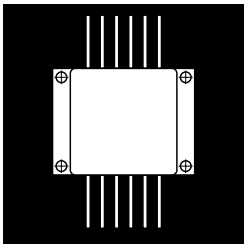
H-BRIDGE, MULTI-CHIP IGBT MODULE IN A HERMETIC ISOLATED PACKAGE



500 And 1000 Volt, 20 And 15 Amp IGBT Module With Soft Recovery Rectifier, H-Bridge Configuration

FEATURES

- 12-Pin Hermetic Power Package
- Isolated Heat Sink Design
- High Input Impedance
- High Switching Speed
- Low On Voltage
- Zener Gate Protection

DESCRIPTION

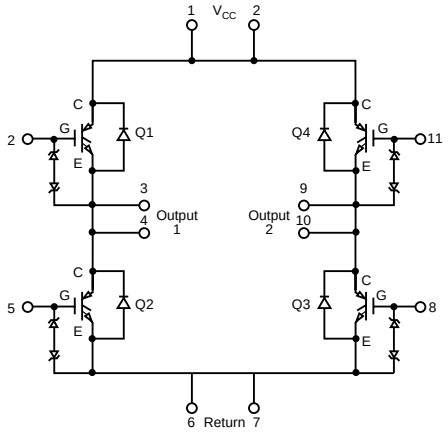
These IGBT modules are ideally suited for high density, high reliability switching applications such as motors, UPS and high power SMPS. These multi-chip modules incorporate in one package both the power IGBT's and soft recovery rectifiers.

2.1

MAXIMUM RATINGS

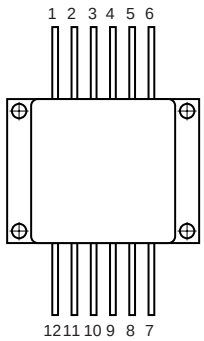
Per IGBT					Per Rectifier		
Part Number	I_C (Cont.) @ 90°C, A	$V_{(BR)CES}$ V	$V_{CE\ (sat)}$ @ 100°C, V	q_{JC} °C/W	PIV V	I_O A	t_{rr} nsec
OM9038SF	20	500	3.0	1.2	600	30	35
OM9039SF	15	1000	4.0	1.1	1000	30	50

SCHEMATIC



H-Bridge

PIN CONNECTION



Pin 1: V_{CC}
Pin 2: Q1/g
Pin 3: Output 1
Pin 4: Output 1
Pin 5: Q2/g
Pin 6: Return
Pin 7: Return
Pin 8: Q4/g
Pin 9: Output 2
Pin 10: Output 2
Pin 11: Q3/g
Pin 12: V_{CC}

OM9038SF

IGBT CHARACTERISTICS - 500V

Parameter - OFF (see Note 1)		**Min.**	**Typ.**	**Max.**	**Units**	**Test Conditions**
$V_{(BR)CES}$	Collector Emitter Breakdown Voltage	500			V	V_{CE} = 0 I_C = 250 µA
I_{CES}	Zero Gate Voltage Drain Current			0.25	mA	V_{CE} = Max. Rat., V_{GE} = 0
				1.0	mA	V_{CE} = 0.8 Max. Rat., V_{GE} = 0 T_C = 125°C
I_{GES}	Gate Emitter Leakage Current			±250	nA	V_{GE} = ±10 V V_{CE} = 0 V
Parameter - ON						
$V_{GE(th)}$	Gate Threshold Voltage	2.0		4.0	V	V_{CE} = V_{GE}, I_C = 250 µA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			3.2	V	V_{GE} = 15 V, I_C = 20 A T_C = 25°C
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			3.0	V	V_{GE} = 15 V, I_C = 20 A T_C = 100°C
Dynamic						
g_{fs}	Forward Transductance	5.0			S	V_{CE} = 20 V, I_C = 20 A
C_{ies}	Input Capacitance		1700		pF	V_{GE} = 0
C_{oes}	Output Capacitance		215		pF	V_{CE} = 25 V
C_{res}	Reverse Transfer Capacitance		115		pF	f = 1 mHz
Switching-Resistive Load						
$T_{d(on)}$	Turn-On Time		75		nS	V_{CC} = 400 V, I_C = 20 A
t_r	Rise Time		145		nS	V_{GE} = 15 V, R_g = 47
Switching-Inductive Load						
$T_{r\ (Volt)}$	Off Voltage Rise Time		.55		µS	$V_{CEclamp}$ = 400 V, I_C = 20 A
t_f	Fall Time		.60		µS	V_{GE} = 15 V, R_g = 100
T_{cross}	Cross-OverTime		1.2		µS	L = 0.1 mH, T_j = 100°C
E_{off}	Turn-Off Energy		3.0		mJ	

DIODE CHARACTERISTICS

V_f	Maximum Forward Voltage			1.35	V	I_F = 30 A, T_C = 25°C
				1.15	V	I_F = 30 A, T_C = 150°C
I_r	Maximum Reverse Current			500	µA	V_R = 600 V, T_C = 25°C
				7.0	mA	V_R = 480 V, T_C = 125°C
t_{rr}	Reverse Recovery Time			35	nS	I_F = 1 A, d_i / d_t = -15 A µ/S V_R = 30 V, T_j = 25°C

Note 1: Limited by diode I_r characteristic.

