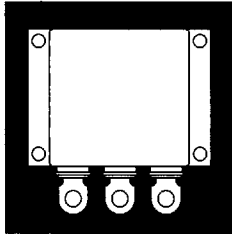


IGBTs IN HERMETIC ISOLATED POWER BLOCK PACKAGES



High Current, High Voltage 600V And 1200V,
Up To 150 Amp IGBTs With FRED Diodes

FEATURES

- Includes Internal FRED Diode
- Rugged Package Design
- Solder Terminals
- Very Low Saturation Voltage
- Fast Switching, Low Drive Current
- Available Screened To MIL-S-19500, TX, TXV And S Levels
- Ceramic Feedthroughs

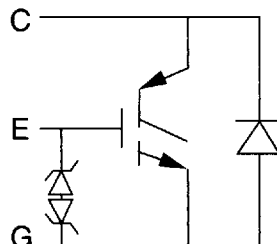
DESCRIPTION

This series of hermetically packaged products feature the latest advanced IGBT technology combined with a package designed specifically for high efficiency, high current applications. They are ideally suited for Hi-Rel requirements where small size, high performance and high reliability are required, and in applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.

GENERAL CHARACTERISTICS @ 25°C

Part Number	V _{CE} (V)	I _C (A)	V _{CE(sat)}	Type
OM120L60SB	600	150	1.8 Volts	Lo Sat.
OM90L120SB	1200	140	3 Volts	Lo Sat.
OM100F60SB	600	150	2.7 Volts	Hi Speed
OM70F120SB	1200	140	4 Volts	Hi Speed

SCHEMATIC



ELECTRICAL CHARACTERISTICS: OM120L60SB ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Collector Emitter Breakdown Voltage, $I_C = 500\ \mu\text{A}$, $V_{CE} = 0\ \text{V}$	$V_{(BR)CES}$	600	-	-	V
Zero Gate Voltage Drain Current, $V_{GS} = 0$, $V_{CE} = \text{Max. Rat.}$	I_{CES}	-	-	0.5	mA
$V_{CE} = 0.8\ \text{Max. Rat.}$, $V_{GS} = 0$, $T_J = 125^\circ\text{C}$		-	-	2.0	mA
Gate Emitter Leakage Current, $V_{GS} = \pm 20\ \text{V}$, $V_{CE} = 0\ \text{V}$	I_{GES}	-	-	± 200	nA

ON CHARACTERISTICS

Gate-Threshold Voltage, $V_{CE} = V_{GS}$, $I_C = 0.5\ \text{mA}$	$V_{(GTH)}$	2.5	-	5.0	V
Collector Emitter Saturation Voltage, $V_{GS} = 15\ \text{V}$, $I_C = 120\ \text{A}$	$V_{(CEsat)}$	-	-	1.8	V

DYNAMIC CHARACTERISTICS

Forward Transconductance	$V_{CE} = 10\ \text{V}$, $I_C = 120\ \text{A}$	g_m	50	-	-	S
Input Capacitance	$V_{GS} = 0$	C_{iss}	-	8000	-	pF
Output Capacitance	$V_{CE} = 25\ \text{V}$	C_{oss}	-	680	-	pF
Reverse Transfer Capacitance	$f = 1.0\ \text{MHz}$	C_{res}	-	200	-	pF

SWITCHING-INDUCTIVE RESISTIVE CHARACTERISTICS

Turn-On Delay Time	$V_{CC} = 480\ \text{V}$, $I_C = 120\ \text{A}$, $R_{DS} = 2.7\ \Omega$, $V_{GS} = 15\ \text{V}$, $L = 100\ \mu\text{H}$	$t_{(ON)}$	-	50	-	nS
Rise Time		t_r	-	200	-	nS
Turn-Off Delay Time		$t_{(OFF)}$	-	600	-	nS
Fall Time		t_f	-	500	-	nS

SWITCHING-INDUCTIVE LOAD CHARACTERISTICS

Turn-Off Delay Time	$V_{(CE)clamp} = 480\ \text{V}$, $I_C = 120\ \text{A}$	$t_{(OFF)}$	-	1000	-	nS
Fall Time	$V_{GS} = 15\ \text{V}$, $R_{DS} = 2.7\ \Omega$	t_f	-	1000	-	nS
Turn-Off Losses	$L = 100\ \mu\text{H}$, $T_J = 125^\circ\text{C}$	$E_{(OFF)}$	-	52	-	mWs

