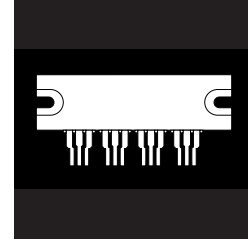


1000 Volt, 5 To 25 Amp, N-Channel IGBTs With Free Wheeling Diodes In Multi-Chip Packages



FEATURES

- Two Or Four IGBTs And Free Wheeling Diodes
- 2500V Package Isolation
- Low Turn-Off Switching Losses
- 3.5V Typical $V_{ce(sat)}$
- 50nS Soft Recovery Diode

APPLICATIONS

- Half And Full Bridge
- AC/DC Motor Control
- Switch Mode Power Supply
- Induction Heating

DESCRIPTION

This series of 1000 Volt, 5 Amp to 25 Amp IGBT power modules feature the latest direct bonded copper technology (DBC) providing optimum thermal management as well as component isolation. These devices feature the free wheeling diode mounted in close proximity with the IGBT and are available in both dual and quad configurations.

IGBT	Maximum Ratings (Per Device)	OM6555	OM6556	Units
$I_C @ T_C = 25^\circ\text{C}$	Continuous Collector Current	10	21	A
$I_C @ T_C = 85^\circ\text{C}$	Continuous Collector Current	5	10	A
$V_{(BR)CES}$	Collector to Emitter Breakdown Voltage	1000	1000	V
V_{GE}	Gate to Emitter Voltage	± 20	± 20	V
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation	35	68	W
$P_D @ T_C = 85^\circ\text{C}$	Maximum Power Dissipation	16	55	W
T_J, T_{ISg}	Operating and Storage Temperature	-40 to 150	-40 to 150	$^\circ\text{C}$

Diode

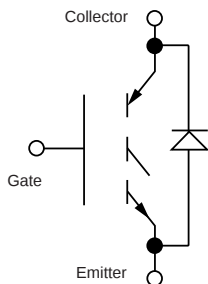
V_{rrm}	Peak Repetitive Reverse Voltage	1000	1000	V
$I_{F(AV)} @ T_C = 25^\circ\text{C}$	Average Rectified Forward Current	8	30	A
$I_{F(AV)} @ T_C = 85^\circ\text{C}$	Average Rectified Forward Current	5	19	A
T_J, T_{ISg}	Operating and Storage Temperature	-40 to 150	-40 to 150	$^\circ\text{C}$

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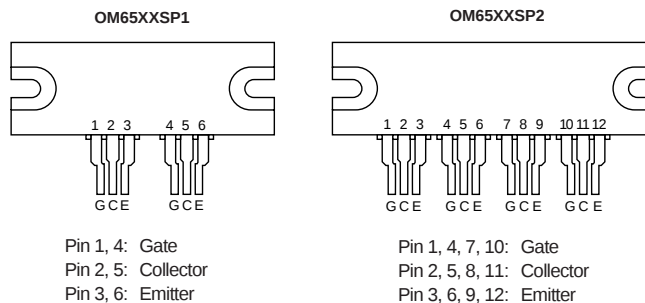
Module Thermal Characteristics

$R_{\theta JC}$, IGBT	Thermal Resistance, Junction-to-Case	1.7	1.7	$^\circ\text{C/W}$
$R_{\theta JC}$, Diode	Thermal Resistance, Junction-to-Case	4	2.6	$^\circ\text{C/W}$
$R_{\theta CS}$, Module	Thermal Resistance, Case-to-Sink (1)	0.1	0.1	$^\circ\text{C/W}$

SCHEMATIC



PIN CONNECTIONS



OM6555SP1/SP2 - OM6556SP1/SP2

OM6555SP1/OM6555SP2

IGBT CHARACTERISTICS ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Parameter - OFF

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)CES}$	Collector to Emitter Breakdown Voltage	1000			V	$V_{GE} = 0$ $I_C = 250 \mu\text{A}$
I_{CES}	Zero Gate Voltage Drain Current			0.25 1	mA mA	$V_{CE} = \text{Max. Rat.}, V_{GE} = 0$ $V_{CE} = 0.8 \text{ Max. Rat.}, V_{GE} = 0$ $T_j = 150^\circ\text{C}$
I_{GES}	Gate Emitter Leakage Current			± 100	nA	$V_{GE} = \pm 20 \text{ V}$ $V_{CE} = 0 \text{ V}$

