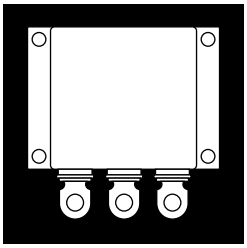
Preliminary Data Sheet

OM120L60SB OM90L120SB
OM100F60SB OM70F120SB

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

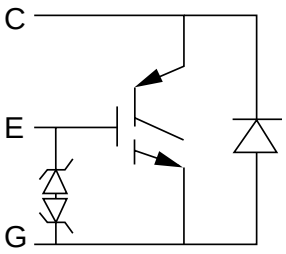
This series of hermetically packaged products feature the latest advanced IGBT technology combined with a package designed specifically for high efficiency, high current applications. They are ideally suited for Hi-Rel requirements where small size, high performance and high reliability are required, 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

3.1

SCHEMATIC



ELECTRICAL CHARACTERISTICS: OM120L60SB (T_C = 25°C unless otherwise specified)

Characteristic		Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector Emitter Breakdown Voltage, I_C = 500 µA, V_{CE} = 0 V		$V_{(BR)CES}$	600	-	-	V
Zero Gate Voltage Drain Current , V_{GE} = 0, V_{CE} = Max. Rat.		I_{CES}	-	-	0.5	mA
V_{CE} = 0.8 Max. Rat., V_{GE} = 0, T_j = 125°C			-	-	2.0	mA
Gate Emitter Leakage Current, V_{GE} = ±20 V, V_{CE} = 0 V		I_{GES}	-	-	±200	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage, V_{CE} = V_{GE}, I_C = 0.5 mA		$V_{GE(th)}$	2.5	-	5.0	V
Collector Emitter Saturation Voltage, V_{GE} = 15 V, I_C = 120 A		$V_{CE(sat)}$	-	-	1.8	V
DYNAMIC CHARACTERISTICS						
Forward Transconductance	V_{CE} = 10 V, I_C = 120 A	g_{fs}	50	-	-	S
Input Capacitance	V_{GE} = 0,	C_{iss}	-	8000	-	pF
Output Capacitance	V_{CE} = 25 V,	C_{oss}	-	680	-	pF
Reverse Transfer Capacitance	f = 1.0 mHz	C_{rss}	-	200	-	pF
SWITCHING-INDUCTIVE RESISTIVE CHARACTERISTICS						
Turn-On Delay Time		$t_{d(on)}$	-	50	-	nS
Rise Time	V_{CC} = 480 V, I_C = 120 A,	t_r	-	200	-	nS
Turn-Off Delay Time	R_{GS} = 2.7 , V_{GS} = 15 V,	$t_{d(off)}$	-	600	-	nS
Fall Time	L = 100 µH	t_f	-	500	-	nS
SWITCHING-INDUCTIVE LOAD CHARACTERISTICS						
Turn-Off Delay Time	$V_{CE(clamp)}$ = 480 V, I_C = 120A	$t_{d(on)}$	-	1000	-	nS
Fall Time	V_{GE} = 15 V, R_g = 2.7	t_f	-	1000	-	nS
Turn-Off Losses	L = 100 µH, T_j = 125°C	$E_{(OFF)}$	-	52	-	m Ws
SOURCE DRAIN DIODE CHARACTERISTICS						
Maximum Forward Voltage	I_F = 120 A, T_j = 25°C	V_f	-	-	1.85	V
	I_F = 120 A, T_j = 125°C		-	-	1.50	
Maximum Reverse Current	V_R = 600 V, T_C = 25°C	I_r	-	-	500	µA
	V_R = 800 V, T_C = 125°C		-	-	28	mA
Reverse Recovery Time	I_F = 1 A, di/dt = 200 A µ/S V_R = 30 V, T_j = 25°C	t_{rr}	-	-	50	nS

ELECTRICAL CHARACTERISTICS: OM90L120SB (T_C = 25°C unless otherwise specified)

