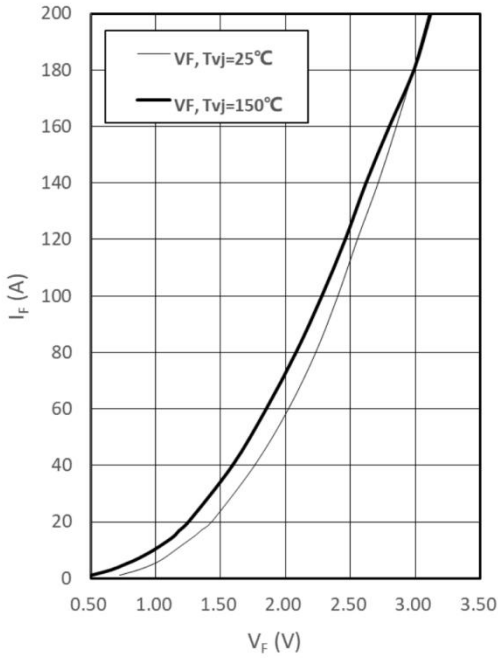
$V_{GE} = \pm 15V, R_G = 1\Omega, T_{vj} = 150^\circ C$



Typical Characteristics

forward characteristic of Diode, Inverter (typical)

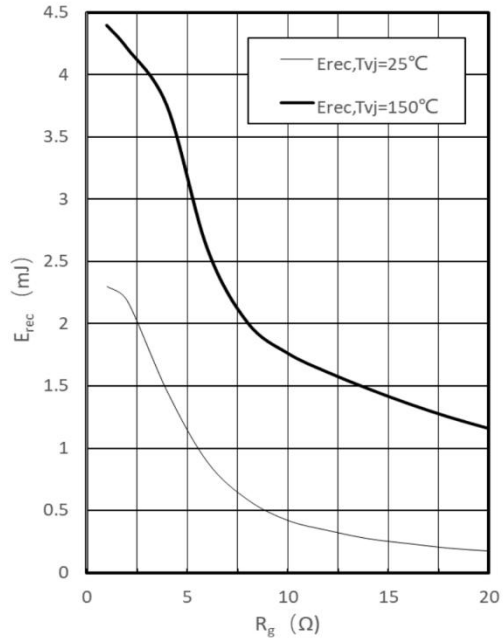
$$I_F = f(V_F)$$



switching losses of Diode, Inverter (typical)

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

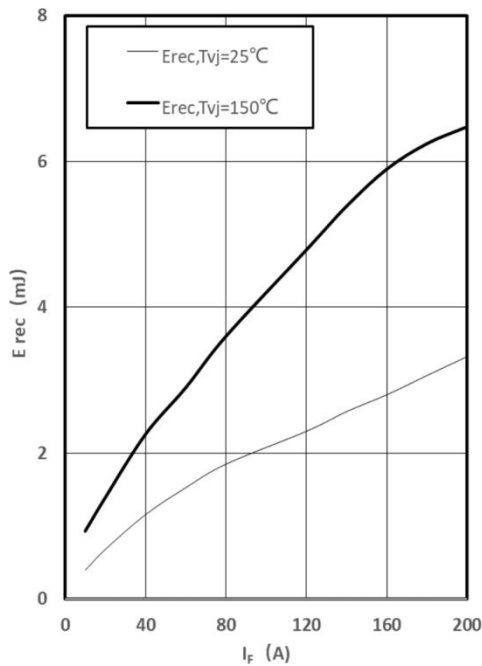
$$I_F = 100\text{A}, V_{CE} = 600\text{V}$$



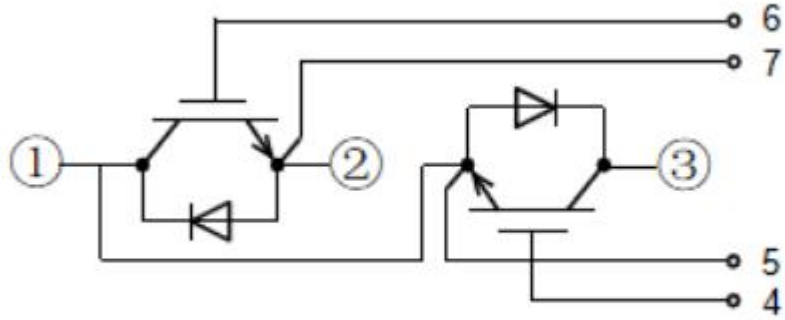
switching loss of Diode, Inverter (typical)

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

$$R_G = 2\Omega, V_{CE} = 600\text{V}$$



Circuit Diagram



Package Dimensions

