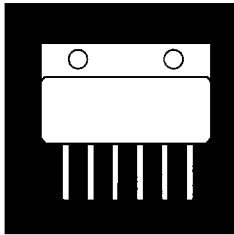


DUAL HIGH CURRENT POWER MOSFETS IN HERMETIC ISOLATED SIP PACKAGE



400V, 500V, 1000V. Up To 24 Amp N-Channel.
Dual Size 6 High Energy MOSFETs

FEATURES

- Dual Uncommitted MOSFETs
- Isolated Hermetic Metal Package
- Size 6 Die, High Energy, High Voltage
- Fast Switching, Low Drive Current
- Ease of Paralleling For Added Power
- Low $R_{DS(on)}$
- Available Screened to MIL-S-19500, TX, TXV And S Levels

DESCRIPTION

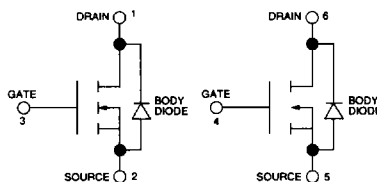
This series of hermetically packaged products feature the latest advanced MOSFET and packaging technology. They are ideally suited for Military requirements where small size, high performance and high reliability are required, and in applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits. This series also features avalanche high energy capability at elevated temperatures.

MAXIMUM RATINGS

PART NUMBER	V_{DS}	$R_{DS(on)}$	I_D (Amp)	*Package
OM6227SS	400	.20	24	S-6D
OM6228SS	500	.27	22	S-6D
OM6230SS	1000	1.30	10	S-6D
OM6231SS	400	.20	24	S-6E
OM6232SS	500	.27	22	S-6E
OM6233SS	1000	1.30	10	S-6E

* See Mechanical Drawing

SCHEMATIC



ELECTRICAL CHARACTERISTICS: 400V (Per MOSFET) ($T_C = 25^\circ$ unless otherwise noted)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 0.25$ mA)	$V_{(BR)SS}$	400	-	-	Vdc
Zero Gate Voltage Drain ($V_{GS} = 400$ V, $V_{DS} = 0$)	I_{DSS}	-	-	0.25	mAdc
($V_{GS} = 500$ V, $V_{DS} = 0$)		-	-	1.0	
Gate-Body Leakage Current, Forward ($V_{GS} = 20$ Vdc, $V_{DS} = 0$)	I_{GSSF}	-	-	100	nAac
Gate-Body Leakage Current, Reverse ($V_{GS} = 20$ Vdc, $V_{DS} = 0$)	I_{GSSR}	-	-	100	nAac

ON CHARACTERISTICS*

Gate-Threshold Voltage ($V_{GS} = V_{DS}, I_D = 0.25$ mAac ($T_J = 125^\circ$ C))	$V_{GS(th)}$	2.0	3.0	4.0	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10$ Vdc, $I_D = 13$ Aac)	$r_{DS(on)}$	1.5	-	3.5	Ω m
Drain-Source On-Voltage ($V_{GS} = 10$ Vdc) ($I_D = 24$ A)	$V_{DS(on)}$	-	-	5.0	Vdc
($I_D = 12$ A, $T_J = 125^\circ$ C)		-	-	5.0	
Forward Transconductance ($V_{GS} = 15$ Vdc, $I_D = 12$ Aac)	g_{FS}	14	-	-	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance ($V_{GS} = 25$ V, $V_{DS} = 0$, $f = 1.0$ MHz)	C_{iss}	-	4000	-	pF
Output Capacitance	C_{oss}	-	550	-	
Transfer Capacitance	C_{riss}	-	110	-	

SWITCHING CHARACTERISTICS

Turn-On Delay Time ($V_{GS} = 250$ V, $I_D = 24$ A, $R_{\theta(jc)} = 4.3$ θ m)	t_{don}	-	35	-	ns
Rise Time	t_r	-	95	-	
Turn-Off Delay Time	t_{doff}	-	80	-	
Fall Time	t_f	-	80	-	
Total Gate Charge ($V_{GS} = 400$ V, $I_D = 24$ A, $V_{GS} = 10$ V)	Q_g	-	110	14	nC
Gate-Source Charge	Q_{gs}	-	20	-	
Gate-Drain Charge	Q_{gd}	-	80	-	

SOURCE DRAIN DIODE CHARACTERISTICS

Forward On-Voltage ($I_S = 24$ A, $dI/dt = 100$ A/ μ s)	V_{SD}	-	1.1	1.6	Vdc
Forward Turn-On Time	t_{on}	-	**	-	ns
Reverse Recovery Time	t_r	-	500	1000	

* Indicates Pulse Test = 300 μ sec, Duty Cycle = 2%
** Limited by circuit inductance

