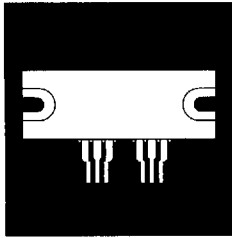


UNCOMMITTED POWER MOSFET AND HIGH SPEED RECTIFIER IN 6-PIN PACKAGE



100V Thru 1000V, 4A To 30A Power MOSFET
And High Speed Rectifier In One Package

FEATURES

- MOSFET And Common Cathode Rectifier In One Package
- Isolated High Density Package
- Fast Switching
- Low $R_{DS(on)}$ MOSFET
- High Current

DESCRIPTION

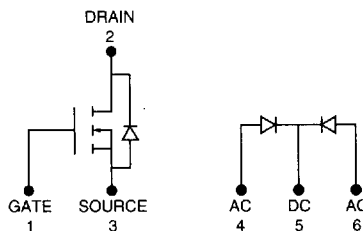
This series of Industrial products feature the latest advanced semiconductor and packaging technology. They are ideally suited where small size, high performance and high reliability are required. Ideal applications include switching power supplies, motor controls, inverters, amplifiers and high energy pulse circuits.

MAXIMUM RATINGS @ 25°C

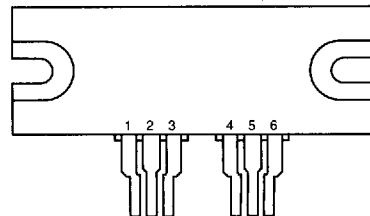
PART NUMBER	MOSFET			Rectifier			
	V_{DS}	$R_{DS(on)}$	I_D	PIV	V_F	I_O	t_{rr}
OM9027SP1	100V	.065 Ω	30A	100V	1.1V	10A	50nsec
OM9028SP1	200V	0.1 Ω	25A	200V	1.45V	10A	50nsec
OM9029SP1	500V	0.4 Ω	12A	500V	1.45V	10A	50nsec
OM9030SP1	1000V	3 Ω	4A	1000V	1.55V	10A	75nsec

2.1

SCHEMATIC



PIN CONNECTION



Pin 1: Gate
Pin 2: Drain
Pin 3: Source

Pin 4: AC
Pin 5: DC
Pin 6: AC

MOSFET ELECTRICAL CHARACTERISTICS:
OM9027SP1 (100V) ($T_C = 25^\circ$ unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Units
OFF CHARACTERISTICS				
Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 0.25\text{mA}$)	$V_{DS(BSS)}$	100	-	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = \text{Rated } V_{DS}, V_{GS} = 0$)	I_{DSS}	-	0.2	mA
($V_{DS} = \text{Rated } V_{DS}, V_{GS} = 0, T_J = 125^\circ\text{C}$)		-	1	
Gate-Body Leakage Current, Forward ($V_{GSF} = 20\text{ Vdc}, V_{DS} = 0$)	I_{GSSF}	-	100	nA
Gate-Body Leakage Current, Reverse ($V_{GSR} = 20\text{ Vdc}, V_{DS} = 0$)	I_{GSR}	-	100	nA

ON CHARACTERISTICS*				
Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1\text{mA}$) ($T_J = 100^\circ\text{C}$)	$V_{GS(th)}$	2 1.5	4 3.5	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10\text{ Vdc}, I_D = 20\text{ A}$)	$r_{DS(on)}$	-	0.065	Ohm
Drain-Source-On-Voltage ($V_{GS} = 10\text{ V}$) ($I_D = 30\text{ A}$)	$V_{DS(on)}$	-	2.3 2.6	Vdc
($I_D = 20\text{ A}$, $T_J = 100^\circ\text{C}$)		-	-	
Forward Transconductance ($V_{DS} = 15\text{ V}, I_D = 20\text{ A}$)	g_{FS}	10	-	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance ($V_{DS} = 25\text{V}, V_{GS} = 0, f = 1\text{MHz}$)	C_{iss}	2800 (Typ)	-	pF
Output Capacitance	C_{oss}	1200 (Typ)	-	
Reverse Transfer Capacitance	C_{rss}	400 (Typ)	-	

SWITCHING CHARACTERISTICS* ($T_J = 100^\circ\text{C}$)

