

Descriptions

This is 700V 100A IGBT Power Module in a Isolation Type Package.

Features

- $V_{CE}=700V$ $I_C=100A$
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature $150^{\circ}C$
- Isolation Type Package

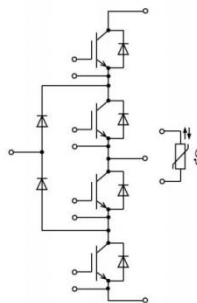
Application

- 3-Level-Applications
- Solar Applications
- UPS Systems

Package Type & Internal Circuit



E2



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Maximum Power Dissipation	$V_{EC}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	700	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	$T_{vj}=25^{\circ}C$	± 20	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=150^{\circ}C$	300	W

Maximum Rated Values (IGBT T1 T2 T3 T4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =100A, V _{GE} =15 V, T _{vj} =25 °C		1.8	2.3	V	
		I _C =100A, V _{GE} =15 V, T _{vj} =150 °C		2.0		V	
V _{GE(th)}	Gate Threshold Voltage	I _C =2.0 mA, V _{CE} =V _{GE} , T _{vj} = 25 °C	5.2	6	6.5	V	
I _{CES}	Collector-Emitter Cut-off Current	V _{CE} =700 V, V _{GE} =0 V, T _{vj} =25 °C			1	μA	
I _{GES}	Gate-Emitter Leakage Current	V _{CE} =0 V, V _{GE} =15 V, T _{vj} =25 °C			200	nA	
t _{d(on)}	Turn-on Delay Time	I _C =100 A, V _{CE} =300 V V _{GE} = ±15 V R _G =1Ω T _{vj} =25 °C		52.3		ns	
t _r	Rise Time			41.0		ns	
t _{d(off)}	Turn-off Delay Time			223		ns	
t _f	Fall TimeLeakage Current			51		ns	
E _{on}	Turn-on Switching Loss			0.5		mJ	
E _{off}	Turn-off Switching Loss			3.5		mJ	
t _{d(on)}	Turn-on Delay Time		I _C = 100 A, V _{CE} =300 V V _{GE} = ±15 V R _G = 1Ω T _{vj} = 150 °C		52.6		ns
t _r	Rise Time				43.2		ns
t _{d(off)}	Turn-off Delay Time				251		ns
t _f	Fall TimeLeakage Current				121		ns
E _{on}	Turn-on Switching Loss			0.7		mJ	
E _{off}	Turn-off Switching Loss			4.5		mJ	
R _{thJC}	Thermal resistance, junction to case	per IGBT			0.42	K/W	
T _{vj op}	Temperature under switching conditions		-40		150	°C	
I _{SC}	SC data	V _{GE} ≤15 V, V _{CC} = 360 V V _{CEmax} = V _{CES} -L _{sCE} ·di/dt t _p ≤ 10 μs, T _{vj} = 150 °C		700		A	

Maximum Rated Values (Diode D1 D2 D3 D4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$		700		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

Characteristics Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit		
V_F	Forward Voltage	$I_F = 100\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 25\text{ }^{\circ}\text{C}$		1.7	2.2	V		
		$I_F = 100\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 150\text{ }^{\circ}\text{C}$		1.6		V		
t_{rr}	Reverse Recovery time	$I_F = 100\text{ A}, V_R = 300\text{ V} -$ $di/dt = 2800\text{ A/us}$ $T_{vj} = 25\text{ }^{\circ}\text{C}$		170		ns		
Q_r	Recovered Charge			7		uC		
E_{rec}	Reverse Recovery Energy			0.7		mJ		
t_{rr}	Reverse Recovery time	$I_F = 100\text{ A}, V_R = 300\text{ V} -$ $di/dt = 2800\text{ A/us}$ $T_{vj} = 150\text{ }^{\circ}\text{C}$		230		ns		
			Q_r	Recovered Charge		9.7		uC
			E_{rec}	Reverse Recovery Energy		2.1		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.8	K/W		
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$		

