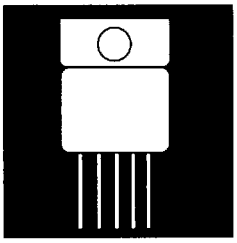
POWER MOSFETS & FAST RECOVERY RECTIFIER IN HERMETIC ISOLATED JEDEC MO-078 PACKAGE



100V Thru 500V, Up To 14 Amp, N-Channel MOSFET And Fast Recovery Power Rectifier

FEATURES

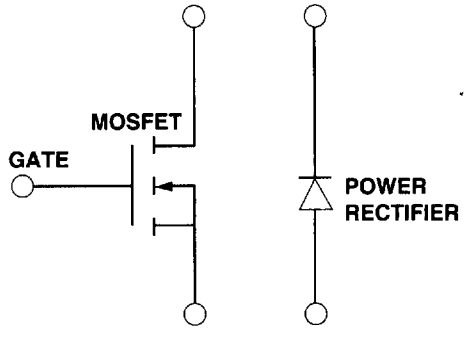
- Uncommitted MOSFET And Rectifier In One Package
- Isolated Hermetic 5-Pin Metal Package
- Fast Switching, Low $R_{DS(on)}$ MOSFET
- Ultra-Fast Recovery, Low V_F Rectifier
- Available Screened To OM803

DESCRIPTION

This series of hermetically packaged products feature the latest advanced MOSFET and ultra-fast recovery rectifier with innovative 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.

PART NUMBER	MOSFET			RECTIFIER		
	V_{DS}	$R_{DS(on)}$	I_D	V_F	I_O	T_{RR}
OM9007SC	100 V	.18 Ω	14 A	0.975 V	14 A	35 ns
OM9008SC	200 V	.40 Ω	9 A	0.925 V	9 A	35 ns
OM9009SC	400 V	1.0 Ω	5.5 A	1.5 V	5.5 A	50 ns
OM9010SC	500 V	1.5 Ω	4.5 A	1.5 V	4.5 A	50 ns

SCHEMATIC



ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM9007SC (100 V)

MOSFET Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	100			V	V_{GS} = 0, I_D = 250 µA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, I_D = 1 µA
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	0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
			0.2	1.0	mA	V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current[1]	14			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		1.2	1.44	V	V_{GS} = 10 V, I_D = 8 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.15	0.18	Ω	V_{GS} = 10 V, I_D = 8 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]			0.31	Ω	V_{GS} = 10 V, I_D = 8 A, T_C = 125°C

DYNAMIC

g_{fs}	Forward Transductance[1]	4.0	4.4		S	$V_{DS} \geq 2\ V_{DS(on)}$, I_D = 8 A
C_{iss}	Input Capacitance		750		pF	V_{GS} = 0
C_{oss}	Output Capacitance		250		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		100		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		15		ns	V_{DD} = 30 V, $I_D \cong$ 8 A
t_r	Rise Time		35		ns	R_g = 7.5 Ω, R_L = 4.3 Ω
$t_{d(off)}$	Turn-Off Delay Time		38		ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f	Fall Time		23		ns	

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	1.8	°C/W	
R_{thJA}	Junction-to-Ambient	80	°C/W	Free Air Operation

RECTIFIER PARAMETER

V_{FM}	Maximum Forward Voltage			.975	V	T_J = 25°C, I_C = 14 A
				.900	V	T_J = 100°C, I_C = 14 A
I_R	Maximum Reverse Current			10	µA	T_J = 25°C, V_R = 100 V
				1	mA	T_J = 100°C, V_R = 100 V
T_{rr}	Maximum Reverse Recovery Time*			35	ns	T_J = 25°C
R_{JC}	Junction-to-Case			2.0	°C/W	
R_{JA}	Junction-to-Ambient			80	°C/W	Free Air Operation

* Measured in Circuit I_F = 1/2 A, I_R = 1.0 A, I_{REC} = 1/4 A
1 Pulse Test: Pulse Width ≤ 300µsec, Duty Cycle ≤ 2%.