Characteristic		Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector Emitter Breakdown Voltage, I_C = 6 mA, V_{CE} = 0 V		$V_{(BR)CES}$	1200	-	-	V
Zero Gate Voltage Drain Current , V_{GE} = 0, V_{CE} = Max. Rat.		I_{CES}	-	-	0.6	mA
V_{CE} = 0.8 Max. Rat., V_{GE} = 0, T_j = 125°C			-	-	2.4	mA
Gate Emitter Leakage Current, V_{GE} = ±20 V, V_{CE} = 0 V		I_{GES}	-	-	±200	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage, V_{CE} = V_{GE}, I_C = 8 mA		$V_{GE(th)}$	4.0	-	8.0	V
Collector Emitter Saturation Voltage, V_{GE} = 15 V, I_C = 90 A		$V_{CE(sat)}$	-	-	3.0	V
DYNAMIC CHARACTERISTICS						
Forward Transconductance	V_{CE} = 6 V, I_C = 90 A	g_{fs}	50	-	-	S
Input Capacitance	V_{GE} = 0,	C_{iss}	-	8500	-	pF
Output Capacitance	V_{CE} = 25 V,	C_{oss}	-	400	-	pF
Reverse Transfer Capacitance	f = 1.0 mHz	C_{rss}	-	2400	-	pF
SWITCHING-INDUCTIVE RESISTIVE CHARACTERISTICS						
Turn-On Delay Time		$t_{d(on)}$	-	80	-	nS
Rise Time	V_{CC} = 960 V, I_C = 90 A,	t_r	-	250	-	nS
Turn-Off Delay Time	R_{GS} = 2.7 , V_{GS} = 15 V,	$t_{d(off)}$	-	450	-	nS
Fall Time	L = 100 µH	t_f	-	1200	-	nS
SWITCHING-INDUCTIVE LOAD CHARACTERISTICS						
Turn-Off Delay Time	$V_{CE(clamp)}$ = 960 V, I_C = 90 A	$t_{d(on)}$	-	450	-	nS
Fall Time	V_{GE} = 15 V, R_g = 2.7	t_f	-	1200	-	nS
Turn-Off Losses	L = 100 µH, T_j = 125°C	$E_{(OFF)}$	-	54	-	m Ws
SOURCE DRAIN DIODE CHARACTERISTICS						
Maximum Forward Voltage	I_F = 105 A, T_j = 25°C	V_f	-	-	2.55	V
	I_F = 105 A, T_j = 125°C		-	-	2.15	
Maximum Reverse Current	V_R = 1200 V, T_C = 25°C	I_r	-	-	4.4	mA
	V_R = 960 V, T_C = 125°C		-	-	28	mA
Reverse Recovery Time	I_F = 1 A, di/dt = 200 A µ/S V_R = 30 V, T_j = 25°C	t_{rr}	-	-	60	nS

ELECTRICAL CHARACTERISTICS: OM100F60SB (T_C = 25°C unless otherwise specified)

Characteristic		Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector Emitter Breakdown Voltage, I_C = 500 µA, V_{CE} = 0 V		$V_{(BR)CES}$	600	-	-	V
Zero Gate Voltage Drain Current , V_{GE} = 0, V_{CE} = Max. Rat.		I_{CES}	-	-	0.5	mA
V_{CE} = 0.8 Max. Rat., V_{GE} = 0, T_j = 125°C			-	-	2.0	mA
Gate Emitter Leakage Current, V_{GE} = ±20 V, V_{CE} = 0 V		I_{GES}	-	-	±200	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage, V_{CE} = V_{GE}, I_C = 0.5 mA		$V_{GE(th)}$	2.5	-	5.0	V
Collector Emitter Saturation Voltage, V_{GE} = 15 V, I_C = 100 A		$V_{CE(sat)}$	-	-	2.7	V
DYNAMIC CHARACTERISTICS						
Forward Transconductance	V_{CE} = 10 V, I_C = 100 A	g_{fs}	50	-	-	S
Input Capacitance	V_{GE} = 0,	C_{iss}	-	8000	-	pF
Output Capacitance	V_{CE} = 25 V,	C_{oss}	-	680	-	pF
Reverse Transfer Capacitance	f = 1.0 mHz	C_{rss}	-	200	-	pF
SWITCHING-INDUCTIVE RESISTIVE CHARACTERISTICS						
Turn-On Delay Time		$t_{d(on)}$	-	50	-	nS
Rise Time	V_{CC} = 480 V, I_C = 100 A,	t_r	-	200	-	nS
Turn-Off Delay Time	R_{GS} = 2.7 , V_{GS} = 15 V, L = 100 µH	$t_{d(off)}$	-	200	-	nS
Fall Time		t_f	-	300	-	nS
SWITCHING-INDUCTIVE LOAD CHARACTERISTICS						
Turn-Off Delay Time	$V_{CE(clamp)}$ = 480 V, I_C = 100 A	$t_{d(on)}$	-	300	-	nS
Fall Time	V_{GE} = 15 V, R_g = 2.7	t_f	-	600	-	nS
Turn-Off Losses	L = 100 µH, T_j = 125°C	$E_{(OFF)}$	-	1.5	-	m Ws
SOURCE DRAIN DIODE CHARACTERISTICS						
Maximum Forward Voltage	I_F = 120 A, T_j = 25°C	V_f	-	-	1.85	V
	I_F = 120 A, T_j = 150°C		-	-	1.50	
Maximum Reverse Current	V_R = 600 V, T_C = 25°C	I_r	-	-	400	µA
	V_R = 480 V, T_C = 125°C		-	-	28	mA
Reverse Recovery Time	I_F = 1 A, di/dt = 200 A µ/S V_R = 30 V, T_j = 25°C	t_{rr}	-	-	50	nS

ELECTRICAL CHARACTERISTICS: OM70L120SB (T_C = 25°C unless otherwise specified)