SOURCE DRAIN DIODE CHARACTERISTICS

Maximum Forward Voltage	$I_F = 120\ \text{A}$, $T_J = 25^\circ\text{C}$	V_F	-	-	1.85	V
	$I_F = 120\ \text{A}$, $T_J = 125^\circ\text{C}$		-	-	1.50	
Maximum Reverse Current	$V_R = 600\ \text{V}$, $T_C = 25^\circ\text{C}$	I_R	-	-	500	μA
	$V_R = 800\ \text{V}$, $T_C = 125^\circ\text{C}$		-	-	28	
Reverse Recovery Time	$I_F = 1\ \text{A}$, $dI/dt = 200\ \text{A}/\mu\text{S}$, $V_R = 30\ \text{V}$, $T_J = 25^\circ\text{C}$	t_r	-	-	50	nS

ELECTRICAL CHARACTERISTICS: OM90L120SB ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Collector Emitter Breakdown Voltage, $I_C = 6\ \text{mA}$, $V_{CE} = 0\ \text{V}$	$V_{(BR)CES}$	1200	-	-	V
Zero Gate Voltage Drain Current, $V_{GS} = 0$, $V_{CE} = \text{Max. Rat.}$	I_{CES}	-	-	0.6	mA
$V_{CE} = 0.8\ \text{Max. Rat.}$, $V_{GS} = 0$, $T_J = 125^\circ\text{C}$		-	-	2.4	mA
Gate Emitter Leakage Current, $V_{GS} = \pm 20\ \text{V}$, $V_{CE} = 0\ \text{V}$	I_{GES}	-	-	± 200	nA

ON CHARACTERISTICS

Gate-Threshold Voltage, $V_{CE} = V_{GS}$, $I_C = 8\ \text{mA}$	$V_{(GTH)}$	4.0	-	8.0	V
Collector Emitter Saturation Voltage, $V_{GS} = 15\ \text{V}$, $I_C = 90\ \text{A}$	$V_{(CEsat)}$	-	-	3.0	V

DYNAMIC CHARACTERISTICS

Forward Transconductance	$V_{CE} = 6\ \text{V}$, $I_C = 90\ \text{A}$	g_m	50	-	-	S
Input Capacitance	$V_{GS} = 0$	C_{iss}	-	8500	-	pF
Output Capacitance	$V_{CE} = 25\ \text{V}$	C_{oss}	-	400	-	pF
Reverse Transfer Capacitance	$f = 1.0\ \text{MHz}$	C_{res}	-	2400	-	pF

SWITCHING-INDUCTIVE RESISTIVE CHARACTERISTICS

Turn-On Delay Time	$V_{CC} = 960\ \text{V}$, $I_C = 90\ \text{A}$, $R_{DS} = 2.7\ \Omega$, $V_{GS} = 15\ \text{V}$, $L = 100\ \mu\text{H}$	$t_{(ON)}$	-	80	-	nS
Rise Time		t_r	-	250	-	nS
Turn-Off Delay Time		$t_{(OFF)}$	-	450	-	nS
Fall Time		t_f	-	1200	-	nS

SWITCHING-INDUCTIVE LOAD CHARACTERISTICS

Turn-Off Delay Time	$V_{(CE)clamp} = 960\ \text{V}$, $I_C = 90\ \text{A}$	$t_{(OFF)}$	-	450	-	nS
Fall Time	$V_{GS} = 15\ \text{V}$, $R_{DS} = 2.7\ \Omega$	t_f	-	1200	-	nS
Turn-Off Losses	$L = 100\ \mu\text{H}$, $T_J = 125^\circ\text{C}$	$E_{(OFF)}$	-	54	-	mWs

SOURCE DRAIN DIODE CHARACTERISTICS

Maximum Forward Voltage	$I_F = 105\ \text{A}$, $T_J = 25^\circ\text{C}$	V_F	-	-	2.55	V
	$I_F = 105\ \text{A}$, $T_J = 125^\circ\text{C}$		-	-	2.15	
Maximum Reverse Current	$V_R = 1200\ \text{V}$, $T_C = 25^\circ\text{C}$	I_R	-	-	4.4	mA
	$V_R = 960\ \text{V}$, $T_C = 125^\circ\text{C}$		-	-	28	
Reverse Recovery Time	$I_F = 1\ \text{A}$, $dI/dt = 200\ \text{A}/\mu\text{S}$, $V_R = 30\ \text{V}$, $T_J = 25^\circ\text{C}$	t_r	-	-	60	nS