Parameter - ON

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{GE(th)}$	Gate Threshold Voltage	4.5		6.5	V	$V_{CE} = V_{GE}, I_C = 1 \text{ mA}$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage		3.5		V	$V_{GE} = 15 \text{ V}, I_C = 10 \text{ A}$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			3.8	v	$V_{GE} = 15 \text{ V}, I_C = 5 \text{ A}$ $T_j = 150^\circ\text{C}$

Dynamic

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
G_{fs}	Forward Transconductance		1.7		S	$V_{CE} = 20 \text{ V}, I_C = 15 \text{ A}$
C_{iss}	Input Capacitance		650		pF	$V_{GE} = 0$
C_{oss}	Output Capacitance		50		pF	$V_{CE} = 25 \text{ V}$
C_{res}	Reverse Transfer Capacitance		20		pF	$f = 1 \text{ MHz}$
$T_{d(on)}$	Turn-On Delay Time		50		nS	$V_{CC} = 600 \text{ V}, I_C = 15 \text{ A}$ $V_{GE} = 15 \text{ V}$ $R_g = 3.3$ $L = .1 \text{ mH}$ $T_j = 150^\circ\text{C}$
T_r	Rise Time		200		nS	
$T_{d(off)}$	Turn-Off Delay Time		200		nS	
T_f	Fall Time		300		nS	
E_{ts}	Turn-Off Switching Losses		2.4		mJ	

DIODE CHARACTERISTICS ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_f	Maximum Forward Voltage			1.9 1.7	V V	$I_F = 8 \text{ A}, T_j = 25^\circ\text{C}$ $I_F = 5 \text{ A}, T_j = 150^\circ\text{C}$
I_r	Maximum Reverse Current			1.2 2.5	mA mA	$V_R = 1000 \text{ V}, T_j = 25^\circ\text{C}$ $V_R = 800 \text{ V}, T_j = 150^\circ\text{C}$
T_{rr}	Reverse Recovery Time			135	nS	$I_F = 1 \text{ A}, d_i/d_t = -15 \text{ A}/\mu\text{S}$ $V_R = 30 \text{ V}, T_j = 25^\circ\text{C}$

OM6556SP1/OM6556SP2**IGBT CHARACTERISTICS ($T_j = 25^\circ\text{C}$ unless otherwise specified)****Parameter - OFF**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)CES}$	Collector to Emitter Breakdown Voltage	1000			V	$V_{GE} = 0$ $I_C = 250 \mu\text{A}$
I_{CES}	Zero Gate Voltage Drain Current			0.25 1	mA mA	$V_{CE} = \text{Max. Rat.}, V_{GE} = 0$ $V_{CE} = 0.8 \text{ Max. Rat.}, V_{GE} = 0$ $T_j = 150^\circ\text{C}$
I_{GES}	Gate Emitter Leakage Current			± 100	nA	$V_{GE} = \pm 20 \text{ V}$ $V_{CE} = 0 \text{ V}$

Parameter - ON

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{GE(th)}$	Gate Threshold Voltage	4.5		6.5	V	$V_{CE} = V_{GE}, I_C = 1 \text{ mA}$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage		3.5		V	$V_{GE} = 15 \text{ V}, I_C = 21 \text{ A}$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			3.8	V	$V_{GE} = 15 \text{ V}, I_C = 10 \text{ A}$ $T_j = 150^\circ\text{C}$

