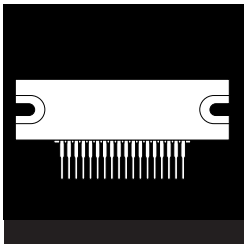
THREE PHASE MOSFET HALF BRIDGE IN A PLASTIC SIP PACKAGE



100V Thru 500V, Up to 6 Amp, Three Phase MOSFET Half Bridge

FEATURES

- Isolated High Density, Low Profile Package
- 6 MOSFETs Per Package
- Fast Switching, Low Drive Current
- Heat Sinkable
- Low $R_{DS(on)}$
- P-Channel Also Available

DESCRIPTION

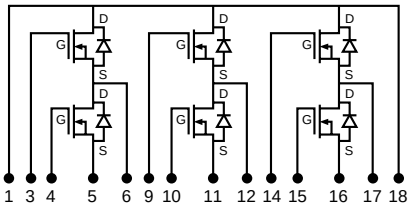
This series of three phase MOSFET half bridge products feature the latest advanced MOSFET and packaging technology. They are ideally suited where small size, high performance and high reliability are required in applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.

2.1

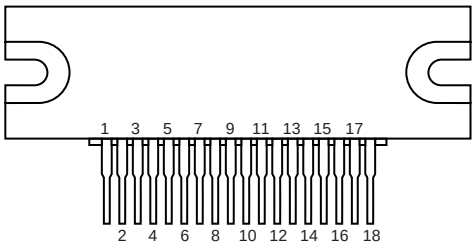
MAXIMUM RATINGS (Per MOSFET)

PART NUMBER	V_{DS}	$R_{DS(on)}$	$I_{D(MAX)}$
OM6413SP3	100V	.085	6A
OM6414SP3	200V	.180	4A
OM6415SP3	400V	.55	2.5A
OM6416SP3	500V	.85	2A

SCHEMATIC



PIN CONNECTION



Pin 1: V_{CC}	Pin 5: Source	Pin 9: Gate	Pin 13: N/C	Pin 17: Drain/Source
Pin 2: N/C	Pin 6: Drain/Source	Pin 10: Gate	Pin 14: Gate	Pin 18: V_{CC}
Pin 3: Gate	Pin 7: N/C	Pin 11: Source	Pin 15: Gate	
Pin 4: Gate	Pin 8: N/C	Pin 12: Drain/Source	Pin 16: Source	

Note: Pin 1 and Pin 18 are common

Omnirel

ELECTRICAL CHARACTERISTICS: T_C = 25° unless otherwise noted
STATIC P/N OM6413SP3

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	100			V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	V_{DS} = V_{GS}, I_D = 250 mA
I_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20 V
I_{GSSR}	Gate-Body Leakage Reverse			-100	nA	V_{GS} = - 20 V
I_{DSS}	Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	mA mA	V_{DS} = Max. Rat., V_{GS} = 0 V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 100° C
$I_{D(on)}$	On-State Drain Current[1]	6			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		1.275	1.425	V	V_{GS} = 10 V, I_D = 6 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		.085	.095		V_{GS} = 10 V, I_D = 6 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		.130	.155		V_{GS} = 10 V, I_D = 6 A, T_C = 100 C

DYNAMIC

g_{fs}	Forward Transductance[1]	6.0	7.2		S	V_{DS} 2 $V_{DS(on)}$, I_D = 6 A
C_{iss}	Input Capacitance		1275	1600	pF	V_{GS} = 0
C_{oss}	Output Capacitance		550	800	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		160	300	pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time		16	30	ns	V_{DD} = 30 V, I_D @ 15 A
t_r	Rise Time		19	60	ns	R_g = 5 W, R_L = 2 W
$T_{d(off)}$	Turn-Off Delay Time		42	80	ns	(MOSFET) switching times are essentially independent of operating temperature.
t_f	Fall Time		24	30	ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			- 6	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			- 20	A	
V_{SD}	Diode Forward Voltage[1]			- 2.5	V	T_C = 25 C, I_S = -12 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		400		ns	T_J = 150 C, I_F = I_S, dI_F/ds = 100 A/ms

1 Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

ELECTRICAL CHARACTERISTICS: T_C = 25° unless otherwise noted
STATIC P/N OM6414SP3

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	200			V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	V_{DS} = V_{GS}, I_D = 250 mA
I_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20 V
I_{GSSR}	Gate-Body Leakage Reverse			- 100	nA	V_{GS} = - 20 V
I_{DSS}	Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	mA mA	V_{DS} = Max. Rat., V_{GS} = 0 V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 100° C
$I_{D(on)}$	On-State Drain Current[1]	4			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		1.4	1.8	V	V_{GS} = 10 V, I_D = 4 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.14	0.18		V_{GS} = 10 V, I_D = 4 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.28	0.36		V_{GS} = 10 V, I_D = 4 A, T_C = 100 C

DYNAMIC

g_{fs}	Forward Transductance[1]	6.0	9.0		S	V_{DS} 2 $V_{DS(on)}$, I_D = 4 A
C_{iss}	Input Capacitance		1000	1600	pF	V_{GS} = 0
C_{oss}	Output Capacitance		250	750	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		100	300	pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time		17	30	ns	V_{DD} = 75 V, I_D @ 10 A
t_r	Rise Time		52	60	ns	R_g = 5 W, R_L = 7.3 W
$T_{d(off)}$	Turn-Off Delay Time		36	80	ns	(MOSFET) switching times are essentially independent of operating temperature.
t_f	Fall Time		30	60	ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			- 4	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			- 25	A	
V_{SD}	Diode Forward Voltage[1]			- 2	V	T_C = 25 C, I_S = -9 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		350		ns	T_J = 150 C, I_F = I_S, dI_F/ds = 100 A/ms

