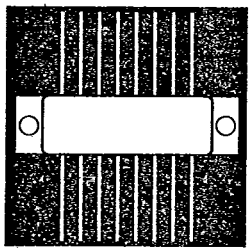
OM9332SC OM9334SC OM9336SC OM9338SC OM9340SC
OM9333SC OM9335SC OM9337SC OM9339SC

QUAD POWER MOSFETS

T-39-11
T-39-21



Uncommitted and Isolated Quad MOSFETs in 16-Pin Hermetic Package

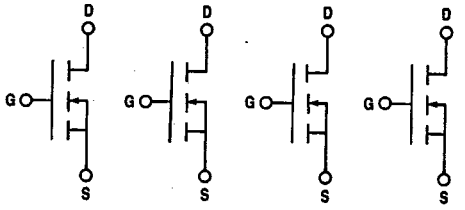
FEATURES

- P-Channel and N-Channel Devices
- Fully Isolated
- Heat Sink Tab
- Low Thermal Resistance

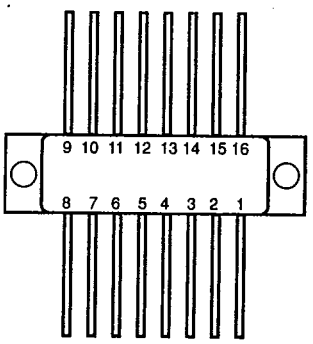
DESCRIPTION

This series of hermetically packaged product provides both N-Channel P-Channel or combinations of P and N-Channel power MOSFETs in a 16-pin hermetic package. Useful in many applications where space saving is required, this series of devices can be used to form quad current sinks and sources and full H bridges.

SCHEMATIC

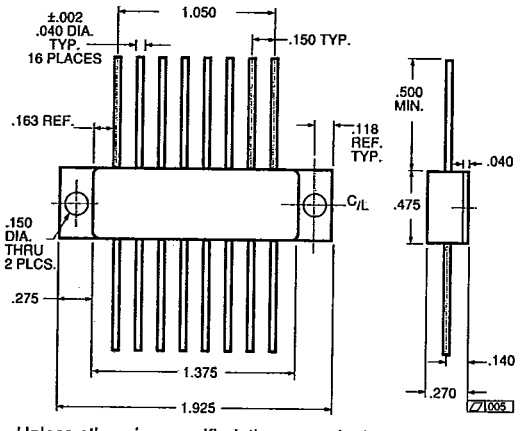


PIN CONNECTION



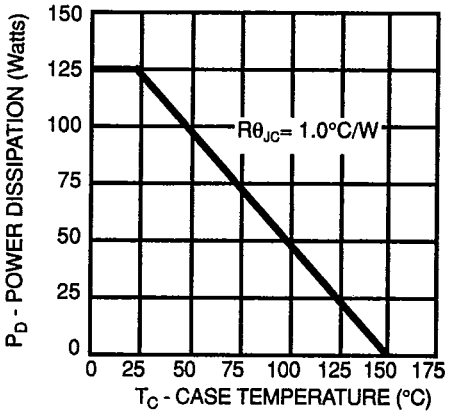
Pin 1, 8, 9, and 16 Are Uncommitted

MECHANICAL OUTLINE



Unless otherwise specified, the general tolerance is ± .010.