Dynamic

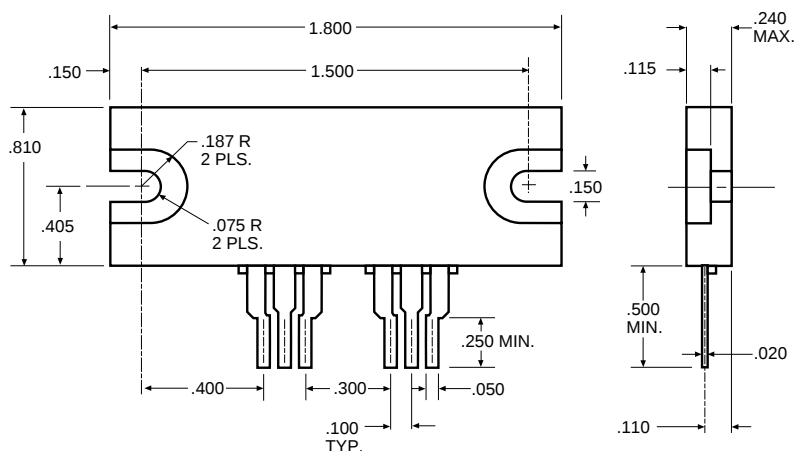
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
G_{fs}	Forward Transconductance		1.7		S	$V_{CE} = 20 \text{ V}, I_C = 15 \text{ A}$
C_{iss}	Input Capacitance		650		pF	$V_{GE} = 0$
C_{oss}	Output Capacitance		50		pF	$V_{CE} = 25 \text{ V}$
C_{res}	Reverse Transfer Capacitance		20		pF	$f = 1 \text{ MHz}$
$T_{d(on)}$	Turn-On Delay Time		50		nS	$V_{CC} = 600 \text{ V}, I_C = 10 \text{ A}$ $V_{GE} = 15 \text{ V}$ $R_g = 3.3$ $L = .1 \text{ mH}$ $T_j = 150^\circ\text{C}$
T_r	Rise Time		200		nS	
$T_{d(off)}$	Turn-Off Delay Time		200		nS	
T_f	Fall Time		300		nS	
E_{ts}	Turn-Off Switching Losses		2.4		mJ	

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DIODE CHARACTERISTICS ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_f	Maximum Forward Voltage			1.9 1.7	V V	$I_F = 8 \text{ A}, T_j = 25^\circ\text{C}$ $I_F = 5 \text{ A}, T_j = 150^\circ\text{C}$
I_r	Maximum Reverse Current			1.2 2	mA mA	$V_R = 1000 \text{ V}, T_j = 25^\circ\text{C}$ $V_R = 800 \text{ V}, T_j = 150^\circ\text{C}$
T_{rr}	Reverse Recovery Time			135	nS	$I_F = 1 \text{ A}, d_i/d_t = -15 \text{ A}/\mu\text{S}$ $V_R = 30 \text{ V}, T_j = 25^\circ\text{C}$

Omnirel Package P-1 (Industrial 6-Pin)



Technical drawing of a 12-pin connector, showing top, side, and end views with dimensions in inches.

Top View Dimensions:

- Overall width: 2.800
- Distance from left edge to center of first pin: 2.500
- Pin pitch (center-to-center): .400
- Pin width: .300 TYP.
- Pin thickness: .050
- Pin length: .250 MIN.
- Pin spacing from right edge: .100 TYP.
- Pin spacing from center line: .020

Side View Dimensions:

- Overall height: .810
- Distance from top edge to center of first pin: .150
- Pin height: .405
- Pin thickness: .020
- Pin length: .500 MIN.
- Pin spacing from bottom edge: .070

End View Dimensions:

- Overall width: .240 MAX.
- Distance from left edge to center of first pin: .115
- Pin width: .150
- Pin thickness: .020
- Pin length: .500 MIN.
- Pin spacing from right edge: .070

Notes:

- .187 R 2 PLS. (Top left corner radius)
- .075 R 2 PLS. (Bottom left corner radius)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Torque	Mounting Torque $\pm 10\%$		10.5 6		Nm in/lbs	Package to heat sink (1, 2)
wt	Approximate Weight		0.8 17		g oz	SP1 Package
			1.3 28		g oz	SP2 Package

1. Mounting surface flat, smooth, and greased. Recommended mounting compound Dow Corning DC340
2. Mount using two #6 size screws with flat washers (.375" OD, .188" ID, .040" Thickness)