Maximum Rated Values (Diode,D5-D6)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$		700		V
I_F	Continuous DC Forward Current	$T_C = 100^{\circ}\text{C}$		100		A
I_{FRM}	Repetitive Peak Forward Current	$tP = 1\text{ ms}$		200		A

Characteristic Values (Diode,D5-D6)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F = 100\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 25\text{ }^{\circ}\text{C}$		1.7	2.2	V
		$I_F = 100\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 150\text{ }^{\circ}\text{C}$		1.6		V
t_{rr}	Reverse Recovery time	$I_F = 100\text{ A}, V_R = 300\text{ V} -$ $di/dt = 2800\text{ A/us}$ $T_{vj} = 25\text{ }^{\circ}\text{C}$		170		ns
Q_r	Recovered Charge			7		μC
E_{rec}	Reverse Recovery Energy			0.7		mJ
t_{rr}	Reverse Recovery time	$I_F = 100\text{ A}, V_R = 300\text{ V} -$ $di/dt = 2800\text{ A/us}$ $T_{vj} = 150\text{ }^{\circ}\text{C}$		230		ns
			Q_r	Recovered Charge		9.7
E_{rec}	Reverse Recovery Energy			2.1		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode			0.8	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

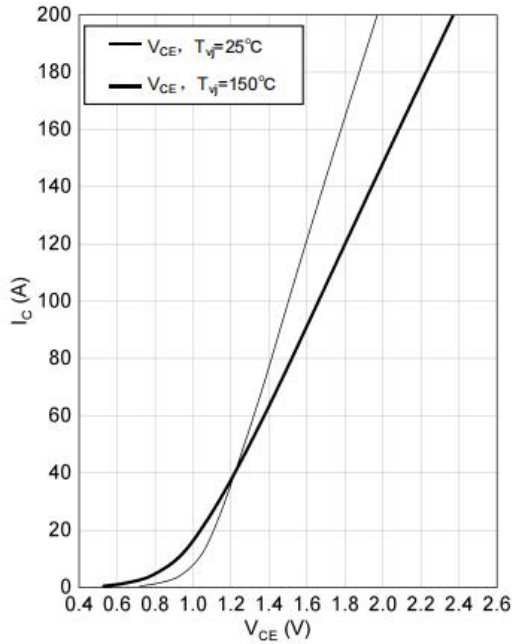
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{isol}	Isolation voltage	t = 1min, f=50Hz	2500			V
T _{stg}	Storage Temperature		-40		150	°C
F	Mounting Force per Clamp		40		80	N
G	Weight of Module			40		g

Typical Characteristics

output characteristic of IGBT, Inverter (typical)

$I_c = f(V_{CE})$

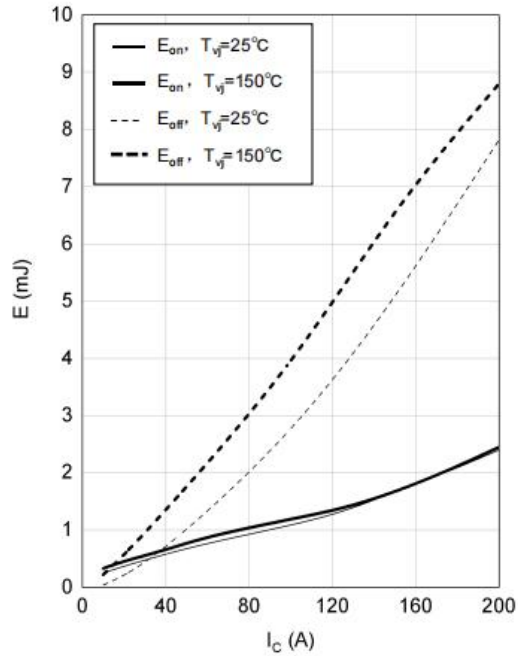
$V_{GE} = 15V$



switching loss of IGBT, Inverter (typical)

