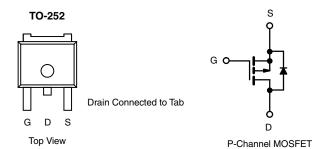


Automotive P-Channel 80 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY				
V _{DS} (V)	- 80			
$R_{DS(on)}(\Omega)$ at V_{GS} = - 10 V	0.028			
I _D (A)	- 48			
Configuration	Single			



FEATURES

- Halogen-free According to IEC 61249-2-21 **Definition**
- TrenchFET® Power MOSFET
- AEC-Q101 Qualifiedd
- 100 % R_q and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



ORDERING INFORMATION	
Package	TO-252
Lead (Pb)-free and Halogen-free	SQD50P08-28-GE3

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)					
PARAMETER	SYMBOL	LIMIT	UNIT		
Drain-Source Voltage		V _{DS}	- 80	.,	
Gate-Source Voltage		V _{GS}	± 20	V	
Continuous Dunin Comment	T _C = 25 °C	- I _D	- 48		
Continuous Drain Current	T _C = 125 °C		- 28		
Continuous Source Current (Diode Conduction) ^a		I _S	- 50	Α	
Pulsed Drain Current ^b		I _{DM}	- 190		
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	- 45		
Single Pulse Avalanche Energy	L = 0.1 MH	E _{AS}	100	mJ	
Maximum Power Dissipation ^b	T _C = 25 °C	T _C = 25 °C	136	W	
	T _C = 125 °C	P_D	45] vv	
Operating Junction and Storage Temperature Range	ge	T _J , T _{stg}	- 55 to + 175	°C	

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount ^c	R_{thJA}	50	°C/W
Junction-to-Case (Drain)		R _{thJC}	1.1	O/ VV

Notes

- a. Package limited.
- b. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.
- c. When mounted on 1" square PCB (FR-4 material).
- d. Parametric verification ongoing.



PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0, I _D = - 250 μA		- 80	-	-	V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =	$V_{DS} = V_{GS}, I_{D} = -250 \mu\text{A}$		- 3.0	- 3.5	
Gate-Source Leakage	I _{GSS}	V _{DS} =	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$		-	± 100	nA
		V _{GS} = 0 V	V _{DS} = - 80 V	-	-	- 1	
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V	V _{DS} = - 80 V, T _J = 125 °C	-	-	- 50	μΑ
		V _{GS} = 0 V	V _{DS} = - 80 V, T _J = 175 °C	-	-	- 250	
On-State Drain Current ^a	I _{D(on)}	V _{GS} = - 10 V	V _{DS} ≤ - 5 V	- 50	-	-	Α
		V _{GS} = - 10 V	I _D = - 12.5 A	-	0.023	0.028	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V	I _D = - 12.5 A, T _J = 125 °C	-	-	0.049	Ω
		V _{GS} = - 10 V	I _D = - 12.5 A, T _J = 175 °C	-	-	0.061	
Forward Transconductanceb	9 _{fs}	V _{DS} = -	V _{DS} = - 15 V, I _D = - 12.5 A		32	-	S
Dynamic ^b							
Input Capacitance	C _{iss}		V _{DS} = - 25 V, f = 1 MHz	-	4826	6035	pF
Output Capacitance	C _{oss}	$V_{GS} = 0 V$		-	343	430	
Reverse Transfer Capacitance	C _{rss}			-	224	280	
Total Gate Charge ^c	Qg			-	95	145	
Gate-Source Charge ^c	Q _{gs}	V _{GS} = - 10 V	$V_{DS} = -40 \text{ V}, I_{D} = -12.5 \text{ A}$	-	19	-	nC
Gate-Drain Charge ^c	Q _{gd}			-	26		
Gate Resistance	R _g		f = 1 MHz		3.47	5.21	Ω
Turn-On Delay Time ^c	t _{d(on)}			-	15	23	
Rise Time ^c	t _r		$V_{DD} = -40 \text{ V}, R_1 = 3.8 \Omega$		11	17	ns
Turn-Off Delay Time ^c	t _{d(off)}	$I_D \cong$ - 10.5 A, $V_{GEN} =$ - 10 V, $R_g =$ 1 Ω		-	65	98	
Fall Time ^c	t _f			-	16	24	
Source-Drain Diode Ratings and Chara	acteristics ^b						
Pulsed Current ^a	I _{SM}			-	-	- 190	Α
Forward Voltage	V_{SD}	I _F = - 10 A, V _{GS} = 0		_	- 0.82	- 1.5	V