POWER RATING



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Omnirel

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

P-CHANNEL		60 VOLT					100 VOLT					200 VOLT				
	Parameter	Min.	Typ.	Max.	Units	Test Conditions	Min.	Typ.	Max.	Units	Test Conditions	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	60			V	V_{GS} = 0 I_D = 250µA	100			V	V_{GS} = 0 I_D = 250µA	200			V	V_{GS} = 0 I_D = 250µA
$V_{GS(th)}$	Gate-Threshhold Voltage	2		4	V	$V_{DS} = V_{GS}$, I_D = 250µA	2		4	V	$V_{DS} = V_{GS}$, I_D = 250µA	2		4		$V_{DS} = V_{GS}$, I_D = 250µA
I_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20V			100	nA	V_{GS} = 20V			100	nA	V_{GS} = 20V
I_{GSSR}	Gate-Body Leakage Reverse			-100	nA	V_{GS} = -20V			-100	nA	V_{GS} = -20V			-100	nA	V_{GS} = -20V
I_{DSS}	Zero Gate Voltage Drain Current		0.1	0.25	mA	V_{DS} = Max Rating, V_{GS} = 0		0.1	0.25	mA	V_{DS} = Max Rating, V_{GS} = 0		0.1	0.25	mA	V_{DS} = Max Rating, V_{GS} = 0
			0.2	1.0	mA	V_{DS} = 0.8 Max Rating, V_{GS} = 0 T_C = 125° C		0.2	1.0	mA	V_{DS} = 0.8 Max Rating, V_{GS} = 0 T_C = 125° C		0.2	1.0	mA	V_{DS} = 0.8 Max Rating, V_{GS} = 0 T_C = 125° C
$I_{D(on)}$	On-State Drain Current[1]	6			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10V	5			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10V	4			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10V
$V_{DS(on)}$	Static Drain-Source On-State Vltg.[1]			2.4	V	V_{GS} = 10V, I_D = 6A			3	V	V_{GS} = 10V, I_D = 5A		1.25	2	V	V_{GS} = 10V, I_D = 4A
$R_{DS(on)}$	Static Drain-Source On-State Res.[1]			.4	Ω	V_{GS} = 10V, I_D = 6A			.6	Ω	V_{GS} = 10V, I_D = 5A		0.25	0.4	Ω	V_{GS} = 10V, I_D = 4A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]			.8	Ω	V_{GS} = 10V, I_D = 4A T_C = 125°C			1.2	Ω	V_{GS} = 10V, I_D = 5A T_C = 125°C		0.54	0.76	Ω	V_{GS} = 10V, I_D = 4A T_C = 125°C
DYNAMIC																
g_{fs}	Forward Transductance[1]	3.0	5.8		S(℧)	$V_{DS} \geq 2V_{DS(on)}$, I_D = 5A	4.0			S(Ω)	$V_{DS} \geq 2V_{DS(on)}$, I_D = 8A	3.0	5.8		S(℧)	$V_{DS} \geq 2V_{DS(on)}$, I_D = 5A
C_{iss}	Input Capacitance		750	800	pF			750	800	pF			750	800	pF	
C_{oss}	Output Capacitance		150	450	pF	V_{GS} = 0, V_{DS} = 25V		250	500	pF	V_{GS} = 0, V_{DS} = 25V		150	450	pF	V_{GS} = 0, V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance		55	250	pF	f = 1 MHz		100	150	pF	f = 1 MHz		55	150	pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		9	140	ns	V_{DD} = 75V, $I_D \cong$ 5A		15	30	ns	V_{DD} = 30V, $I_D \cong$ 8A		9	30	ns	V_{DD} = 75V, $I_D \cong$ 5A
t_r	Rise Time		18	140	ns	R_g = 7.5Ω, R_L = 15Ω		35	75	ns	R_g = 7.5Ω, R_L = 4.3Ω		18	50	ns	R_g = 7.5Ω, R_L = 15Ω
$t_{d(off)}$	Turn-Off Delay Time		45	140	ns	(MOSFET switching times are		30	40	ns	(MOSFET switching times are		45	50	ns	(MOSFET switching times are
t_f	Fall Time		27	140	ns	essentially independent of		23	45	ns	essentially independent of		27	40	ns	essentially independent of
						operating temperature.)					operating temperature.)					operating temperature.)
BODY-DRAIN DIODE RATINGS																
I_S	Continuous Source Current (Body Diode)			6	A	Modified MOSPOWER symbol showing the integral P-N Junction Rectifier			5	A	Modified MOSPOWER symbol showing the integral P-N Junction Rectifier			5	A	Modified MOSPOWER symbol showing the integral P-N Junction Rectifier
I_{SM}	Source Current[1] (Body Diode)			15	A				12	A				12	A	
V_{SD}	Diode Forward Voltage[1]			6	V	T_C = 25°C, I_S = -8A, V_{GS} = 0			6	V	T_C = 25°C, I_S = -12A, V_{GS} = 0			5	V	T_C = 25°C, I_S = -8A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		250		ns	T_J = 150°C, $I_F = I_S$, dI_F/ds = 100A/µs		300		ns	T_J = 150°C, $I_F = I_S$, dI_F/ds = 100A/µs		250		ns	T_J = 150°C, $I_F = I_S$, dI_F/ds = 100A/µs