1 Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

ELECTRICAL CHARACTERISTICS: T_C = 25° unless otherwise noted
STATIC P/N OM6415SP3

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	400			V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	V_{DS} = V_{GS}, I_D = 250 mA
I_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20 V
I_{GSSR}	Gate-Body Leakage Reverse			-100	nA	V_{GS} = - 20 V
I_{DSS}	Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	mA mA	V_{DS} = Max. Rat., V_{GS} = 0 V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 100° C
$I_{D(on)}$	On-State Drain Current[1]	2.5			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		2.35	2.75	V	V_{GS} = 10 V, I_D = 2.5 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.47	0.55		V_{GS} = 10 V, I_D = 2.5 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.93	1.10		V_{GS} = 10 V, I_D = 2.5 A, T_C = 100 C

DYNAMIC

g_{fs}	Forward Transductance[1]	4.0	4.4		S	V_{DS} 2 $V_{DS(on)}$, I_D = 2.5 A
C_{iss}	Input Capacitance		1150	1600	pF	V_{GS} = 0
C_{oss}	Output Capacitance		165	450	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		70	150	pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time		17	35	ns	V_{DD} = 175 V, I_D @ 5 A
t_r	Rise Time		12	15	ns	R_g = 5 W, R_L = 35 W
$T_{d(off)}$	Turn-Off Delay Time		45	90	ns	(MOSFET) switching times are essentially independent of operating temperature.
t_f	Fall Time		30	35	ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			- 2.5	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			- 10	A	
V_{SD}	Diode Forward Voltage[1]			- 2	V	T_C = 25 C, I_S = -5 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		400		ns	T_J = 150 C, I_F = I_S, dI_F/ds = 100 A/ms

1 Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

ELECTRICAL CHARACTERISTICS: T_C = 25° unless otherwise noted
STATIC P/N OM6416SP3

Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	500			V	V_{GS} = 0, I_D = 250 mA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	V_{DS} = V_{GS}, I_D = 250 mA
I_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20 V
I_{GSSR}	Gate-Body Leakage Reverse			- 100	nA	V_{GS} = - 20 V
I_{DSS}	Zero Gate Voltage Drain Current		0.1 0.2	0.25 1.0	mA mA	V_{DS} = Max. Rat., V_{GS} = 0 V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 100° C
$I_{D(on)}$	On-State Drain Current[1]	2.0			A	V_{DS} 2 $V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		3.2	3.4	V	V_{GS} = 10 V, I_D = 2 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.8	0.85		V_{GS} = 10 V, I_D = 2 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		1.50	1.65		V_{GS} = 10 V, I_D = 2 A, T_C = 100 C

DYNAMIC

g_{fs}	Forward Transductance[1]	4.0	4.8		S	V_{DS} 2 $V_{DS(on)}$, I_D = 2 A
C_{iss}	Input Capacitance		1225	1600	pF	V_{GS} = 0
C_{oss}	Output Capacitance		200	350	pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		85	150	pF	f = 1 MHz
$T_{d(on)}$	Turn-On Delay Time		17	35	ns	V_{DD} = 200 V, I_D @ 4 A
t_r	Rise Time		5	15	ns	R_g = 5 W, R_L = 49 W
$T_{d(off)}$	Turn-Off Delay Time		42	90	ns	(MOSFET) switching times are essentially independent of operating temperature.
t_f	Fall Time		14	30	ns	

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)			- 2	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier.
I_{SM}	Source Current[1] (Body Diode)			- 8	A	
V_{SD}	Diode Forward Voltage[1]			- 2	V	T_C = 25 C, I_S = -9 A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		400		ns	T_J = 150 C, I_F = I_S, dI_F/ds = 100 A/ms

1 Pulse Test: Pulse Width 300msec, Duty Cycle 2%.

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

	Parameter	OM6413	OM6414	OM6415	OM6416	Units
V_{DS}	Drain-Source Voltage	100	200	400	500	V
V_{DGR}	Drain-Gate Voltage (R_{GS} = 1 M)	100	200	400	500	V
I_D @ T_C = 25°C	Continuous Drain Current	± 6	± 4	± 2.5	± 2	A
I_{DM}	Pulsed Drain Current[1]	± 30	± 25	± 20	± 15	A
V_{GS}	Gate-Source Voltage	± 20	± 20	± 20	± 20	V
P_D @ T_C = 25°C	Maximum Power Dissipation	50	50	50	50	W
Junction To Case	Linear Derating Factor	0.5	0.5	0.5	0.5	W/°C
Junction To Ambient	Linear Derating Factor	.020	.020	.020	.020	W/°C
T_J	Operating and					
T_{stg}	Storage Temperature Range	-55 to 125	-55 to 125	-55 to 125	-55 to 125	°C
Lead Temperature	(1/16" from case for 5 secs.)	225	225	225	225	°C

1 Pulse Test: Pulse width 300 µsec. Duty Cycle 2%.

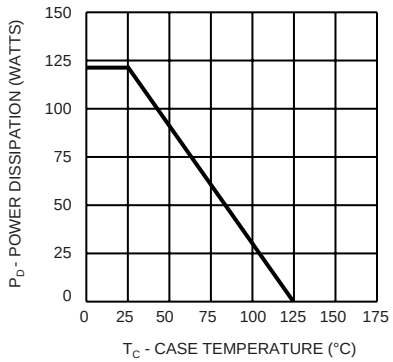
2 Pan Head Screw, Non-Lubricated Threads

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	2.00	°C/W	
R_{thJA}	Junction-to-Ambient	50	°C/W	Free Air Operation
	Mounting Torque	3.0	LBF•IN	

2.1

POWER RATING



MECHANICAL OUTLINE