

Molding Type Module

1200V/100A 2 in one-package

General Description

IGBT Power Module provides ultra low conduction loss as well as short circuit ruggedness. They are designed for the applications such as electronic welders.

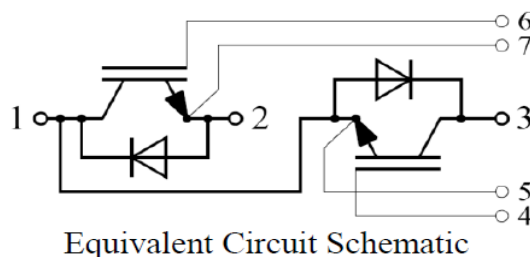
Features

- Low $V_{CE(sat)}$ trench IGBT technology
- 10 μ s short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175 $^{\circ}$ C
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology



Typical Applications

- Switching mode power supplies
- Electronic welders



Absolute Maximum Ratings $T_c=25^{\circ}$ C unless otherwise noted

Symbol	Description	Value	Units
V _{CE} S	Collector-Emitter Voltage	1200	V
V _{GE} S	Gate-Emitter Voltage	± 20	V
I _c	Collector Current @ $T_c=175^{\circ}$ C	150	A
I _{CM}	Pulsed Collector Current $t_p=1$ ms	300	A
I _F	Diode Continuous Forward Current	150	A
I _{FM}	Diode Maximum Forward Current $t_p=1$ ms	300	A
P _D	Maximum Power Dissipation @ $T_j=175^{\circ}$ C	861	W
T _{jmax}	Maximum Junction Temperature	175	$^{\circ}$ C
T _{STG}	Storage Temperature Range	-40 to +125	$^{\circ}$ C
V _{ISO}	Isolation Voltage RMS, f=50Hz, t=1min	2500	V
Mounting Torque	Power Terminal Screw:M5 Mounting Screw:M6	2.5 to 5.0 3.0 to 5.0	N.m

Electrical Characteristics of IGBT $T_C=25^\circ\text{C}$ unless otherwise noted

Off Characteristics

Symbol	meter	Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$T_j=25^\circ\text{C}$	1200	-	-	V
I_{CES}	Collector Cut-Off Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_j=25^\circ\text{C}$	-	-	1.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=15\text{V}, V_{CE}=0\text{V}, T_j=25^\circ\text{C}$	-	-	100	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=2.4\text{mA}, V_{CE}=V_{GE}, T_j=25^\circ\text{C}$	5.0	-	6.4	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=150\text{A}, V_{GE}=15\text{V}, T_j=25^\circ\text{C}$	2.2	-	2.8	V
		$I_C=150\text{A}, V_{GE}=15\text{V}, T_j=125^\circ\text{C}$	-	2.9	-	

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600\text{V}, I_C=150\text{A}, R_G=10\Omega, V_{GE}=\pm 15\text{V}, T_j=25^\circ\text{C}$	-	146	-	ns
t_r	Rise Time		-	105	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	460	-	ns
t_f	Fall Time		-	45	-	ns
E_{on}	Turn-On Switching Loss		-	5.3	-	mJ
E_{off}	Turn-Off Switching Loss		-	9.2	-	mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600\text{V}, I_C=150\text{A}, R_G=10\Omega, V_{GE}=\pm 15\text{V}, T_j=125^\circ\text{C}$	-	158	-	ns
t_r	Rise Time		-	164	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	475	-	ns
t_f	Fall Time		-	124	-	ns
E_{on}	Turn-On Switching Loss		-	8.7	-	mJ
E_{off}	Turn-Off Switching Loss		-	13.5	-	mJ
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, f=1\text{MHz}, V_{GE}=0\text{V}$	-	6.42	-	nF
C_{res}	Reverse Transfer Capacitance		-	0.56	-	nF
Q_G	Gate Charge	$V_{GE}=-15\text{V} \dots +15\text{V}$	-	540	-	nC
R_{Gint}	Internal Gate Resistance		-	10	-	Ω
L_{CE}	Stray Inductance		-	-	30	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip		-	0.84	-	m Ω

Electrical Characteristics of Diode $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=150\text{A}$	1.5	-	2.4	V
Q_r	Recovered Charge	$I_F=150\text{A}$, $T_j=25^\circ\text{C}$	-	23	-	μC
I_{RM}	Peak Reverse Recovery Current	$V_R=600\text{V}$, $R_G=10\Omega$, $V_{GE}=-15\text{V}$	-	226	-	A
E_{rec}	Reverse Recovery Energy		-	10.9	-	mJ

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)	-	0.32	K/W
$R_{\theta JC}$	Junction-to-Case (per Diode)	-	0.58	K/W
$R_{\theta CS}$	Case-to-Sink (per IGBT -Conductive grease applied)	0.61	-	K/W
$R_{\theta CS}$	Case-to-Sink (per Diode -Conductive grease applied)	0.74	-	K/W

Package Dimensions

