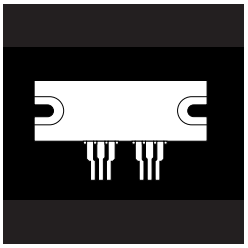
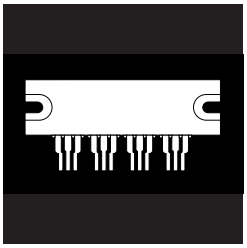
OM6553SP1 OM6554SP1
OM6553SP2 OM6554SP2



500 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

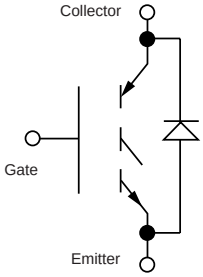
DESCRIPTION

This series of 500 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)**	OM6553	OM6554	Units
I_C @ T_C = 25°C	Continuous Collector Current	10	26	A
I_C @ T_C = 85°C	Continuous Collector Current	5	12	A
$V_{(BR)CES}$	Collector to Emitter Breakdown Voltage	500	500	V
V_{GE}	Gate to Emitter Voltage	±20	±20	V
P_D @ T_C = 25°C	Maximum Power Dissipation	35	68	W
P_D @ T_C = 85°C	Maximum Power Dissipation	16	36	W
T_J, T_{tsg}	Operating and Storage Temperature	-40 to 150	-40 to 150	°C
Diode				
V_{rrm}	Peak Repetitive Reverse Voltage	600	600	V
$I_{F(AV)}$ @ T_C = 25°C	Average Rectified Forward Current	8	30	A
$I_{F(AV)}$ @ T_C = 85°C	Average Rectified Forward Current	5	19	A
T_J, T_{tsg}	Operating and Storage Temperature	-40 to 150	-40 to 150	°C
Module Thermal Characteristics				
Rq_{JC}, IGBT	Thermal Resistance, Junction-to-Case	4	1.2	°C/W
Rq_{JC}, Diode	Thermal Resistance, Junction-to-Case	4	2.6	°C/W
Rq_{CS}, Module	Thermal Resistance, Case-to-Sink (1)	0.1	0.1	°C/W

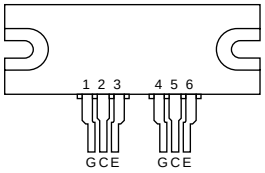
3.1

SCHEMATIC



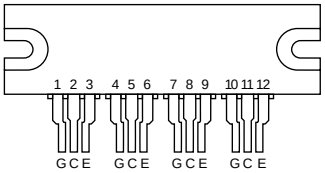
PIN CONNECTIONS

OM65XXSP1



Pin 1, 4: Gate
Pin 2, 5: Collector
Pin 3, 6: Emitter

OM65XXSP2



Pin 1, 4, 7, 10: Gate
Pin 2, 5, 8, 11: Collector
Pin 3, 6, 9, 12: Emitter

OM6553SP1/OM6553SP2

IGBT CHARACTERISTICS (T_j = 25°C unless otherwise specified)

Parameter - OFF

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)CES}$	Collector to Emitter Breakdown Voltage	500			V	V_{GE} = 0 I_C = 250 µA
I_{CES}	Zero Gate Voltage Drain Current			0.25 1	mA mA	V_{CE} = Max. Rat., V_{GE} = 0 V_{CE} = 0.8 Max. Rat., V_{GE} = 0 T_j = 150°C
I_{GES}	Gate Emitter Leakage Current			±100	nA	V_{GE} = ±20 V V_{CE} = 0 V

Parameter - ON

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{GE(th)}$	Gate Threshold Voltage	2		4	V	V_{CE} = V_{GE}, I_C = 1mA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage		3.2		V	V_{GE} = 15 V, I_C = 10 A
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			3	V	V_{GE} = 15 V, I_C = 5 A T_j = 150°C

Dynamic

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
G_{fs}	Forward Transconductance		2		S	V_{CE} = 20 V, I_C = 5 A
C_{iss}	Input Capacitance		260		pF	V_{GE} = 0
C_{oss}	Output Capacitance		50		pF	V_{CE} = 25 V
C_{res}	Reverse Transfer Capacitance		20		pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time		37		nS	V_{CC} = 400 V, I_C = 5 A
T_r	Rise Time		150		nS	V_{GE} = 15 V
$T_{d(off)}$	Turn-Off Delay Time		350		nS	R_g = 47
T_f	Fall Time		810		nS	L = .1 mH
E_{ts}	Turn-Off Switching Losses		0.95		mJ	T_j = 150°C

DIODE CHARACTERISTICS (T_j = 25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_f	Maximum Forward Voltage			1.5 1.4	V V	I_F = 8 A, T_j = 25°C I_F = 5 A, T_j = 150°C
I_r	Maximum Reverse Current			150 1.5	µA mA	V_R = 500 V, T_j = 25°C V_R = 400 V, T_j = 150°C
T_{rr}	Reverse Recovery Time			100	nS	I_F = 1 A, d_i/d_t = -15 A/µS V_R = 30 V, T_j = 25°C

