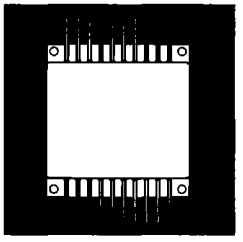
FULL BRIDGE, 3 PHASE, MULTI-CHIP IGBT MODULE IN A HERMETIC ISOLATED PACKAGE



500 And 1000 Volt, 30 And 25 Amp IGBT Module With Soft Recovery Rectifier. Full Bridge Configuration With Gate Drivers

FEATURES

- Hermetic Isolated Metal Package
- Includes Gate Drivers And Soft Recovery Rectifiers
- High Current And High Voltage
- Antiparallel Diode Protection
- Available Hi-Rel Screened

DESCRIPTION

These IGBT modules are ideally suited for high density, high reliability switching applications such as frequency converters for 3-phase motors, UPS and high power SMPS. These multi-chip modules incorporate in one package both the power IGBT's, soft recovery rectifiers and gate drive circuit in a full bridge configuration.

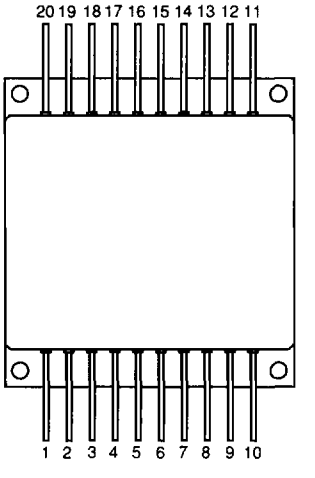
2.1

MAXIMUM RATINGS

	Per IGBT			Rectifier		
Part Number	I_C (Cont.) @ 90°C, A	$V_{(BR)CES}$ V	$V_{CE\ (sat)}$ @ 100°C, V	PIV V	I_O A	t_{rr} nsec
OM9036SF	30	500	3.0	600	30	35
OM9037SF	25	1000	4.0	1000	30	50

PIN CONNECTION

Pin 1:	Out 1	Pin 11:	Out 3
Pin 2:	Return	Pin 12:	V_{CC}
Pin 3:	U2	Pin 13:	U5
Pin 4:	U4	Pin 14:	U5 +15V
Pin 5:	Out 2	Pin 15:	U3
Pin 6:	Out 2	Pin 16:	U3 +15V
Pin 7:	V_{CC} +15V	Pin 17:	U1 +15V
Pin 8:	U6	Pin 18:	U1
Pin 9:	Return	Pin 19:	V_{CC}
Pin 10:	Out 3	Pin 20:	Out 3



OM9036SF

IGBT CHARACTERISTICS - 500V

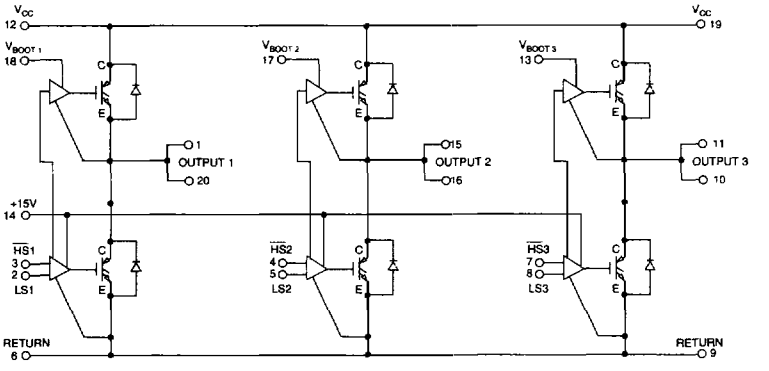
Parameter - OFF (see Note 1)		Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)CES}$	Collector Emitter Breakdown Voltage	500			V	V_{GE} = 0 I_C = 250 µA
I_{CES}	Zero Gate Voltage Drain Current			0.25	mA	V_{CE} = Max. Rat., V_{GE} = 0
				1.0	mA	V_{CE} = 0.8 Max. Rat., V_{GE} = 0 T_C = 125°C
I_{GES}	Gate Emitter Leakage Current			±100	nA	V_{GE} = ±20 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			2.5	V	V_{GE} = 15 V, I_C = 30 A T_C = 25°C
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			2.5	V	V_{GE} = 15 V, I_C = 30 A T_C = 125°C
Dynamic						
g_{fs}	Forward Transductance	8.0			S	V_{CE} = 15 V, I_C = 30 A
C_{ies}	Input Capacitance			3500	pF	V_{GE} = 0
C_{oes}	Output Capacitance			250	pF	V_{CE} = 25 V
C_{res}	Reverse Transfer Capacitance			50	pF	f = 1 mHz
Switching-Resistive Load						
$T_{d(on)}$	Turn-On Time			100	nS	
t_r	Rise Time			200	nS	V_{CC} = 400 V, I_C = 30 A
$T_{d(off)}$	Turn-Off Delay Time			1.0	µS	V_{GE} = 15 V, R_g = 100 Ω
t_f	Fall Time			2.0	µS	
Switching-Inductive Load						
$T_{d(on)}$	Turn-On Delay Time			100	nS	$V_{CEclamp}$ = 400 V, I_C = 30 A
t_r	Rise Time			200	nS	V_{GE} = 15 V, R_g = 100 Ω
$T_{d(off)}$	Turn-Off Delay Time			1.0	nS	L = 0.1 mH, T_j = 100°C
t_f	Current Fall Time			3.0	µS	