Turn-On Delay Time ($V_{DS} = 50\text{V}, I_D = 20\text{A}, R_{\theta JA} = 4.7\text{ Ohms}$)	$t_{d(on)}$	-	40	ns
Rise Time	t_r	-	120	
Turn-Off Delay Time	$t_{d(off)}$	-	150	
Fall Time	t_f	-	100	
Total Gate Charge ($V_{DS} = 80\text{V}, I_D = 30\text{A}, V_{GS} = 10\text{V}$)	Q_g	105 (Typ)	130	nC
Gate-Source Charge	Q_{gs}	15 (Typ)	28	
Gate-Drain Charge	Q_{gd}	45 (Typ)	70	

SOURCE-DRAIN DIODE CHARACTERISTICS*

Forward On-Voltage ($I_S = 30\text{A}, V_{GS} = 0$)	V_{SD}	-	2.2	Vdc
Forward Turn-On Time	t_{on}	Limited By Stray Inductance	-	
Reverse Recovery Time	t_r	200 (Typ)	-	ns

*Pulse Test: Pulse Width = 300 μ s, Duty Cycle $\leq$ 2%.

MOSFET ELECTRICAL CHARACTERISTICS:
OM9028SP1 (200V) ($T_C = 25^\circ$ unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Units
OFF CHARACTERISTICS				
Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 0.25\text{mA}$)	$V_{DS(BSS)}$	200	-	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = \text{Rated } V_{DS}, V_{GS} = 0$)	I_{DSS}	-	0.2	mA
($V_{DS} = \text{Rated } V_{DS}, V_{GS} = 0, T_J = 125^\circ\text{C}$)		-	1	
Gate-Body Leakage Current, Forward ($V_{GSF} = 20\text{ Vdc}, V_{DS} = 0$)	I_{GSSF}	-	100	nA
Gate-Body Leakage Current, Reverse ($V_{GSR} = 20\text{ Vdc}, V_{DS} = 0$)	I_{GSR}	-	100	nA

ON CHARACTERISTICS*

Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1\text{mA}$) ($T_J = 100^\circ\text{C}$)	$V_{GS(th)}$	2 1.5	4 3.5	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10\text{ Vdc}, I_D = 16\text{ A}$)	$r_{DS(on)}$	-	0.1	Ohm
Drain-Source-On-Voltage ($V_{GS} = 10\text{ V}$) ($I_D = 25\text{ A}$)	$V_{DS(on)}$	-	3.5 3.2	Vdc
($I_D = 16\text{ A}$, $T_J = 100^\circ\text{C}$)		-	-	
Forward Transconductance ($V_{DS} = 15\text{ V}, I_D = 16\text{ A}$)	g_{FS}	10	-	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance ($V_{DS} = 25\text{V}, V_{GS} = 0, f = 1\text{MHz}$)	C_{iss}	2850 (Typ)	-	pF
Output Capacitance	C_{oss}	700 (Typ)	-	
Reverse Transfer Capacitance	C_{rss}	170 (Typ)	-	

SWITCHING CHARACTERISTICS* ($T_J = 100^\circ\text{C}$)

Turn-On Delay Time ($V_{DS} = 100\text{V}, I_D = 16\text{A}, R_{\theta JA} = 4.7\text{ Ohms}$)	$t_{d(on)}$	-	40	ns
Rise Time	t_r	-	90	
Turn-Off Delay Time	$t_{d(off)}$	-	150	
Fall Time	t_f	-	100	
Total Gate Charge ($V_{DS} = 100\text{V}, I_D = 25\text{A}, V_{GS} = 10\text{V}$)	Q_g	85 (Typ)	130	nC
Gate-Source Charge	Q_{gs}	15 (Typ)	28	
Gate-Drain Charge	Q_{gd}	40 (Typ)	65	

SOURCE-DRAIN DIODE CHARACTERISTICS*

Forward On-Voltage ($I_S = 25\text{A}, V_{GS} = 0$)	V_{SD}	-	2	Vdc
Forward Turn-On Time	t_{on}	Limited By Stray Inductance	-	
Reverse Recovery Time	t_r	200 (Typ)	-	ns

*Pulse Test: Pulse Width = 300 μ s, Duty Cycle $\leq$ 2%.

