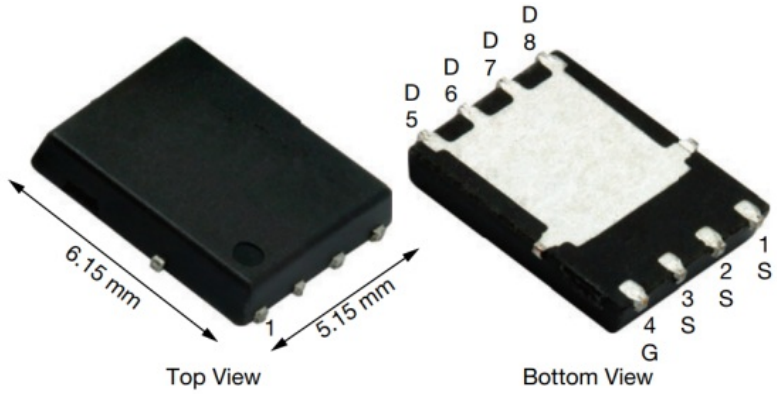
SiR4608LDP

Vishay Siliconix

Contents [hide]

N-Channel 60 V (D-S) MOSFET

PowerPAK® SO-8 Single



PRODUCT SUMMARY

V_{DS} (V)	60
$R_{DS(on)}$ max. (W) at V_{GS} = 10 V	0.0115
$R_{DS(on)}$ max. (W) at V_{GS} = 4.5 V	0.0153
Q_g typ. (nC)	7
I_D (A)	43.4
Configuration	Single

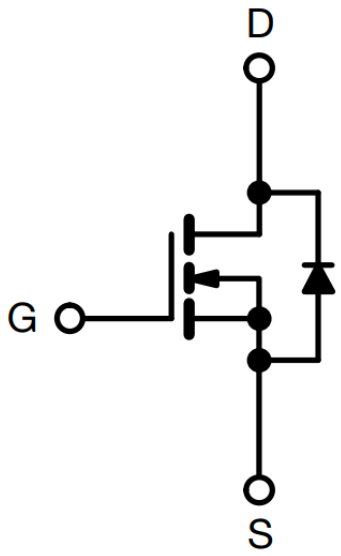
FEATURES

- TrenchFET ® Gen IV power MOSFET
- Very low R DS x Q figure-of-merit (FOM)
- Tuned for the lowest R g DS x Q FOM
- 100 % R g oss and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Synchronous rectification
- Primary side switch
- DC/DC converters
- OR-ing

- Power supplies
- Motor drive control
- Battery and load switch



N-Channel MOSFET

ORDERING INFORMATION

Package	PowerPAK SO-8
Lead (Pb)-free and halogen-free	SIR4608LDP-T1-GE3

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-source voltage		VDS	60	V
Gate-source voltage		VGS	± 20	
Continuous drain current (T_J = 150 °C)	T_C = 25 °C	I_D	43.4	
	T_C = 70 °C		34.7	

	T_A = 25 °C		13.3 b, c	A
	T_A = 70 °C		10.6 b, c	
Pulsed drain current (t = 100 µs)		IDM	100	
Continuous source-drain diode current	T_C = 25 °C	I_S	35.5 a	
	T_A = 25 °C		3.3 b, c	
Single pulse avalanche current	L = 0.1 mH	IAS	15	
Single pulse avalanche energy		EAS	11.25	mJ
Maximum power dissipation	T_C = 25 °C	P_D	39	W
	T_C = 70 °C		25	
	T_A = 25 °C		3.6 b, c	
	T_A = 70 °C		2.3 b, c	
Operating junction and storage temperature range		TJ, Tstg	-55 to +150	°C
Soldering recommendations (peak temperature) d, e			260	

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient b	t £ 10 s	RthJA	24	34	°C/W
Maximum junction-to-case (drain)	Steady state	RthJC	2.5	3.2	

Notes

a. T C = 25 °C

b. Surface mounted on 1″ x 1″ FR4 board

c. t = 10 s

d. See solder profile (www.vishay.com/doc?73257). The PowerPAK SO-8 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection

e. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components

f. Maximum under steady state conditions is 70 °C/W

SPECIFICATIONS

(TJ= 25 °C, unless otherwise noted)