OM6554SP1/OM6554SP2

IGBT CHARACTERISTICS (T_j = 25°C unless otherwise specified)

Parameter - OFF

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)CES}$	Collector to Emitter Breakdown Voltage	500			V	V_{GE} = 0 I_C = 250 µA
I_{CES}	Zero Gate Voltage Drain Current			0.25 1	mA mA	V_{CE} = Max. Rat., V_{GE} = 0 V_{CE} = 0.8 Max. Rat., V_{GE} = 0 T_j = 150°C
I_{GES}	Gate Emitter Leakage Current			±100	nA	V_{GE} = ±20 V V_{CE} = 0 V

Parameter - ON

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{GE(th)}$	Gate Threshold Voltage	2		4	V	V_{CE} = V_{GE}, I_C = 1mA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage		2.6		V	V_{GE} = 15 V, I_C = 26 A
$V_{CE(sat)}$	Collector Emitter Saturation Voltage			3	V	V_{GE} = 15 V, I_C = 12 A T_j = 150°C

Dynamic

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
G_{fs}	Forward Transconductance		6		S	V_{CE} = 20 V, I_C = 10 A
C_{iss}	Input Capacitance		980		pF	V_{GE} = 0
C_{oss}	Output Capacitance		106		pF	V_{CE} = 25 V
C_{res}	Reverse Transfer Capacitance		30		pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time		56		nS	V_{CC} = 400 V, I_C = 10 A
T_r	Rise Time		115		nS	V_{GE} = 15 V
$T_{d(off)}$	Turn-Off Delay Time		170		nS	R_g = 47
T_f	Fall Time		300		nS	L = .1 mH
E_{ts}	Turn-Off Switching Losses		1		mJ	T_j = 150°C

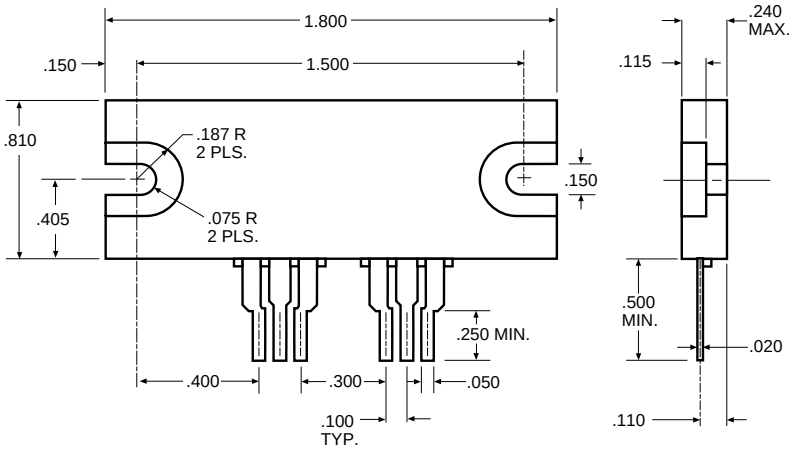
DIODE CHARACTERISTICS (T_j = 25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_f	Maximum Forward Voltage			1.9 1.8	V V	I_F = 30 A, T_j = 25°C I_F = 19 A, T_j = 150°C
I_r	Maximum Reverse Current			150 1.5	µA mA	V_R = 500 V, T_j = 25°C V_R = 400 V, T_j = 150°C
T_{rr}	Reverse Recovery Time			110	nS	I_F = 1 A, d_i/d_t = -15 A/µS V_R = 30 V, T_j = 25°C

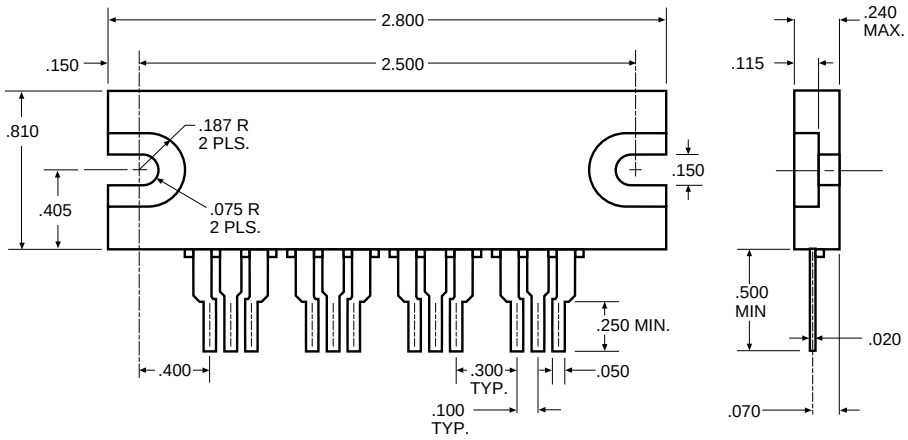
3.1

Mechanical Outlines

Omnirel Package P-1 (Industrial 6-Pin)



Omnirel Package P-2 (Industrial 12-Pin)



Mechanical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Torque	Mounting Torque ±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

Notes:

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)

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