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM9008SC (200 V)

MOSFET Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	200			V	V_{GS} = 0, I_D = 250 µA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, I_D = 1 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	0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
			0.2	1.0	mA	V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current[1]	9.0			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		1.25	2.0	V	V_{GS} = 10 V, I_D = 5.0 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.25	0.4	Ω	V_{GS} = 10 V, I_D = 5.0 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.54	0.76	Ω	V_{GS} = 10 V, I_D = 5.0 A, T_C = 125°C

DYNAMIC

g_{fs}	Forward Transductance[1]	3.0	5		S	$V_{DS} \geq 2\ V_{DS(on)}$, I_D = 5.0 A
C_{iss}	Input Capacitance		780		pF	V_{GS} = 0
C_{oss}	Output Capacitance		150		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		55		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		9		ns	V_{DD} = 75 V, $I_D \cong$ 5.0 A
t_r	Rise Time		18		ns	R_g = 7.5 Ω, R_L = 15 Ω
$t_{d(off)}$	Turn-Off Delay Time		45		ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f	Fall Time		27		ns	

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	1.8	°C/W	
R_{thJA}	Junction-to-Ambient	80	°C/W	Free Air Operation

RECTIFIER PARAMETER

V_{FM}	Maximum Forward Voltage			.925	V	T_J = 25°C, I_C = 9 A
				.85	V	T_J = 100°C, I_C = 9 A
I_R	Maximum Reverse Current			15	µA	T_J = 25°C, V_R = 200 V
				1	mA	T_J = 100°C, V_R = 200 V
T_{rr}	Maximum Reverse Recovery Time*			35	ns	T_J = 25°C
R_{JC}	Junction-to-Case			2.0	°C/W	
R_{JA}	Junction-to-Ambient			80	°C/W	Free Air Operation

* Measured in Circuit I_F = 1/2 A, I_R = 1.0 A, I_{REC} = 1/4 A
1 Pulse Test: Pulse Width ≤ 300µsec, Duty Cycle ≤ 2%.

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM9009SC (400 V)

MOSFET Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	400			V	V_{GS} = 0, I_D = 250 µA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, I_D = 1 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	0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
			0.2	1.0	mA	V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current[1]	5.5			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		2.4	3.0	V	V_{GS} = 10 V, I_D = 3 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		0.8	1.0	Ω	V_{GS} = 10 V, I_D = 3 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		1.6	2.0	Ω	V_{GS} = 10 V, I_D = 3 A, T_C = 125°C

DYNAMIC

g_{fs}	Forward Transductance[1]	3.0	3.6		S	$V_{DS} \geq 2\ V_{DS(on)}$, I_D = 3.0 A
C_{iss}	Input Capacitance		700		pF	V_{GS} = 0
C_{oss}	Output Capacitance		70		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		20		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		18		ns	V_{DD} = 175 V, $I_D \cong$ 3.0 A
t_r	Rise Time		20		ns	R_g = 10 Ω, R_L = 56 Ω
$t_{d(off)}$	Turn-Off Delay Time		40		ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f	Fall Time		25		ns	

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	1.8	°C/W	
R_{thJA}	Junction-to-Ambient	80	°C/W	Free Air Operation

RECTIFIER PARAMETER

V_{FM}	Maximum Forward Voltage			1.5	V	T_J = 25°C, I_C = 5.5 A
				1.4	V	T_J = 100°C, I_C = 5.5 A
I_R	Maximum Reverse Current			80	µA	T_J = 25°C, V_R = 400 V
				2.0	mA	T_J = 100°C, V_R = 400 V
T_{rr}	Maximum Reverse Recovery Time*			50	ns	T_J = 25°C
R_{JC}	Junction-to-Case			2.0	°C/W	
R_{JA}	Junction-to-Ambient			80	°C/W	Free Air Operation

* Measured in Circuit I_F = 1/2 A, I_R = 1.0 A, I_{REC} = 1/4 A
1 Pulse Test: Pulse Width ≤ 300µsec, Duty Cycle ≤ 2%.