MOSFET ELECTRICAL CHARACTERISTICS:
OM9029SP1 (500V) ($T_C = 25^\circ$ unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Units
OFF CHARACTERISTICS				
Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 0.25\text{mA}$)	V_{BRDSS}	500	-	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = \text{Rated } V_{DS}, V_{GS} = 0$)	I_{DSS}	-	0.2	mA
($V_{DS} = \text{Rated } V_{DS}, V_{GS} = 0, T_J = 125^\circ\text{C}$)		-	1	
Gate-Body Leakage Current, Forward ($V_{GS} = 20\text{ Vdc}, V_{DS} = 0$)	I_{GSSF}	-	100	nA
Gate-Body Leakage Current, Reverse ($V_{GS} = 20\text{ Vdc}, V_{DS} = 0$)	I_{GSSR}	-	100	nA

ON CHARACTERISTICS*

Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1\text{mA}$) ($T_J = 100^\circ\text{C}$)	$V_{GS(th)}$	2 1.5	4.5 4	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10\text{ Vdc}, I_D = 7\text{ Adc}$)	$r_{DS(on)}$	-	0.4	Ohm
Drain-Source-On-Voltage ($V_{GS} = 10\text{ V}$) ($I_D = 12\text{ Adc}$)	$V_{DS(on)}$	-	6	Vdc
($I_D = 7\text{ Adc}, T_J = 100^\circ\text{C}$)		-	5.4	
Forward Transconductance ($V_{DS} = 15\text{ V}, I_D = 7\text{ A}$)	g_{FS}	4	-	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance ($V_{DS} = 25\text{V}, V_{GS} = 0, f = 1\text{MHz}$)	C_{iss}	2300 (Typ)	-	pF
Output Capacitance	C_{oss}	330 (Typ)	-	
Reverse Transfer Capacitance	C_{res}	155 (Typ)	-	

SWITCHING CHARACTERISTICS* ($T_J = 100^\circ\text{C}$)

Turn-On Delay Time ($V_{DS} = 250\text{V}, I_D = 7\text{A}, R_{\theta JA} = 4.7\text{ Ohms}$)	$t_{d(on)}$	-	40	ns
Rise Time	t_r	-	65	
Turn-Off Delay Time	$t_{d(off)}$	-	150	
Fall Time	t_f	-	80	
Total Gate Charge ($V_{DS} = 250\text{V}, I_D = 12\text{A}, V_{GS} = 10\text{V}$)	Q_g	110 (Typ)	160	nC
Gate-Source Charge	Q_{gs}	14 (Typ)	25	
Gate-Drain Charge	Q_{gd}	60 (Typ)	95	

SOURCE-DRAIN DIODE CHARACTERISTICS*

Forward On-Voltage ($I_S = 12\text{A}, V_{GS} = 0$)	V_{SD}	1.1 (Typ)	2	Vdc
Forward Turn-On Time	t_{on}	Limited By Stray Inductance	-	
Reverse Recovery Time	t_r	1200 (Typ)	-	ns

*Pulse Test: Pulse Width = 300 μ s, Duty Cycle $\leq$ 2%.

MOSFET ELECTRICAL CHARACTERISTICS:
OM9030SP1 (1000V) ($T_C = 25^\circ$ unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Units
OFF CHARACTERISTICS				
Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 0.25\text{mA}$)	V_{BRDSS}	1000	-	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = \text{Rated } V_{DS}, V_{GS} = 0$)	I_{DSS}	-	0.2	mA
($V_{DS} = \text{Rated } V_{DS}, V_{GS} = 0, T_J = 125^\circ\text{C}$)		-	1	
Gate-Body Leakage Current, Forward ($V_{GS} = 20\text{ Vdc}, V_{DS} = 0$)	I_{GSSF}	-	100	nA
Gate-Body Leakage Current, Reverse ($V_{GS} = 20\text{ Vdc}, V_{DS} = 0$)	I_{GSSR}	-	100	nA

ON CHARACTERISTICS*

Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1\text{mA}$) ($T_J = 100^\circ\text{C}$)	$V_{GS(th)}$	2 1.5	4.5 4	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 10\text{ Vdc}, I_D = 2.5\text{ Adc}$)	$r_{DS(on)}$	-	3	Ohm
Drain-Source-On-Voltage ($V_{GS} = 10\text{ V}$) ($I_D = 4\text{ Adc}$)	$V_{DS(on)}$	-	15	Vdc
($I_D = 2.5\text{ Adc}, T_J = 100^\circ\text{C}$)		-	12.5	
Forward Transconductance ($V_{DS} = 15\text{ V}, I_D = 2.5\text{ A}$)	g_{FS}	2	-	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance ($V_{DS} = 25\text{V}, V_{GS} = 0, f = 1\text{MHz}$)	C_{iss}	2200 (Typ)	-	pF
Output Capacitance	C_{oss}	220 (Typ)	-	
Reverse Transfer Capacitance	C_{res}	100 (Typ)	-	