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						

Drain-source breakdown voltage	VDS	V_{GS} = 0 V, I_D = 250 µA	60	–	–	V
V_{DS} temperature coefficient	DV_{DS}/ T_J	I_D = 10 mA	–	34	–	mV /°C
$V_{GS(th)}$ temperature coefficient	DVGS (th)/TJ	I_D = 250 µA	–	-4.1	–	
Gate-source threshold voltage	VGS(th)	V_{DS} = V_{GS}, I_D = 250 µA	1	–	3	V
Gate-source leakage	IGSS	V_{DS} = 0 V, V_{GS} = ± 20 V	–	–	100	nA
Zero gate voltage drain current	IDSS	V_{DS} = 60 V, V_{GS} = 0 V	–	–	1	µA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 70 °C	–	–	15	
Drain-source on-state resistance a	RDS(on)	V_{GS} = 10 V, I_D = 10 A	–	0.0094	0.0115	W
		V_{GS} = 4.5 V, I_D = 10 A	–	0.0128	0.0153	
Forward transconductance a	gfs	V_{DS} = 15 V, I_D = 10 A	–	31	–	S
Dynamic b						
Input capacitance	Ciss	V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz	–	905	–	pF
Output capacitance	Coss		–	198	–	
Reverse transfer capacitance	Crss		–	6.2	–	

Total gate charge	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 10 A	–	15	23	nC
		V_{DS} = 30 V, V_{GS} = 4.5 V, I_D = 10 A	–	7	11	
Gate-source charge	Qgs		–	3.1	–	
Gate-drain charge	Qgd		–	1.95	–	
Output charge	Qoss	V_{DS} = 30 V, V_{GS} = 0 V	–	12.4	–	
Gate resistance	R_g	f = 1 MHz	0.7	1.5	2.6	W
Turn-on delay time	td(on)	V_{DD} = 30 V, R_L = 3 W, I_D @ 10 A, V_{GEN} = 10 V, R_g = 1 W	–	9	18	ns
Rise time	t_r		–	6	12	
Turn-off delay time	td(off)		–	17	34	
Fall time	t_f		–	4	8	
Turn-on delay time	td(on)	V_{DD} = 30 V, R_L = 3 W, I_D @ 10 A, V_{GEN} = 4.5 V, R_g = 1 W	–	13	26	
Rise time	t_r		–	58	116	
Turn-off delay time	td(off)		–	16	32	
Fall time	t_f		–	8	16	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	T_C = 25 °C	–	–	35.5	A
Pulse diode forward current	ISM		–	–	100	

Body diode voltage	VSD	I_S = 5 A, V_{GS} = 0 V	–	0.81	1.1	V
Body diode reverse recovery time	trr	I_F = 10 A, di/dt = 100 A/µs, T_J = 25 °C	–	19	38	ns
Body diode reverse recovery charge	Qrr		–	9	18	nC
Reverse recovery fall time	t_a		–	9	–	ns
Reverse recovery rise time	t_b		–	10	–	

Notes

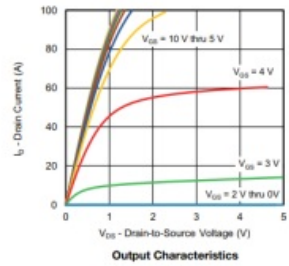
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %

b. Guaranteed by design, not subject to production testing

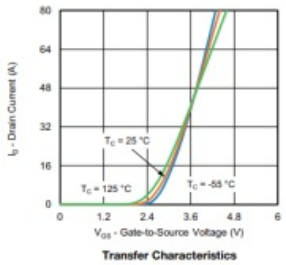
Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS

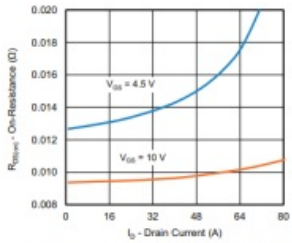
(25 °C, unless otherwise noted)



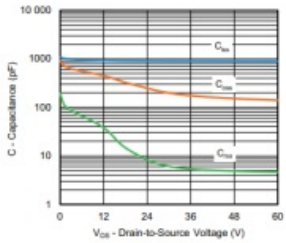
Output Characteristics



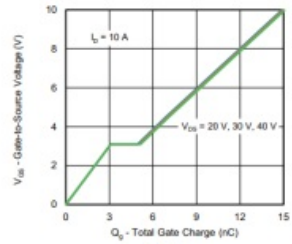
Transfer Characteristics



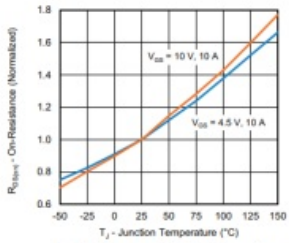
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