ELECTRICAL CHARACTERISTICS: (T_C = 25°C unless otherwise noted)
STATIC P/N OM9010SC (500 V)

MOSFET Parameter		Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	500			V	V_{GS} = 0, I_D = 250 µA
$V_{GS(th)}$	Gate-Threshold Voltage	2.0		4.0	V	$V_{DS} = V_{GS}$, I_D = 1 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	0.25	mA	V_{DS} = Max. Rat., V_{GS} = 0
			0.2	1.0	mA	V_{DS} = 0.8 Max. Rat., V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current[1]	4.5			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10 V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]		3.25	3.75	V	V_{GS} = 10 V, I_D = 2.5 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		1.3	1.5	Ω	V_{GS} = 10 V, I_D = 2.5 A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]		2.9	3.3	Ω	V_{GS} = 10 V, I_D = 2.5 A, T_C = 125°C

DYNAMIC

g_{fs}	Forward Transductance[1]	2.5	2.6		S	$V_{DS} \geq 2\ V_{DS(on)}$, I_D = 2.5 A
C_{iss}	Input Capacitance		700		pF	V_{GS} = 0
C_{oss}	Output Capacitance		90		pF	V_{DS} = 25 V
C_{rss}	Reverse Transfer Capacitance		30		pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		18		ns	V_{DD} = 255 V, $I_D \cong$ 2.5 A
t_r	Rise Time		20		ns	R_g = 7.5 Ω, R_L = 88 Ω
$t_{d(off)}$	Turn-Off Delay Time		42		ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f	Fall Time		25		ns	

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	1.8	°C/W	
R_{thJA}	Junction-to-Ambient	80	°C/W	Free Air Operation

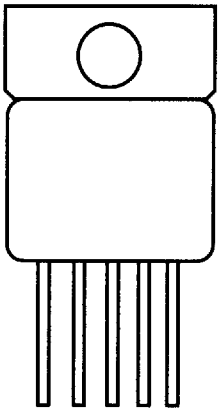
RECTIFIER PARAMETER

V_{FM}	Maximum Forward Voltage			1.5	V	T_J = 25°C, I_C = 4.5 A
				1.4	V	T_J = 100°C, I_C = 4.5 A
I_R	Maximum Reverse Current			100	µA	T_J = 25°C, V_R = 500 V
				2.5	mA	T_J = 100°C, V_R = 500 V
T_{rr}	Maximum Reverse Recovery Time*			50	ns	T_J = 25°C
R_{JC}	Junction-to-Case			2.0	°C/W	
R_{JA}	Junction-to-Ambient			80	°C/W	Free Air Operation

* Measured in Circuit I_F = 1/2 A, I_R = 1.0 A, I_{REC} = 1/4 A
1 Pulse Test: Pulse Width ≤ 300µsec, Duty Cycle ≤ 2%.

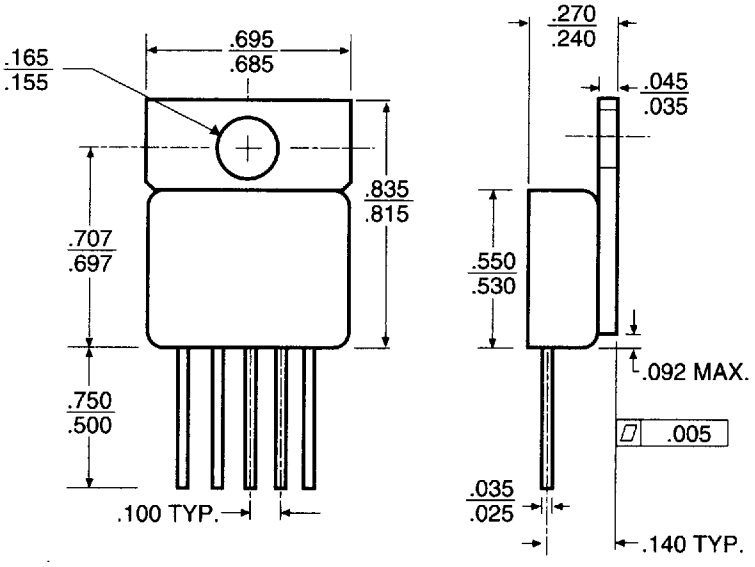
MECHANICAL SPECIFICATIONS

PIN CONNECTION



Pin 1: Gate
Pin 2: Source
Pin 3: Drain
Pin 4: Anode
Pin 5: Cathode

MECHANICAL OUTLINE



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