1 **Pulse Test:** Pulsewidth ≤ 300 µsec. Duty Cycle ≤ 2%

T-39-11 T-39-21

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

N-CHANNEL

	Parameter	60 VOLT Min.	Typ.	Max.	Units	Test Conditions	100 VOLT Min.	Typ.	Max.	Units	Test Conditions	200 VOLT Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	60			V	V_{GS} = 0, I_D = 250µA	100			V	V_{GS} = 0, I_D = 250µA	200			V	V_{GS} = 0, I_D = 250µA
$V_{GS(th)}$	Gate-Threshhold Voltage	2		4	V	$V_{DS} = V_{GS}$, I_D = 250µA	2		4	V	$V_{DS} = V_{GS}$, I_D = 250µA	2		4		$V_{DS} = V_{GS}$, I_D = 250µA
I_{GSSF}	Gate-Body Leakage Forward			100	nA	V_{GS} = 20V			100	nA	V_{GS} = 20V			100	nA	V_{GS} = 20V
I_{GSSR}	Gate-Body Leakage Reverse			-100	nA	V_{GS} = -20V			-100	nA	V_{GS} = -20V			-100	nA	V_{GS} = -20V
I_{DSS}	Zero Gate Voltage Drain Current		0.1	0.25	mA	V_{DS} = Max Rating, V_{GS} = 0		0.1	0.25	mA	V_{DS} = Max Rating, V_{GS} = 0		0.1	0.25	mA	V_{DS} = Max Rating, V_{GS} = 0
			0.2	1.0	mA	V_{DS} = 0.8 Max Rating, V_{GS} = 0, T_C = 125° C		0.2	1.0	mA	V_{DS} = 0.8 Max Rating, V_{GS} = 0, T_C = 125° C		0.2	1.0	mA	V_{DS} = 0.8 Max Rating, V_{GS} = 0, T_C = 125° C
$I_{D(on)}$	On-State Drain Current[1]	12			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10V	10			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10V	8			A	$V_{DS} \geq 2\ V_{DS(on)}$, V_{GS} = 10V
$V_{DS(on)}$	Static Drain-Source On-State Vltg.[1]			1.6	V	V_{GS} = 10V, I_D = 8A			1.6	V	V_{GS} = 10V, I_D = 8A			4	V	V_{GS} = 10V, I_D = 5A
$R_{DS(on)}$	Static Drain-Source On-State Res.[1]			.2	Ω	V_{GS} = 10V, I_D = 8A			.2	Ω	V_{GS} = 10V, I_D = 8A			.5	Ω	V_{GS} = 10V, I_D = 5A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]			.4	Ω	V_{GS} = 10V, I_D = 8A, T_C = 125°C			.4	Ω	V_{GS} = 10V, I_D = 8A, T_C = 125°C			1.0	Ω	V_{GS} = 10V, I_D = 5A, T_C = 125°C

DYNAMIC

g_{fs}	Forward Transductance[1]	4.0			S(℧)	$V_{DS} \geq 2V_{DS(on)}$, I_D = 8A	4.0			S(Ω)	$V_{DS} \geq 2V_{DS(on)}$, I_D = 8A	3.0	5.0		S(℧)	$V_{DS} \geq 2V_{DS(on)}$, I_D = 5A
C_{iss}	Input Capacitance		750	800	pF			750	800	pF			750	800	pF	
C_{oss}	Output Capacitance		250	500	pF	V_{GS} = 0, V_{DS} = 25V		250	500	pF	V_{GS} = 0, V_{DS} = 25V		150	450	pF	V_{GS} = 0, V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance		100	150	pF	f = 1 MHz		100	150	pF	f = 1 MHz		55	150	pF	f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time		15	30	ns	V_{DD} = 30V, $I_D \cong$ 8A		15	30	ns	V_{DD} = 30V, $I_D \cong$ 8A		9	30	ns	V_{DD} = 75V, $I_D \cong$ 5A
t_r	Rise Time		35	75	ns	R_g = 7.5Ω, R_L = 4.3Ω		35	75	ns	R_g = 7.5Ω, R_L = 4.3Ω		18	50	ns	R_g = 7.5Ω, R_L = 15Ω
$t_{d(off)}$	Turn-Off Delay Time		30	40	ns	(MOSFET switching times are		30	40	ns	(MOSFET switching times are		45	50	ns	(MOSFET switching times are
t_f	Fall Time		23	45	ns	essentially independent of		23	45	ns	essentially independent of		27	40	ns	essentially independent of
						operating temperature.)					operating temperature.)					operating temperature.)

