

## Molding Type Module

### 1200V/75A 2 in one-package

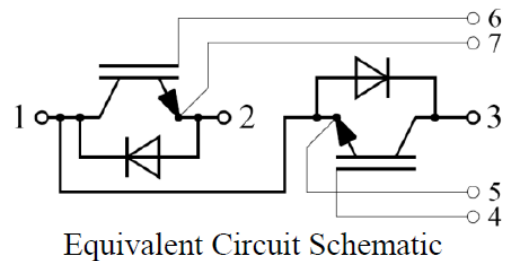
### General Description

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 $\mu$ 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		Units
V <sub>CE</sub> S	Collector-Emitter Voltage	1200	V
V <sub>GE</sub> S	Gate-Emitter Voltage	$\pm 20$	V
I <sub>c</sub>	Collector Current @ $T_c=25^{\circ}$ C $T_{vj}$ max = 175 $^{\circ}$ C	75	A
I <sub>CM</sub>	Pulsed Collector Current $t_p=1$ ms	150	A
I <sub>F</sub>	Diode Continuous Forward Current	75	A
I <sub>FM</sub>	Diode Maximum Forward Current $t_p=1$ ms	150	A
P <sub>D</sub>	Maximum Power Dissipation @ $T_j=175^{\circ}$ C	395	W
T <sub>jmax</sub>	Maximum Junction Temperature	175	$^{\circ}$ C
T <sub>STG</sub>	Storage Temperature Range	-40 to +125	$^{\circ}$ C
V <sub>ISO</sub>	Isolation Voltage RMS, $f=50$ Hz, $t=1$ min	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	Parameter	Test 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	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_j=25^{\circ}\text{C}$			1.5	mA
$I_{GES}$	Gate-Emitter Leakage Current	$V_{GE}=\pm 20, V_{CE}=0\text{V}, T_j=25^{\circ}\text{C}$			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	-	6.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=75\text{A}, V_{GE}=15\text{V}, T_j=25^{\circ}\text{C}$	1.6	-	3.0	V
		$I_C=75\text{A}, V_{GE}=15\text{V}, T_j=125^{\circ}\text{C}$		2.0		

**Switching Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CE}=600\text{V}, I_C=75\text{A}, R_G=10\Omega, V_{GE}=\pm 15\text{V}, T_j=25^{\circ}\text{C}$		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	$V_{CE}=600\text{V}, I_C=75\text{A}, R_G=10\Omega, V_{GE}=\pm 15\text{V}, T_j=25^{\circ}\text{C}$		0.6		mJ
$E_{off}$	Turn-Off Switching Loss			8.0		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CE}=600\text{V}, I_C=75\text{A}, R_G=10\Omega, V_{GE}=\pm 15\text{V}, T_j=125^{\circ}\text{C}$		142		ns
$t_r$	Rise Time			95		ns
$t_{d(off)}$	Turn-Off Delay Time			475		ns
$t_f$	Fall Time			55		ns
$E_{on}$	Turn-On Switching Loss				0.8	
$E_{off}$	Turn-Off Switching Loss			9.5		mJ

C <sub>ies</sub>	Input Capacitance	V <sub>CE</sub> =25V, f=1MHz, V <sub>GE</sub> =0V		4.65		nF
C <sub>res</sub>	Reverse Transfer Capacitance			0.26		nF
Q <sub>G</sub>	Gate Charge	V <sub>GE</sub> =-15V ... +15V		540		nC
R <sub>Gint</sub>	Internal Gate Resistance			10		Ω
L <sub>CE</sub>	Stray Inductance				30	nH
R <sub>CC'+EE'</sub>	Module Lead Resistance, Terminal To Chip			0.84		mΩ

### Electrical Characteristics of Diode T<sub>C</sub>=25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> =75A	T <sub>J</sub> =25°C	2.2	-	7.0	V
Q <sub>r</sub>	Recovered Charge	I <sub>F</sub> =75A, V <sub>R</sub> =300V,	T <sub>J</sub> =25°C		7.6		μC
I <sub>RM</sub>	Peak Reverse Recovery Current	R <sub>G</sub> =20Ω, V <sub>GE</sub> =-15V	T <sub>J</sub> =25°C		25		A
E <sub>rec</sub>	Reverse Recovery Energy		T <sub>J</sub> =25°C		2.6		mJ

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
R <sub>thJC</sub>	Junction-to-Case (per IGBT)		0.38	K/W
R <sub>thJC</sub>	Junction-to-Case (per Diode)		0.58	K/W
R <sub>thCS</sub>	Case-to-Sink (per IGBT -Conductive grease applied)	0.082		K/W
R <sub>thCS</sub>	Case-to-Sink (per Diode-Conductive grease applied)	0.13		K/W

Package Dimensions

