Molding Type Module

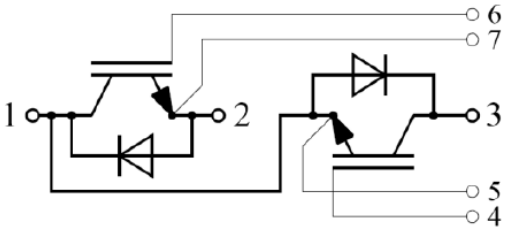
1200V/50A 2 in one-package

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
- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175℃
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology



Equivalent Circuit Schematic

Typical Applications

- Switching mode power supplies
- Electronic welders

Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Symbol	Description		Units
VCES	Collector-Emitter Voltage	1200	V
VGES	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25℃ Tvj max = 175 ℃	50	A
ICM	Pulsed Collector Current t_p=1ms	100	A
I_F	Diode Continuous Forward Current	50	A
IFM	Diode Maximum Forward Current t_p=1ms	100	A
P_D	Maximum Power Dissipation @ T_j=175℃	285	W
Tjmax	Maximum Junction Temperature	175	℃
T_{STG}	Storage Temperature Range	-40 to +125	℃
VISO	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℃ unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	T_j=25℃	1200			V
I_{CES}	Collector Cut-Off Current	V_{CE}=1200V,V_{GE}=0V, T_j=25℃			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=±20,V_{CE}=0V, T_j=25℃			100	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=2.4mA,V_{CE}=V_{GE}, T_j=25℃	5.0	-	6.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=50A,V_{GE}=15V, T_j=25℃	2.2	-	3.0	V
		I_C=50A,V_{GE}=15V, T_j=125℃		2.8		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
td(on)	Turn-On Delay Time	V_{CE}=600V, I_C=50A, R_G=10Ω, V_{GE}=±15V, T_j=25℃		130		ns
tr	Rise Time			70		ns
td(off)	Turn-Off Delay Time			400		ns
tf	Fall Time			50		ns
E_{on}	Turn-On Switching Loss			8.0		mJ
E_{off}	Turn-Off Switching Loss			5.0		mJ
td(on)	Turn-On Delay Time	V_{CE}=600V, I_C=50A, R_G=10Ω, V_{GE}=±15V, T_j=125℃		150		ns
tr	Rise Time			80		ns
td(off)	Turn-Off Delay Time			415		ns
tf	Fall Time			90		ns
E_{on}	Turn-On Switching Loss			15		mJ
E_{off}	Turn-Off Switching Loss			9.0		mJ

Cies	Input Capacitance	V_{CE}=25V,f=1MHz, V_{GE}=0V		6.68		nF
C_{res}	Reverse Transfer Capacitance			0.15		nF
Q_G	Gate Charge	VGE=-15V …+15V		262		nC
RGint	Internal Gate Resistance			2.35		Ω
LCE	Stray Inductance				30	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip			0.75		mΩ

Electrical Characteristics of Diode T_c=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=50A	Tj=25℃	2.2	-	7.5	V
Q_r	Recovered Charge	I_F=50A, V_R=300V, R_G=20Ω, V_{GE}=-15V	Tj=25℃		6.0		μC
I_{RM}	Peak Reverse Recovery Current		Tj=25℃		30		A
E_{rec}	Reverse Recovery Energy		Tj=25℃		2.4		mJ

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
RθJC	Junction-to-Case (per IGBT)		0.55	K/W
RθJC	Junction-to-Case (per Diode)		0.91	K/W
RθCS	Case-to-Sink (per IGBT -Conductive grease applied)	0.082		K/W
RθCS	Case-to-Sink (per Diod-Conductive grease applied)	0.13		K/W

Package Dimensions