ELECTRICAL CHARACTERISTICS: 500V (Per MOSFET) ($T_C = 25^\circ$ unless otherwise noted)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 0.25$ mA)	$V_{(BR)SS}$	500	-	-	Vdc
Zero Gate Voltage Drain ($V_{GS} = 500$ V, $V_{DS} = 0$)	I_{DSS}	-	-	0.25	mAac
($V_{GS} = 500$ V, $V_{DS} = 0$, $T_J = 125^\circ$ C)		-	-	1.0	
Gate-Body Leakage Current, Forward ($V_{GS} = 20$ Vdc, $V_{DS} = 0$)	I_{GSSF}	-	-	100	nAac
Gate-Body Leakage Current, Reverse ($V_{GS} = 20$ Vdc, $V_{DS} = 0$)	I_{GSSR}	-	-	100	nAac

ON CHARACTERISTICS*

Gate-Threshold Voltage ($V_{GS} = V_{DS}, I_D = 0.25$ mAac ($T_J = 125^\circ$ C))	$V_{GS(th)}$	2.0	3.0	4.0	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10$ Vdc, $I_D = 13$ Aac)	$r_{DS(on)}$	1.5	-	3.5	Ω m
Drain-Source On-Voltage ($V_{GS} = 10$ Vdc) ($I_D = 24$ A)	$V_{DS(on)}$	-	-	8.0	Vdc
($I_D = 12$ A, $T_J = 125^\circ$ C)		-	-	8.0	
Forward Transconductance ($V_{GS} = 15$ Vdc, $I_D = 13$ Aac)	g_{FS}	13	-	-	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance ($V_{GS} = 25$ V, $V_{DS} = 0$, $f = 1.0$ MHz)	C_{iss}	-	4000	-	pF
Output Capacitance	C_{oss}	-	480	-	
Transfer Capacitance	C_{riss}	-	95	-	

SWITCHING CHARACTERISTICS

Turn-On Delay Time ($V_{GS} = 250$ V, $I_D = 24$ A, $R_{\theta(jc)} = 4.3$ θ m)	t_{don}	-	32	-	ns
Rise Time	t_r	-	95	-	
Turn-Off Delay Time	t_{doff}	-	75	-	
Fall Time	t_f	-	75	-	
Total Gate Charge ($V_{GS} = 400$ V, $I_D = 24$ A, $V_{GS} = 10$ V)	Q_g	-	115	140	nC
Gate-Source Charge	Q_{gs}	-	20	-	
Gate-Drain Charge	Q_{gd}	-	80	-	

SOURCE DRAIN DIODE CHARACTERISTICS

Forward On-Voltage ($I_S = 24$ A, $dI/dt = 100$ A/ μ s)	V_{SD}	-	1.1	1.6	Vdc
Forward Turn-On Time	t_{on}	-	**	-	ns
Reverse Recovery Time	t_r	-	500	1000	

* Indicates Pulse Test = 300 μ sec, Duty Cycle = 2%
** Limited by circuit inductance

UNCLAMPED DRAIN-TO-SOURCE AVALANCHE CHARACTERISTICS ($T_J < 150^\circ$)

Symbol	Value	Unit
W_{DSS} (1) $T_J = 25^\circ$ C	1000	mJ
	160	
W_{DSS} (2) $T_J = 100^\circ$ C	25	

(1) $V_{DD} = 50$ V, $I_D = 10$ A

(2) Pulse width and frequency is limited by $T_{j(max)}$ and thermal response.

ELECTRICAL CHARACTERISTICS: 1000V (Per MOSFET) (T_C = 25° unless otherwise noted)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage (V _{GS} = 0, I _D = 0.25 mA)	V _{BR(DSS)}	1000	-	-	Vdc
Zero Gate Voltage Drain (V _{DS} = 1000 V, V _{GS} = 0) (V _{DS} = 1000 V, V _{GS} = 0, T _J = 125° C)	I _{DSS}	-	-	10 100	μAdc
Gate-Body Leakage Current, Forward (V _{GSF} = 20 Vdc, V _{DS} = 0)	I _{GSSF}	-	-	100	nAdc
Gate-Body Leakage Current, Reverse (V _{GSR} = 20 Vdc, V _{DS} = 0)	I _{GSR}	-	-	100	nAdc
ON CHARACTERISTICS*					
Gate-Threshold Voltage (V _{DS} = V _{GS} , I _D = 0.25 mAdc (T _J = 125° C)	V _{GS(th)}	2.0 1.5	3.0 -	4.0 3.5	Vdc
Static Drain-Source On-Resistance (V _{GS} = 10 Vdc, I _D = 5 Adc)	r _{DS(on)}	-	-	1.3	Ohm
Drain-Source On-Voltage (V _{GS} = 10 Vdc) (I _D = 10 A) (I _D = 5 A, T _J = 125° C)	V _{DS(on)}	-	-	15 15.3	Vdc
Forward Transconductance (V _{DS} = 15 Vdc, I _D = 5 Adc)	g _{FS}	5.0	-	-	mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	(V _{DS} = 25 V, V _{GS} = 0, f = 1.0 MHz)	C _{iss}	-	5500	pF
Output Capacitance		C _{oss}	-	530	
Transfer Capacitance		C _{rss}	-	90	
SWITCHING CHARACTERISTICS					
Turn-On Delay Time	(V _{DD} = 500 V, I _D = 10 A, R _{g(on)} = 9.1 ohms V _{GS} = 10 V)	t _{d(on)}	-	60	ns
Rise Time		t _r	-	115	
Turn-Off Delay Time		t _{d(off)}	-	240	
Fall Time		t _f	-	140	
Total Gate Charge	(V _{DS} = 400 V, I _D = 10 A, V _{GS} = 10 V)	Q _g	-	140	nC
Gate-Source Charge		Q _{gs}	-	-	
Gate-Drain Charge		Q _{gd}	-	-	
SOURCE DRAIN DIODE CHARACTERISTICS					
Forward On-Voltage	(I _S = 10 A, dI/dt = 100 A/μs)	V _{SD}	-	1.1	Vdc
Forward Turn-On Time		t _{on}	-	**	ns
Reverse Recovery Time		t _{rr}	-	600	1100