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.

SCHEMATIC



3-Phase Half Bridge

OM9037SF

IGBT CHARACTERISTICS - 1000V

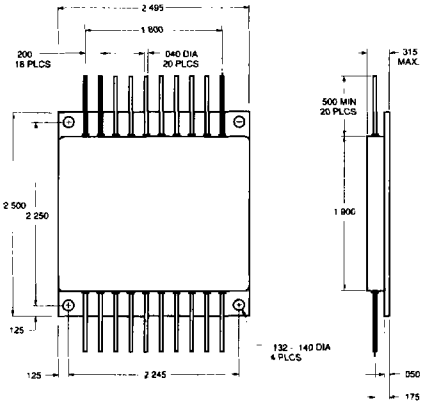
Parameter - OFF (see Note 1)		Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)CES}$	Collector Emitter Breakdown Voltage	1000			V	V_{GE} = 0 I_C = 250 µA
I_{CES}	Zero Gate Voltage Drain Current			0.25	mA	V_{CE} = Max. Rat., V_{GE} = 0
				1.0	mA	V_{CE} = 0.8 Max. Rat., V_{GE} = 0 T_C = 125°C
I_{GES}	Gate Emitter Leakage Current			±100	nA	V_{GE} = ±20 V V_{CE} = 0 V
Parameter - ON						
$V_{GE(th)}$	Gate Threshold Voltage	4.5		6.5	V	V_{CE} = V_{GE}, I_C = 1 mA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			3.5	V	V_{GE} = 15 V, I_C = 15 A T_C = 25°C
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			4.5	V	V_{GE} = 15 V, I_C = 15 A T_C = 125°C
Dynamic						
g_{fs}	Forward Transductance	5.5			S	V_{CE} = 20 V, I_C = 15 A
C_{ies}	Input Capacitance		2000		pF	V_{GE} = 0
C_{oes}	Output Capacitance		160		pF	V_{CE} = 25 V
C_{res}	Reverse Transfer Capacitance		65		pF	f = 1 mHz
Switching-Resistive Load						
$T_{d(on)}$	Turn-On Time		50		nS	V_{CC} = 600 V, I_C = 15 A
t_r	Rise Time		200		nS	V_{GE} = 15 V, R_g = 3.3 Ω,
$T_{d(off)}$	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 = 15 A
t_f	Fall Time		200		nS	V_{GE} = 15 V, R_g = 3.3 Ω
E_{off}	Turn-Off Losses		1.5		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.

MECHANICAL OUTLINE



2.1

Omnirel

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

IGBT

Parameters		OM9036SF	OM9037SF	Units
V_{CES}		500	1000	V
V_{CER}	(R_{ge} = 20 KΩ)	500	1000	V
I_C @ T_C = 25°C	Continuous Drain Current	60	35	A
I_C @ T_C = 90°C	Continuous Drain Current	30	25	A
I_C Pulsed	Pulsed Drain Current	240	200	A
Junction-To-Case	Linear Derating Factor	1.0	1.75	W/°C
Junction-To-Ambient	Linear Derating Factor	.03	.03	W/°C
R_{thJC}	Junction-To-Case	1.0	.60	°C/W
R_{thJA}	Junction-To-Ambient	30	30	°C/W

Rectifier

PIV		600	1000	V
I_O		30	30	A
t_{rr}		35	50	nsec

Gate Driver

V_{DD}	Either Chip	16.5	16.5	V
V_{LSD} to V_{HSD}		600	600	V
LSD to HSD	Slew Rate	10	10	V/µs
Logic Input Voltage		-0.3 to 5.5	-0.3 to 5.5	V
T_j		150	150	°C

2.1

TYPICAL APPLICATION