OM9039SF

IGBT CHARACTERISTICS - 1000V

Parameter - OFF (see Note 1)		**Min.**	**Typ.**	**Max.**	**Units**	**Test Conditions**
$V_{(BR)CES}$	Collector Emitter Breakdown Voltage	1000			V	V_{CE} = 0 I_C = 150 µA
I_{CES}	Zero Gate Voltage Drain Current			150	µA	V_{CE} = Max. Rat., V_{GE} = 0
				700	µA	V_{CE} = 0.8 Max. Rat., V_{GE} = 0 T_C = 125°C
I_{GES}	Gate Emitter Leakage Current			±250	nA	V_{GE} = ±10 V V_{CE} = 0 V
Parameter - ON						
$V_{GE(th)}$	Gate Threshold Voltage	4.5		6.5	V	V_{CE} = V_{GE}, I_C = 700 µA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			3.5	V	V_{GE} = 15 V, I_C = 10 A T_C = 25°C
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			4.5	V	V_{GE} = 15 V, I_C = 10 A T_C = 125°C
Dynamic						
g_{fs}	Forward Transductance	3.5			S	V_{CE} = 20 V, I_C = 10 A
C_{ies}	Input Capacitance		1300		pF	V_{GE} = 0
C_{oes}	Output Capacitance		100		pF	V_{CE} = 25 V
C_{res}	Reverse Transfer Capacitance		50		pF	f = 1 mHz
Switching-Resistive Load						
$T_{d(on)}$	Turn-On Time		50		nS	V_{CC} = 600 V, I_C = 10 A
t_r	Rise Time		200		nS	V_{GE} = 15 V, R_g = 3.3 ,
$T_{d(off)}$	Turn-Off Delay Time		200		nS	T_j = 125°C
t_f	Fall Time		300		nS	
Switching-Inductive Load						
$T_{d(off)}$	Turn-Off Delay Time		200		nS	$V_{CEclamp}$ = 600 V, I_C = 10 A
t_f	Fall Time		200		nS	V_{GE} = 15 V, R_g = 3.3
E_{off}	Turn-Off Losses		1.1		mWs	L = 1 mH, T_j = 125°C

DIODE CHARACTERISTICS

V_f	Maximum Forward Voltage			1.85	V	I_F = 30 A, T_C = 25°C
				1.70	V	I_F = 30 A, T_C = 150°C
I_r	Maximum Reverse Current			500	µA	V_R = 1000 V, T_C = 25°C
				7.0	mA	V_R = 800 V, T_C = 125°C
t_{rr}	Reverse Recovery Time			50	nS	I_F = 1 A, d_I / d_t = -15 A µ/S V_R = 30 V, T_j = 25°C

Note 1: Limited by diode I_r characteristic.

ABSOLUTE MAXIMUM RATINGS Per IGBT (T_C = 25°C unless otherwise noted)

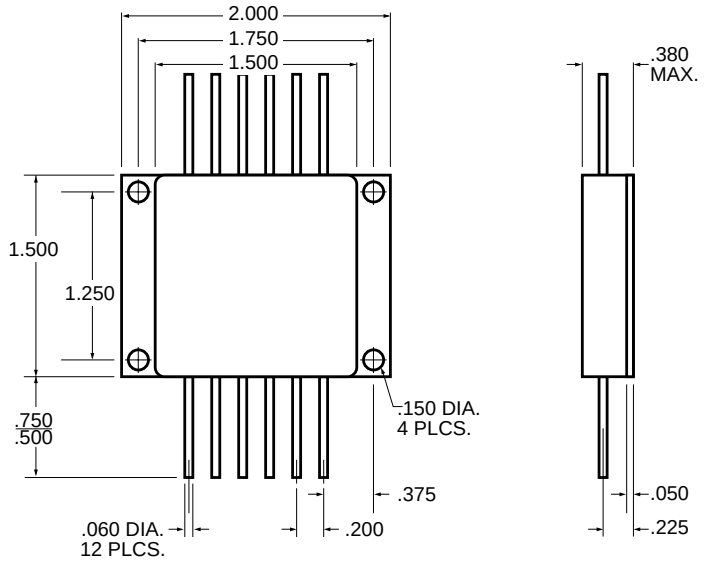
Parameters		OM9038SF	OM9039SF	Units
V_{CES}		500	1000	V
V_{CER}	(R_{ge} = 20 K)	500	1000	V
V_{GE}		15	15	V
I_C	T_C = 25°C	40	30	A
I_C	T_C = 90°C	20	15	A
I_{CM} Pulsed[1]		160	120	A
P_{tot}	T_C = 25°C	115	115	W
Junction-To-Case	Linear Derating Factor	.85	.93	W/°C
Junction-To-Ambient	Linear Derating Factor	.03	.03	W/°C

Thermal Resistance

R_{thJC}	Junction-To-Case	1.18	1.07	°C/W
R_{thJA}	Junction-To-Ambient	30	30	°C/W

Note[1]: **Pu**lsed width limited by SOA.

MECHANICAL OUTLINE



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