* Indicates Pulse Test = 300 μsec, Duty Cycle = 2%
** Limited by circuit inductance

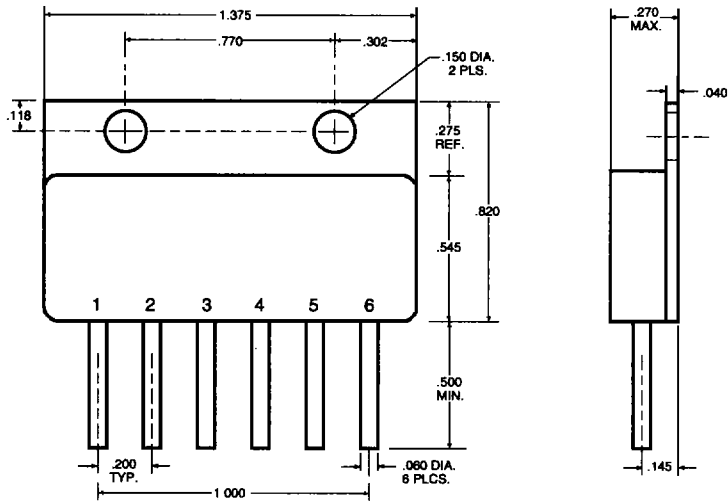
ABSOLUTE MAXIMUM RATINGS PER MOSFET (T_C = 25°C unless otherwise noted)

Parameter	OM6227/ OM6231	OM6228/ OM6232	OM6230/ OM6233	Units
V _{DS}	400	500	1000	V
V _{DGR}	400	500	1000	V
I _D @ T _C = 25°C	24	22	10	A
I _{DM}	92	85	30	A
P _D @ T _C = 25°C	165	165	165	W
P _D	1.31	1.31	1.31	W/°C
W _{DSS} (1)				
Single Pulse Energy				
Drain-To-Source @ 25°C	1000	1000	500	mJ
T _J				
Operating and				
T _{stg}	-55 to +150	-55 to +150	-55 to +150	°C
Storage Temperature Range				
Lead Temperature (1/8" from case for 5 secs.)	275	275	275	°C

THERMAL RESISTANCE (Maximum) at T_A = 25°C

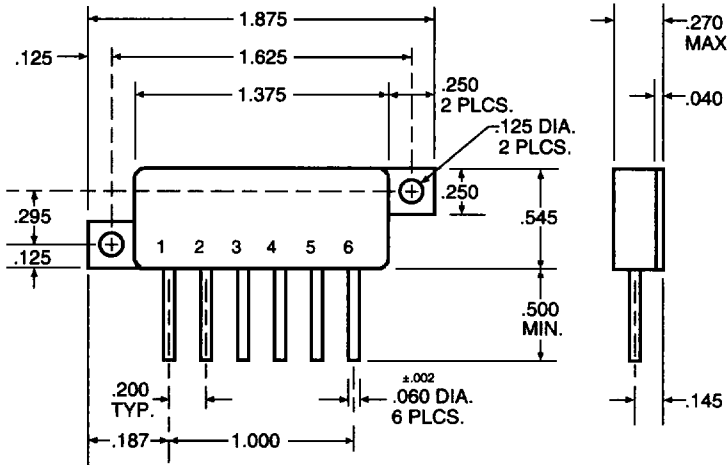
R _{thJC}	Junction-to-Case	.76	°C/W	
R _{thJA}	Junction-to-Ambient	35	°C/W	Free Air Operation

MECHANICAL OUTLINE PACKAGE S-6D



- Pin 1: Drain
- Pin 2: Source
- Pin 3: Gate
- Pin 4: Gate
- Pin 5: Source
- Pin 6: Drain

MECHANICAL OUTLINE PACKAGE S-6E



- Pin 1: Drain
- Pin 2: Source
- Pin 3: Gate
- Pin 4: Gate
- Pin 5: Source
- Pin 6: Drain

2.1