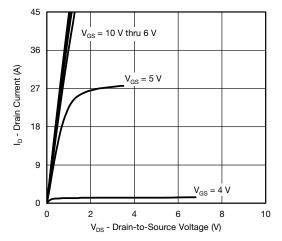
Notes

- a. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

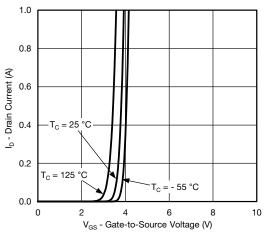
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



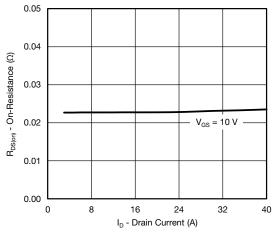
TYPICAL CHARACTERISTICS ($T_A = 25$ °C, unless otherwise noted)



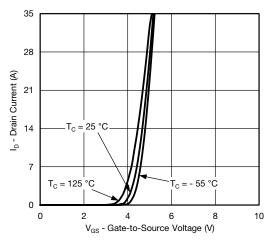
Output Characteristics



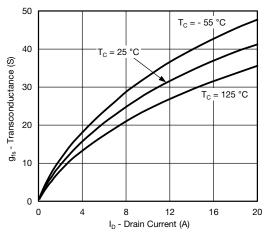
Transfer Characteristics



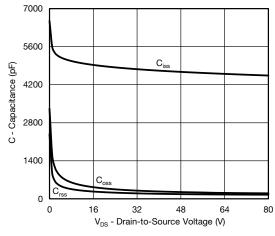
On-Resistance vs. Drain Current



Transfer Characteristics



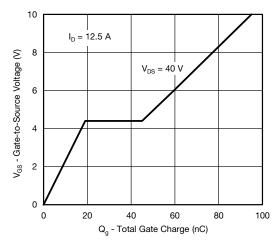
Transconductance



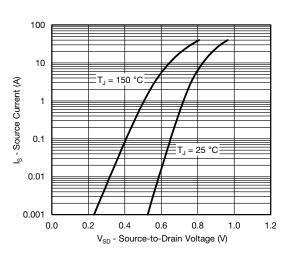
Capacitance



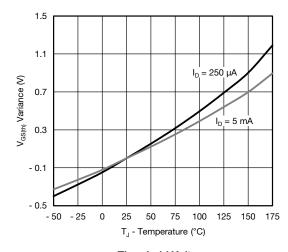
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



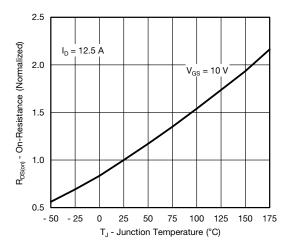
Gate Charge



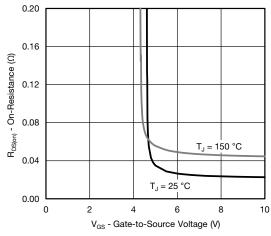
Source Drain Diode Forward Voltage



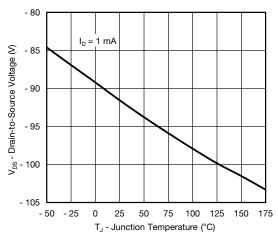
Threshold Voltage



On-Resistance vs. Junction Temperature



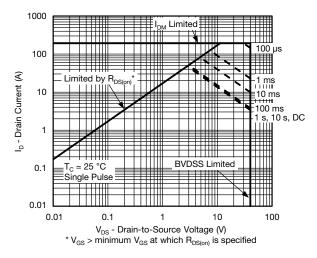
On-Resistance vs. Gate-to-Source Voltage



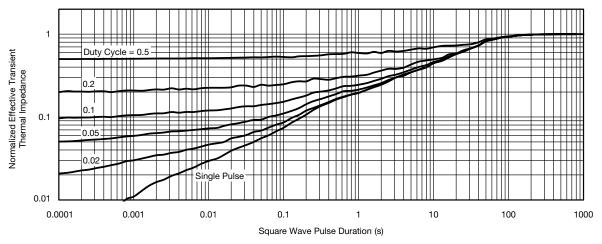
Drain Source Breakdown vs. Junction Temperature



THERMAL RATINGS ($T_A = 25 \, ^{\circ}C$, unless otherwise noted)



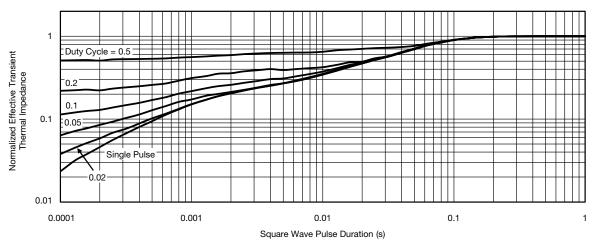
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



THERMAL RATINGS ($T_A = 25$ °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Case (25 °C) are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?63215.