Characteristic		Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector Emitter Breakdown Voltage, I_C = 6 mA, V_{CE} = 0 V		$V_{(BR)CES}$	1200	-	-	V
Zero Gate Voltage Drain Current , V_{GE} = 0, V_{CE} = Max. Rat.		I_{CES}	-	-	0.6	mA
V_{CE} = 0.8 Max. Rat., V_{GE} = 0, T_j = 125°C			-	-	2.4	mA
Gate Emitter Leakage Current, V_{GE} = ±20 V, V_{CE} = 0 V		I_{GES}	-	-	±200	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage, V_{CE} = V_{GE}, I_C = 8 mA		$V_{GE(th)}$	4.0	-	8.0	V
Collector Emitter Saturation Voltage, V_{GE} = 15 V, I_C = 70 A		$V_{CE(sat)}$	-	-	4.0	V
DYNAMIC CHARACTERISTICS						
Forward Transconductance	V_{CE} = 10 V, I_C = 70 A	g_{fs}	50	-	-	S
Input Capacitance	V_{GE} = 0,	C_{iss}	-	7600	-	pF
Output Capacitance	V_{CE} = 25 V,	C_{oss}	-	800	-	pF
Reverse Transfer Capacitance	f = 1.0 mHz	C_{rss}	-	120	-	pF
SWITCHING-INDUCTIVE RESISTIVE CHARACTERISTICS						
Turn-On Delay Time		$t_{d(on)}$	-	80	-	nS
Rise Time	V_{CC} = 960 V, I_C = 70 A,	t_r	-	150	-	nS
Turn-Off Delay Time	R_{GS} = 2.7 , V_{GS} = 15 V,	$t_{d(off)}$	-	400	-	nS
Fall Time	L = 100 µH	t_f	-	700	-	nS
SWITCHING-INDUCTIVE LOAD CHARACTERISTICS						
Turn-Off Delay Time	$V_{CE(clamp)}$ = 600 V, I_C = 70 A	$t_{d(on)}$	-	400	-	nS
Fall Time	V_{GE} = 15 V, R_g = 2.7	t_f	-	1100	-	nS
Turn-Off Losses	L = 100 µH, T_j = 125°C	$E_{(OFF)}$	-	110	-	m Ws
SOURCE DRAIN DIODE CHARACTERISTICS						
Maximum Forward Voltage	I_F = 105 A, T_j = 25°C	V_f	-	-	2.55	V
	I_F = 105 A, T_j = 125°C		-	-	2.15	
Maximum Reverse Current	V_R = 1200 V, T_C = 25°C	I_r	-	-	4.4	mA
	V_R = 960 V, T_C = 125°C		-	-	28	mA
Reverse Recovery Time	I_F = 1 A, di/dt = 200 A µ/S V_R = 30 V, T_j = 25°C	t_{rr}	-	-	60	nS

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

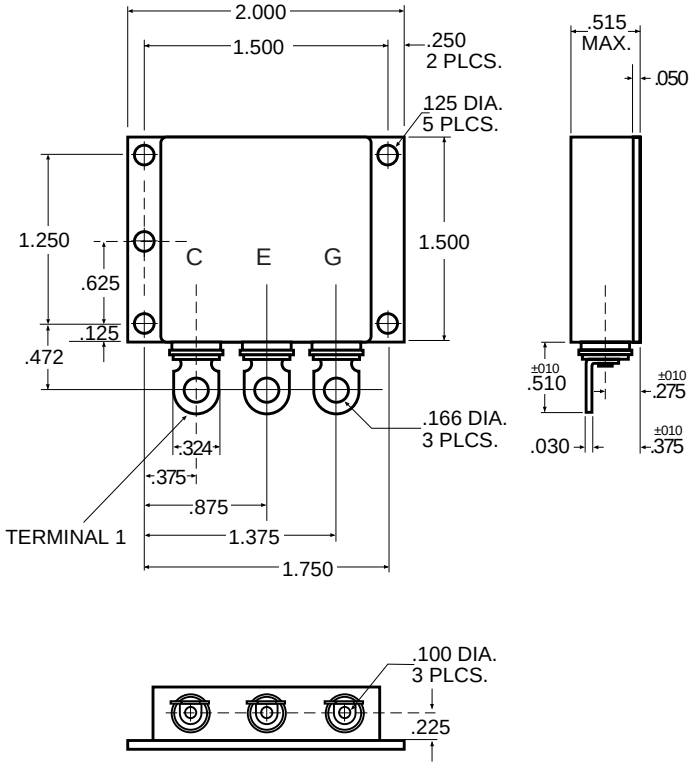
IGBT

Parameters		120L60SB	90L120SB	100F60SB	70F120SB	Units
V_{CE}	Drain Source Voltage	600	1200	600	1200	V
V_{CER}	Drain Gate Voltage (R_{ge} = 20 K)	600	1200	600	1200	V
I_C @ T_C = 25°C	Continuous Drain Current	150	140	150	140	A
I_C @ T_C = 90°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/°C
Junction-To-Ambient	Linear Derating Factor	.03	.03	.03	.03	W/°C
R_{thJC}	Junction-To-Case	0.3	0.3	0.3	0.3	°C/W
R_{thJA}	Junction-To-Ambient	30	30	30	30	°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



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