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

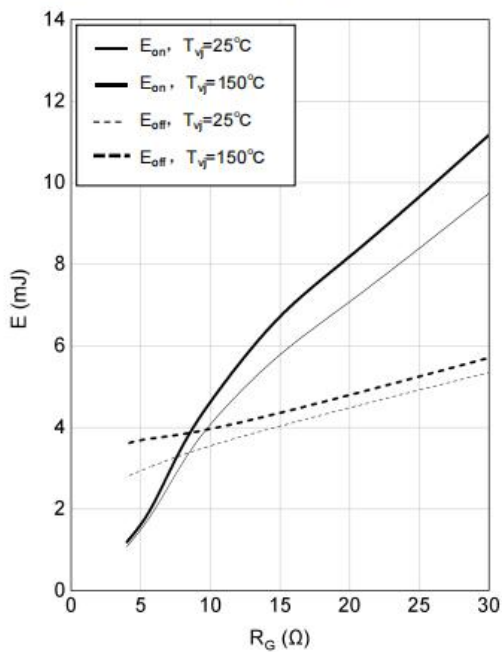
$V_{GE} = \pm 15V, R_G = 1\Omega, V_{CE} = 300V$



switching loss of IGBT, Inverter (typical)

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

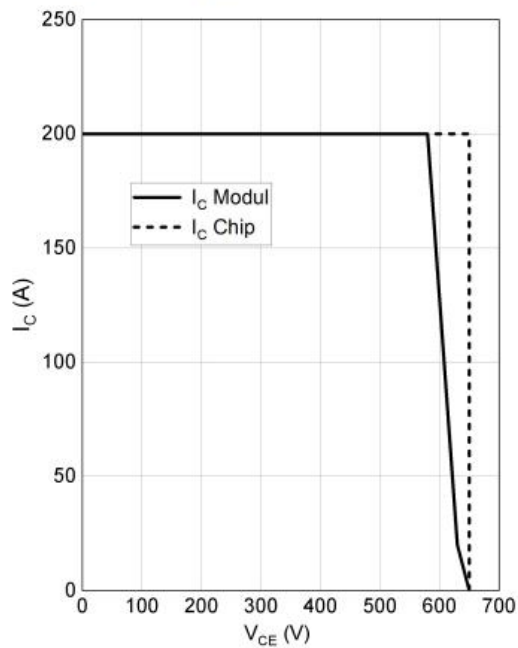
$V_{GE} = \pm 15V, I_c = 100A, V_{CE} = 300V$



RBSOA IGBT, Inverter (typical)

$I_c = f(V_{CE})$

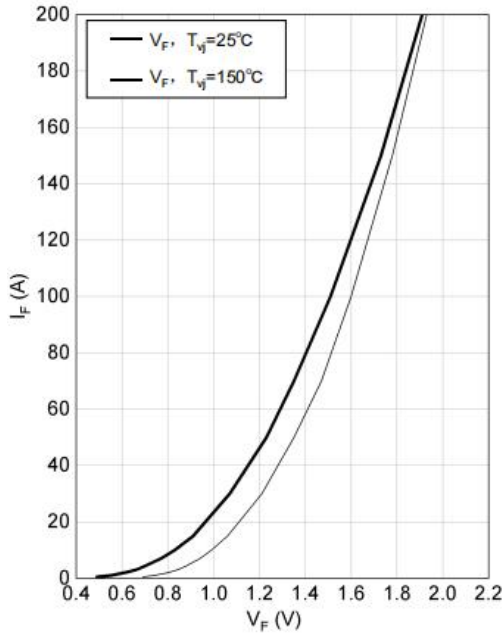
$V_{GE} = \pm 15V, R_G = 1\Omega, T_{vj} = 150\text{ °C}$



Typical Characteristics

forward characteristic of Diode, Inverter (typical)