DPAK / TO-252 and Reverse DPAK

Ordering codes for the SQ rugged series power MOSFETs in the DPAK / TO-252 and Reverse DPAK packages:

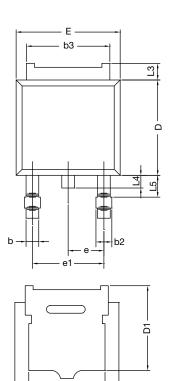
DATASHEET PART NUMBER	OLD ORDERING CODE a	NEW ORDERING CODE
SQD07N25-350H	SQD07N25-350H-GE3	SQD07N25-350H_GE3
SQD100N03-3m2L	SQD100N03-3M2L-GE3	SQD100N03-3M2L_GE3
SQD100N03-3m4	SQD100N03-3M4-GE3	SQD100N03-3M4_GE3
SQD100N04-3m6	SQD100N04-3M6-GE3	SQD100N04-3M6_GE3
SQD100N04-3m6L	SQD100N04-3M6L-GE3	SQD100N04-3M6L_GE3
SQD10N30-330H	SQD10N30-330H-GE3	SQD10N30-330H_GE3
SQD15N06-42L	SQD15N06-42L-GE3	SQD15N06-42L_GE3
SQD19P06-60L	SQD19P06-60L-GE3	SQD19P06-60L_GE3
SQD23N06-31L	SQD23N06-31L-GE3	SQD23N06-31L_GE3
SQD25N06-22L	SQD25N06-22L-GE3	SQD25N06-22L_GE3
SQD25N15-52	SQD25N15-52-GE3	SQD25N15-52_GE3
SQD30N05-20L	SQD30N05-20L-GE3	SQD30N05-20L_GE3
SQD40N06-14L	SQD40N06-14L-GE3	SQD40N06-14L_GE3
SQD40N10-25	SQD40N10-25-GE3	SQD40N10-25_GE3
SQD40P10-40L	SQD40P10-40L-GE3	SQD40P10-40L_GE3
SQD45P03-12	SQD45P03-12-GE3	SQD45P03-12_GE3
SQD50N04-5m6	SQD50N04-5M6-GE3	SQD50N04-5M6_GE3
SQD50N05-11L	SQD50N05-11L-GE3	SQD50N05-11L_GE3
SQD50N06-09L	SQD50N06-09L-GE3	SQD50N06-09L_GE3
SQD50N10-8m9L	SQD50N10-8M9L-GE3	SQD50N10-8M9L_GE3
SQD50P03-07	SQD50P03-07-GE3	SQD50P03-07_GE3
SQD50P04-13L	SQD50P04-13L-GE3	SQD50P04-13L_GE3
SQD50P04-09L	SQD50P04-09L-GE3	SQD50P04-09L_GE3
SQD50P06-15L	SQD50P06-15L-GE3	SQD50P06-15L_GE3
SQD50P08-25L	SQD50P08-25L-GE3	SQD50P08-25L_GE3
SQD50P08-28	SQD50P08-28-GE3	SQD50P08-28_GE3
SQD90P04-9m4L	SQD90P04-9M4L-GE3	SQD90P04-9M4L_GE3
SQD97N06-6m3L	SQD97N06-6M3L-GE3	SQD97N06-6M3L_GE3
SQR40N10-25	SQR40N10-25-GE3	SQR40N10-25_GE3
SQR50N04-3m8	SQR50N04-3M8-GE3	SQR50N04-3M8_GE3

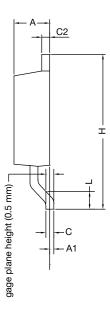
Note

a. Old ordering code is obsolete and no longer valid for new orders



TO-252AA Case Outline





	MILLIN	MILLIMETERS INCHES		HES
DIM.	MIN.	MAX.	MIN.	MAX.
Α	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
С	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	4.10	-	0.161	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
Н	9.40	10.41	0.370	0.410
е	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.01	1.52	0.040	0.060
ECN: T13-0592-Rev. A, 02-Sep-13 DWG: 6019				

Note

• Dimension L3 is for reference only.



RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads Dimensions in Inches/(mm)

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APPLICATION NOTE



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Revision: 02-Oct-12 Document Number: 91000