ELECTRICAL CHARACTERISTICS: OM100F60SB ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Collector Emitter Breakdown Voltage, $I_C = 500\ \mu\text{A}$, $V_{CE} = 0\ \text{V}$	$V_{BR(CE)}$	600	-	-	V
Zero Gate Voltage Drain Current, $V_{GE} = 0$, $V_{CE} = \text{Max. Rat.}$	I_{CES}	-	-	0.5	mA
$V_{CE} = 0.8\ \text{Max. Rat.}$, $V_{GE} = 0$, $T_J = 125^\circ\text{C}$		-	-	2.0	mA
Gate Emitter Leakage Current, $V_{GE} = \pm 20\ \text{V}$, $V_{CE} = 0\ \text{V}$	I_{GES}	-	-	± 200	nA
ON CHARACTERISTICS					
Gate-Threshold Voltage, $V_{CE} = V_{GE}$, $I_C = 0.5\ \text{mA}$	$V_{GE(TH)}$	2.5	-	5.0	V
Collector Emitter Saturation Voltage, $V_{GE} = 15\ \text{V}$, $I_C = 100\ \text{A}$	$V_{CE(SAT)}$	-	-	2.7	V
DYNAMIC CHARACTERISTICS					
Forward Transconductance	$V_{CE} = 10\ \text{V}$, $I_C = 100\ \text{A}$	g_{fs}	50	-	S
Input Capacitance	$V_{GE} = 0$	C_{iss}	-	8000	pF
Output Capacitance	$V_{CE} = 25\ \text{V}$	C_{oss}	-	680	pF
Reverse Transfer Capacitance	$f = 1.0\ \text{MHz}$	C_{res}	-	200	pF

SWITCHING-INDUCTIVE RESISTIVE CHARACTERISTICS

Turn-On Delay Time	$V_{CC} = 480\ \text{V}$, $I_C = 100\ \text{A}$ $R_{DS} = 2.7\ \Omega$, $V_{GS} = 15\ \text{V}$, $L = 100\ \mu\text{H}$	$t_{D(on)}$	-	50	-	nS
Rise Time		t_r	-	200	-	nS
Turn-Off Delay Time		$t_{D(off)}$	-	200	-	nS
Fall Time		t_f	-	300	-	nS

SWITCHING-INDUCTIVE LOAD CHARACTERISTICS

Turn-Off Delay Time	$V_{CE(amp)} = 480\ \text{V}$, $I_C = 100\ \text{A}$ $V_{GE} = 15\ \text{V}$, $R_g = 2.7\ \Omega$ $L = 100\ \mu\text{H}$, $T_J = 125^\circ\text{C}$	$t_{D(off)}$	-	300	-	nS
Fall Time		t_f	-	600	-	nS
Turn-Off Losses		$E_{(OFF)}$	-	1.5	-	mWs

SOURCE DRAIN DIODE CHARACTERISTICS

Maximum Forward Voltage	$I_F = 120\ \text{A}$, $T_J = 25^\circ\text{C}$	V_F	-	-	1.85	V
	$I_F = 120\ \text{A}$, $T_J = 150^\circ\text{C}$		-	-	1.50	
Maximum Reverse Current	$V_R = 600\ \text{V}$, $T_C = 25^\circ\text{C}$	I_R	-	-	400	μA
	$V_R = 480\ \text{V}$, $T_C = 125^\circ\text{C}$		-	-	28	
Reverse Recovery Time	$I_F = 1\ \text{A}$, $di/dt = 200\ \text{A}/\mu\text{S}$ $V_R = 30\ \text{V}$, $T_J = 25^\circ\text{C}$	t_r	-	-	50	nS

ELECTRICAL CHARACTERISTICS: OM70L120SB ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Collector Emitter Breakdown Voltage, $I_C = 6\ \text{mA}$, $V_{CE} = 0\ \text{V}$	$V_{BR(CE)}$	1200	-	-	V
Zero Gate Voltage Drain Current, $V_{GE} = 0$, $V_{CE} = \text{Max. Rat.}$	I_{CES}	-	-	0.6	mA
$V_{CE} = 0.8\ \text{Max. Rat.}$, $V_{GE} = 0$, $T_J = 125^\circ\text{C}$		-	-	2.4	mA
Gate Emitter Leakage Current, $V_{GE} = \pm 20\ \text{V}$, $V_{CE} = 0\ \text{V}$	I_{GES}	-	-	± 200	nA
ON CHARACTERISTICS					
Gate-Threshold Voltage, $V_{CE} = V_{GE}$, $I_C = 8\ \text{mA}$	$V_{GE(TH)}$	4.0	-	8.0	V
Collector Emitter Saturation Voltage, $V_{GE} = 15\ \text{V}$, $I_C = 70\ \text{A}$	$V_{CE(SAT)}$	-	-	4.0	V
DYNAMIC CHARACTERISTICS					
Forward Transconductance	$V_{CE} = 10\ \text{V}$, $I_C = 70\ \text{A}$	g_{fs}	50	-	S
Input Capacitance	$V_{GE} = 0$	C_{iss}	-	7600	pF
Output Capacitance	$V_{CE} = 25\ \text{V}$	C_{oss}	-	800	pF
Reverse Transfer Capacitance	$f = 1.0\ \text{MHz}$	C_{res}	-	120	pF