BODY-DRAIN DIODE RATINGS

I_S	Continuous Source Current (Body Diode)			12	A	Modified MOSPOWER symbol showing			12	A	Modified MOSPOWER symbol showing			8	A	Modified MOSPOWER symbol showing
I_{SM}	Source Current[1] (Body Diode)			25	A	the integral P-N Junction Rectifier 			25	A	the integral P-N Junction Rectifier 			20	A	the integral P-N Junction Rectifier
V_{SD}	Diode Forward Voltage[1]			-2.5	V	T_C = 25°C, I_S = -12A, V_{GS} = 0			-2.5	V	T_C = 25°C, I_S = -10A, V_{GS} = 0			-2.5	V	T_C = 25°C, I_S = -8A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		300		ns	T_J = 150°C, $I_F = I_S$, dI_F/ds = 100A/µs		300		ns	T_J = 150°C, $I_F = I_S$, dI_F/ds = 100A/µs		250		ns	T_J = 150°C, $I_F = I_S$, dI_F/ds = 100A/µs

1 **Pulse Test:** Pulsewidth ≤ 300 µsec. Duty Cycle ≤ 2%

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

Parameter	Symbol	N Channel 9332	9333	9334	Unit
Drain Source Voltage	V_{DS}	60	100	200	V
Drain Gate Voltage (R_{GS} = 1.0 MΩ)	V_{DGR}	60	100	200	V
Gate Source Voltage (Clamped Gate)	V_{GS}	± 20			V
Continuous Drain Current @ T_C = 25°C	I_D	12	12	7	A
Continuous Drain Current @ T_C = 100°C	I_D	7	7	4	A
Pulsed Drain Current[1]	I_{DM}	40	40	25	A
Max. Power Dissipation @ T_C = 25°C	P_D	50			W
Max. Power Dissipation @ T_C = 100°C	P_D	25			W/° C
Linear Derating Factor Jct. to Case		1.0			W/° C
Linear Derating Factor Jct. to Ambient		.020			W/° C
Operating and Storage Temp. Range	T_J, T_{stg}	-55 to 150			° C
Lead Temp. (1/6" from case for 10 secs.)		300			° C

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	P Channel 9335	9336	9337	Unit
Drain Source Voltage	V_{DS}	60	100	200	V
Drain Gate Voltage (R_{GS} = 1.0 MΩ)	V_{DGR}	60	100	200	V
Gate Source Voltage (Clamped Gate)	V_{GS}	± 20			V
Continuous Drain Current @ T_C = 25° C	I_D	5.5	5.5	3.5	A
Continuous Drain Current @ T_C = 100° C	I_D	3.0	3.0	2.0	A
Pulsed Drain Current[1]	I_{DM}	20	20	12	A
Max. Power Dissipation @ T_C = 25° C	P_D	50			W
Max. Power Dissipation @ T_C = 100° C	P_D	25			W
Linear Derating Factor Jct. to Case		1.0			W/° C
Linear Derating Factor Jct. to Ambient		.020			W/° C
Operating and Storage Temp. Range	T_J, T_{stg}	-55 to 150			° C
Lead Temp. (1/6" from case for 10 secs.)		300			° C

1 Pulse Test: Pulsewidth ≤ 300μsec, Duty cycle ≤ 2%.

THERMAL RESISTANCE

Junction to Case	R_{thJC}	1.0	° C/W
Junction to Ambient (Free Air Operation)	R_{thJA}	50	° C/W

	Nch	Pch	2 Pch - 2 Nch
60V	OM9332SC	OM9335SC	OM9338SC
100V	OM9333SC	OM9336SC	OM9339SC
200V	OM9334SC	OM9337SC	OM9340SC

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