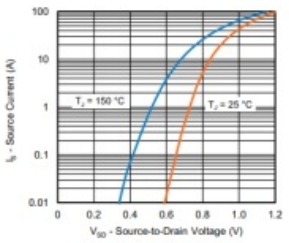


Gate Charge

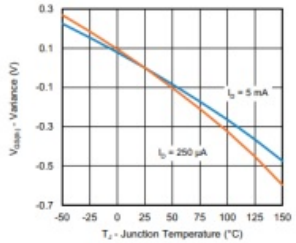


On-Resistance vs. Junction Temperature

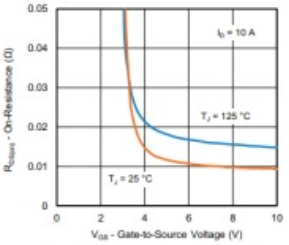
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



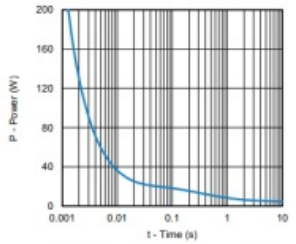
Source-Drain Diode Forward Voltage



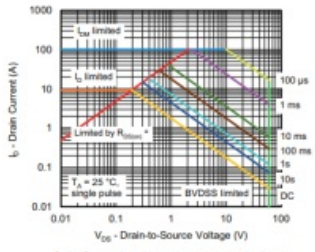
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient

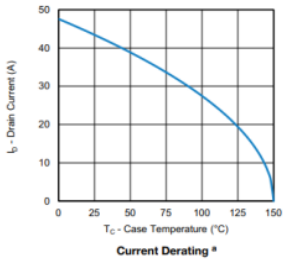


Safe Operating Area, Junction-to-Ambient

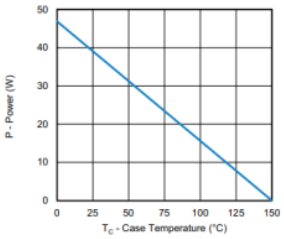
Note

a. V GS > minimum V GS at which R DS(on) is specified

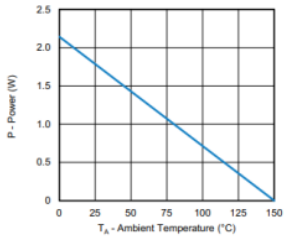
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating *



Power, Junction-to-Case

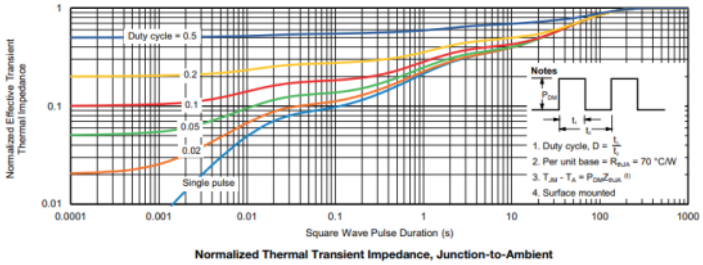


Power, Junction-to-Ambient

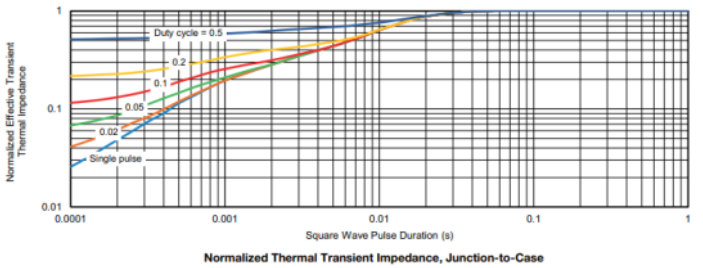
Note

a. The power dissipation P D is based on T max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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Documents / Resources

	VISHAY SiR4608LDP-T1-GE3 N-Channel 60 V Mosfet [pdf] Owner's Manual SiR4608LDP-T1-GE3, SiR4608LDP-T1-GE3 N-Channel 60 V Mosfet, SiR4608LDP-T1-GE3, N-Channel 60 V Mosfet, 60 V Mosfet, Mosfet

References

- User Manual

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60 V Mosfet, MOSFET, N-Channel 60 V Mosfet, SiR4608LDP-T1-GE3, SiR4608LDP-T1-GE3 N-Channel 60 V Mosfet, VISHAY

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