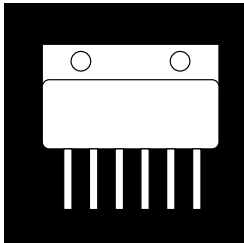


OM6227SS OM6230SS OM6232SS
OM6228SS OM6231SS OM6233SS

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.

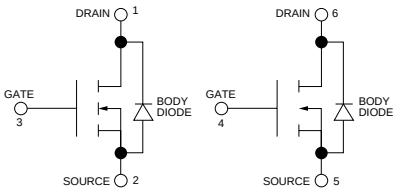
MAXIMUM RATINGS

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

3.1

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)	$V_{(BR)DSS}$	400	-	-	Vdc
Zero Gate Voltage Drain ($V_{DS} = 400$ V, $V_{GS} = 0$) ($V_{DS} = 320$ V, $V_{GS} = 0$, $T_J = 125^\circ$ C)	I_{DSS}	-	-	0.25 1.0	mAdc
Gate-Body Leakage Current, Forward ($V_{GSS} = 20$ Vdc, $V_{DS} = 0$)	I_{GSSF}	-	-	100	nAdc
Gate-Body Leakage Current, Reverse ($V_{GSR} = 20$ Vdc, $V_{DS} = 0$)	I_{GSSR}	-	-	100	nAdc

ON CHARACTERISTICS*

Gate-Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 0.25$ mAdc ($T_J = 125^\circ$ C)	$V_{GS(th)}$	2.0 1.5	3.0 -	4.0 3.5	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10$ Vdc, $I_D = 13$ Adc)	$r_{DS(on)}$	-	-	0.20	Ohm
Drain-Source On-Voltage ($V_{GS} = 10$ Vdc) ($I_D = 24$ A) ($I_D = 12$ A, $T_J = 125^\circ$ C)	$V_{DS(on)}$	-	-	5.0 5.0	Vdc
Forward Transconductance ($V_{DS} = 15$ Vdc, $I_D = 12$ A Adc)	g_{FS}	14	-	-	mhos

DYNAMIC CHARACTERISTICS

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

SWITCHING CHARACTERISTICS

Turn-On Delay Time	$(V_{DD} = 250$ V, $I_D = 24$ A, $R_{gen} = 4.3$ ohms)	$t_{d(on)}$	-	35	-	ns
Rise Time		t_r	-	95	-	
Turn-Off Delay Time		$t_{d(off)}$	-	80	-	
Fall Time		t_f	-	80	-	
Total Gate Charge	$(V_{DS} = 400$ 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_{rr}	-	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)	$V_{(BR)DSS}$	500	-	-	Vdc
Zero Gate Voltage Drain ($V_{DS} = 500$ V, $V_{GS} = 0$) ($V_{DS} = 500$ V, $V_{GS} = 0$, $T_J = 125^\circ$ C)	I_{DSS}	-	-	0.25 1.0	mAdc
Gate-Body Leakage Current, Forward ($V_{GSS} = 20$ Vdc, $V_{DS} = 0$)	I_{GSSF}	-	-	100	nAdc
Gate-Body Leakage Current, Reverse ($V_{GSR} = 20$ Vdc, $V_{DS} = 0$)	I_{GSSR}	-	-	100	nAdc

ON CHARACTERISTICS*

Gate-Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 0.25$ mAdc ($T_J = 125^\circ$ C)	$V_{GS(th)}$	2.0 1.5	3.0 -	4.0 3.5	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10$ Vdc, $I_D = 13$ Adc)	$r_{DS(on)}$	-	-	0.27	Ohm
Drain-Source On-Voltage ($V_{GS} = 10$ Vdc) ($I_D = 24$ A) ($I_D = 12$ A, $T_J = 125^\circ$ C)	$V_{DS(on)}$	-	-	8.0 8.0	Vdc
Forward Transconductance ($V_{DS} = 15$ Vdc, $I_D = 13$ Adc)	g_{FS}	13	-	-	mhos

DYNAMIC CHARACTERISTICS

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

SWITCHING CHARACTERISTICS

Turn-On Delay Time	$(V_{DD} = 250$ V, $I_D = 24$ A, $R_{gen} = 4.3$ ohms)	$t_{d(on)}$	-	32	-	ns
Rise Time		t_r	-	95	-	
Turn-Off Delay Time		$t_{d(off)}$	-	75	-	
Fall Time		t_f	-	75	-	
Total Gate Charge	$(V_{DS} = 400$ 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}	-	60	-	

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_{rr}	-	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
Single Pulse Drain-To-Source Avalanche Energy $T_J = 25^\circ\text{C}$ $T_J = 100^\circ\text{C}$	W_{DSS} (1)	1000	mJ
		160	
Repetitive Pulse Drain-To-Source Avalanche Energy	W_{DSS} (2)	25	

(1) $V_{DD} = 50$ V, $I_D = 10$ A(2) Pulse width and frequency is limited by $T_{J(max)}$ and thermal response.