SWITCHING CHARACTERISTICS* ($T_J = 100^\circ\text{C}$)

Turn-On Delay Time ($V_{DS} = 250\text{V}, I_D = 2.5\text{A}, R_{\theta JA} = 4.7\text{ Ohms}$)	$t_{d(on)}$	-	40	ns
Rise Time	t_r	-	60	
Turn-Off Delay Time	$t_{d(off)}$	-	160	
Fall Time	t_f	-	80	
Total Gate Charge ($V_{DS} = 400\text{V}, I_D = 4\text{A}, V_{GS} = 10\text{V}$)	Q_g	110 (Typ)	140	nC
Gate-Source Charge	Q_{gs}	14 (Typ)	25	
Gate-Drain Charge	Q_{gd}	50 (Typ)	90	

SOURCE-DRAIN DIODE CHARACTERISTICS*

Forward On-Voltage ($I_S = 4\text{A}, V_{GS} = 0$)	V_{SD}	-	1.6	Vdc
Forward Turn-On Time	t_{on}	Limited By Stray Inductance	-	
Reverse Recovery Time	t_r	1.2 (Typ)	-	μ s

*Pulse Test: Pulse Width = 300 μ s, Duty Cycle $\leq$ 2%.

RECTIFIER ELECTRICAL CHARACTERISTICS (Per Diode)

Type	PIV	Maximum Forward Voltage (Volts) @ ⁽¹⁾		Maximum Reverse Current @ PIV		Maximum Reverse Recovery Time ⁽²⁾
		T _J = 25°C	T _J = 100°C	T _J = 25°C	T _J = 100°C	
OM9027SP1	100	1.1V @ 10A	0.92V @ 10A	15μA	550μA	50 nsec
OM9028SP1	200	1.45V @ 10A	1.25V @ 10A	30μA	1.1mA	50 nsec
OM9029SP1	500	1.45V @ 10A	1.25V @ 10A	30μA	1.1mA	50 nsec
OM9030SP1	1000	1.55V @ 10A	1.35V @ 10A	30μA	1.1mA	75 nsec

(1) **Pulse Test:** Pulse Width ≤ 300μsec, Duty Cycle ≤ 2%.(2) **Measured in Circuit:** I_F = 0.5A, I_R = 1.0A, I_{REC} = 0.25A, T_P = 300 μsec.**ABSOLUTE MAXIMUM RATINGS:** (T_C = 25°C unless otherwise noted)

MOSFET	Parameter	OM9027	OM9028	OM9029	OM9030	Units
V _{DS}	Drain-Source Voltage	100	200	500	1000	V
V _{DGH}	Drain-Gate Voltage (R _{GS} = 1MΩ)	100	200	500	1000	V
I _D @ T _C = 25°C	Continuous Drain Current	30	25	12	4	A
V _{GS}	Continuous Gate-Source Voltage	±20	±20	±20	±20	V
V _{GSM}	Gate-Source Voltage Non-Repetitive (t _p ≤ 50μs)	±40	±40	±40	±40	V
I _{DM}	Pulsed Drain Current ¹	90	50	55	12	A
RECTIFIER						
PIV	Peak Inverse Voltage	100	200	500	1000	V
I _O	Max. Avg. DC Output Current @ T _C = 100°C	10	10	10	10	A
I _S	Non-Repetitive Sinusoidal Surge Current 8.3 msec	80	80	80	80	A
TEMPERATURE RANGE						
T _J	Operating and	-65 to	-65 to	-65 to	-65 to	
T _{stg}	Storage Temperature Range	125	125	125	125	°C
Lead Temperature	(1/8" from case for 5 seconds)	225	225	225	225	°C

¹ **Pulse Test:** Pulse Width ≤ 300μsec, Duty Cycle ≤ 2%.**THERMAL RESISTANCE (MAXIMUM)** at T_A = 25°C

R _{thJC}	Junction-to-Case	1.0	°C/W
R _{thJA}	Junction-to-Ambient	40	°C/W Free Air Operation

MECHANICAL OUTLINE