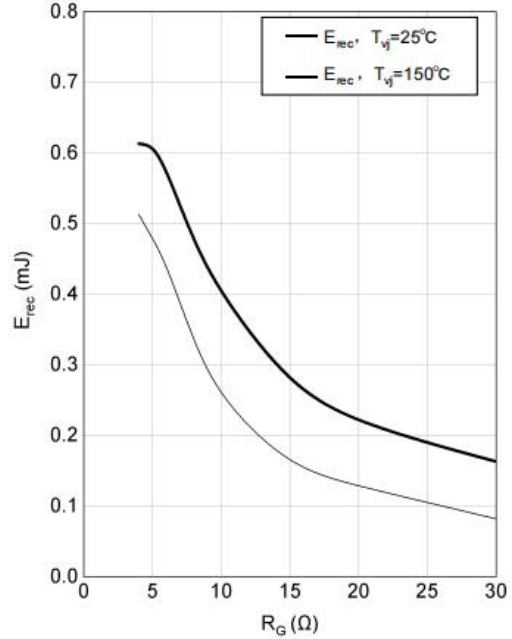
$I_F = f(V_F)$



switching losses of Diode, Inverter (typical)

$E_{rec} = f(R_G)$

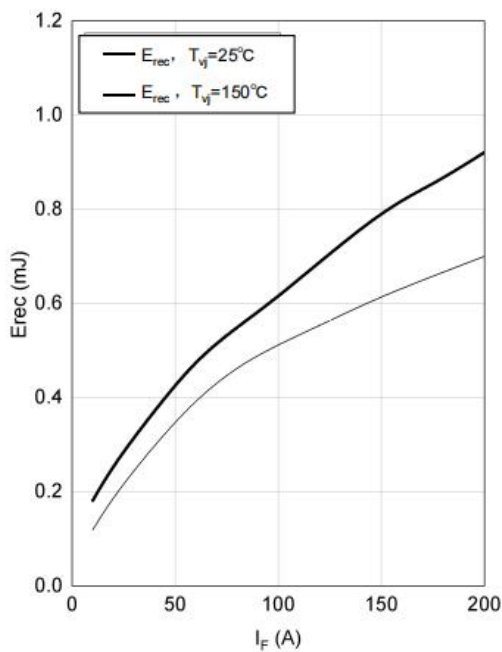
$I_F = 100A, V_{CE} = 300V$



switching loss of Diode, Inverter (typical)

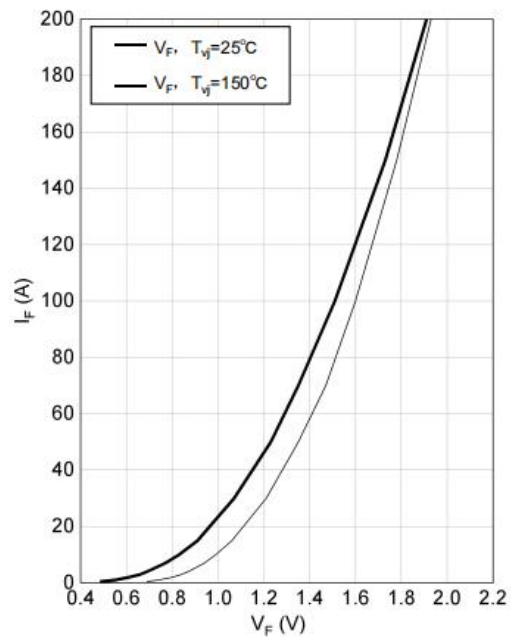
$E_{rec} = f(I_F)$

$R_G = 1Ω, V_{CE} = 300V$



forward characteristic of Diode, D5-D6 (typical)

$I_F = f(V_F)$

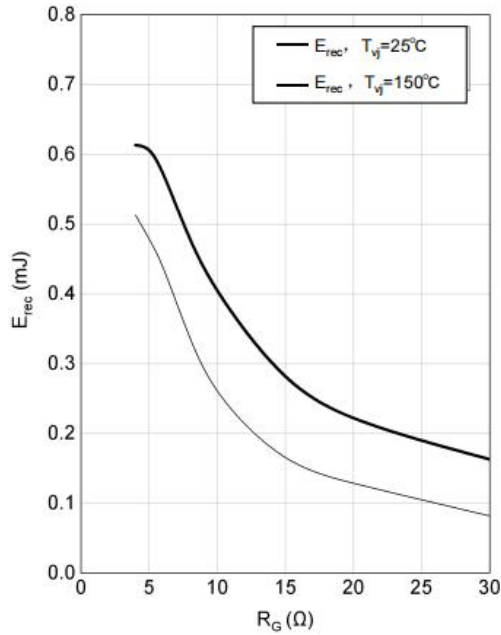


Typical Characteristics

switching loss of Diode, D5-D6 (typical)