OM6227SS - OM6233SS

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)	I _{DSS}	-	-	10	mAdc
(V _{DS} = 1000 V, V _{GS} = 0, T _J = 125° C)		-	-	100	
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 _{GSSR}	-	-	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 _{gen} = 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, d/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

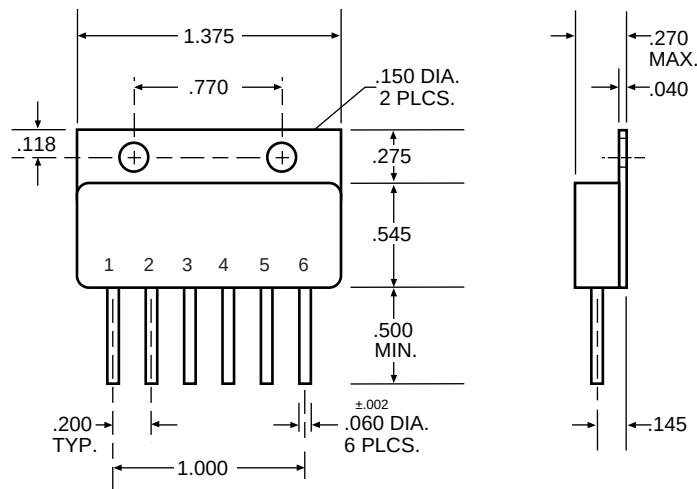
ABSOLUTE MAXIMUM RATINGS PER MOSFET (T_C = 25°C unless otherwise noted)

Parameter	OM6227/ OM6231	OM6228/ OM6232	OM6230/ OM6233	Units
V _{DS} Drain-Source Voltage	400	500	1000	V
V _{DGR} Drain-Gate Voltage (R _{GS} = 1 M)	400	500	1000	V
I _D @ T _C = 25°C Continuous Drain Current	24	22	10	A
I _{DM} Pulsed Drain Current	92	85	30	A
P _D @ T _C = 25°C Maximum Power Dissipation	165	165	165	W
P _D Derate Above 25°C Case	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} Storage Temperature Range	-55 to +150	-55 to +150	-55 to +150	°C
Lead Temperature (1/8" from case for 5 secs.)	275	275	275	°C

THERMAL RESISTANCE (Maximum) at T_A = 25°C

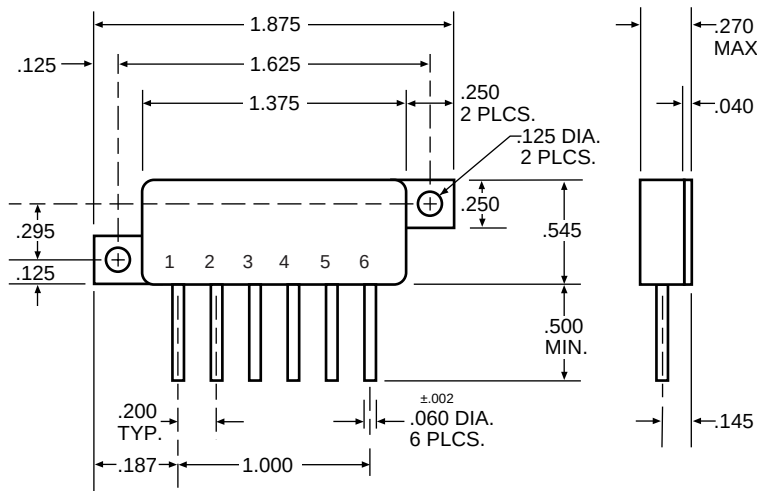
R _{thJC} Junction-to-Case	.76	°C/W	
R _{thJA} Junction-to-Ambient	35	°C/W	Free Air Operation

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