SWITCHING-INDUCTIVE RESISTIVE CHARACTERISTICS

Turn-On Delay Time	$V_{CC} = 960\ \text{V}$, $I_C = 70\ \text{A}$ $R_{DS} = 2.7\ \Omega$, $V_{GS} = 15\ \text{V}$, $L = 100\ \mu\text{H}$	$t_{D(on)}$	-	80	-	nS
Rise Time		t_r	-	150	-	nS
Turn-Off Delay Time		$t_{D(off)}$	-	400	-	nS
Fall Time		t_f	-	700	-	nS

SWITCHING-INDUCTIVE LOAD CHARACTERISTICS

Turn-Off Delay Time	$V_{CE(amp)} = 600\ \text{V}$, $I_C = 70\ \text{A}$ $V_{GE} = 15\ \text{V}$, $R_g = 2.7\ \Omega$ $L = 100\ \mu\text{H}$, $T_J = 125^\circ\text{C}$	$t_{D(off)}$	-	400	-	nS
Fall Time		t_f	-	1100	-	nS
Turn-Off Losses		$E_{(OFF)}$	-	110	-	mWs

SOURCE DRAIN DIODE CHARACTERISTICS

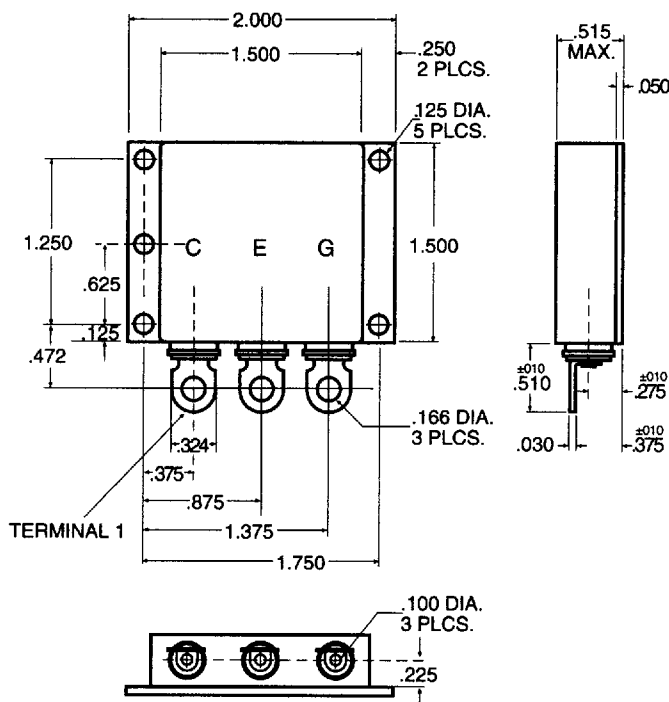
Maximum Forward Voltage	$I_F = 105\ \text{A}$, $T_J = 25^\circ\text{C}$	V_F	-	-	2.55	V
	$I_F = 105\ \text{A}$, $T_J = 125^\circ\text{C}$		-	-	2.15	
Maximum Reverse Current	$V_R = 1200\ \text{V}$, $T_C = 25^\circ\text{C}$	I_R	-	-	4.4	mA
	$V_R = 960\ \text{V}$, $T_C = 125^\circ\text{C}$		-	-	28	
Reverse Recovery Time	$I_F = 1\ \text{A}$, $di/dt = 200\ \text{A}/\mu\text{S}$ $V_R = 30\ \text{V}$, $T_J = 25^\circ\text{C}$	t_r	-	-	60	nS

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)**IGBT**

Parameters		120L60SB	90L120SB	100F60SB	70F120SB	Units
V_{CE}	Drain Source Voltage	600	1200	600	1200	V
V_{CEr}	Drain Gate Voltage ($R_{ge} = 20\text{ K}\Omega$)	600	1200	600	1200	V
$I_C @ T_C = 25^\circ\text{C}$	Continuous Drain Current	150	140	150	140	A
$I_C @ T_C = 90^\circ\text{C}$	Continuous Drain Current	120	90	100	70	A
I_C Pulsed	Pulsed Drain Current	400	360	400	280	A
Junction-To-Case	Linear Derating Factor	3.33	3.33	3.33	3.33	W/ $^\circ\text{C}$
Junction-To-Ambient	Linear Derating Factor	.03	.03	.03	.03	W/ $^\circ\text{C}$
R_{thJC}	Junction-To-Case	0.3	0.3	0.3	0.3	$^\circ\text{C/W}$
R_{thJA}	Junction-To-Ambient	30	30	30	30	$^\circ\text{C/W}$

Rectifier

PIV		600	1200	600	1200	V
I_O		120	105	120	105	A
t_{rr}		35	40	35	40	nSec

MECHANICAL OUTLINE

2.1