$E_{rec} = f(R_G)$

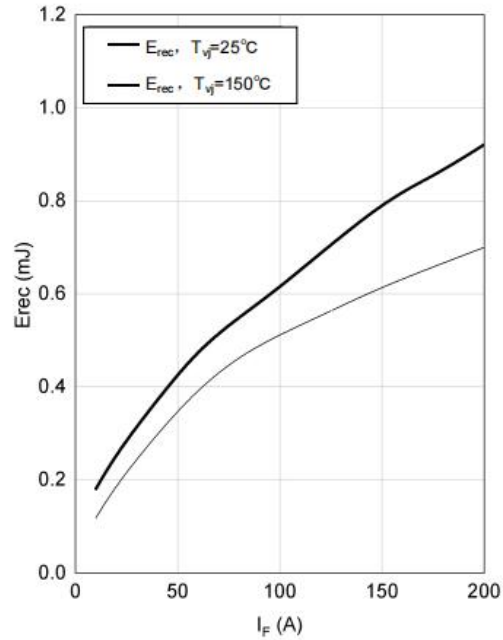
$I_F = 100A, V_{CE} = 300V$



switching loss of Diode, D5-D6 (typical)

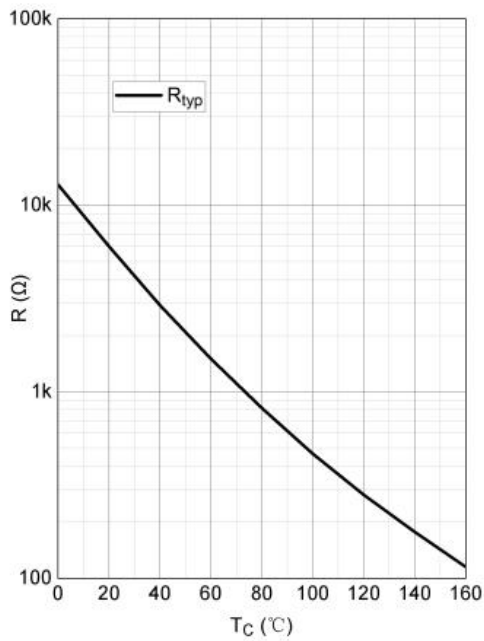
$E_{rec} = f(I_F)$

$R_G = 1Ω, V_{CE} = 300V$

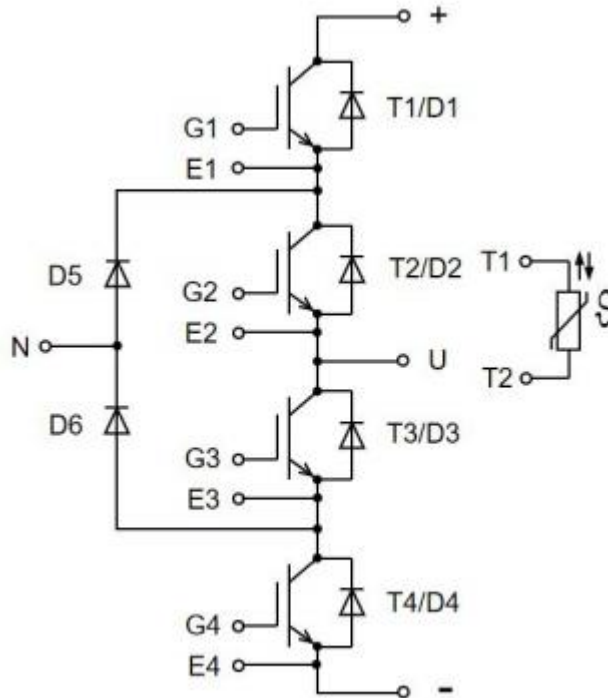


NTC-Thermistor-temperature characteristic (typical)

$R = f(T)$



Circuit Diagram



Package Dimensions

