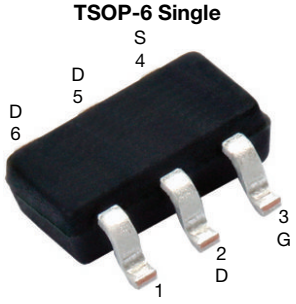
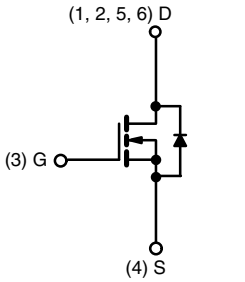
Automotive N-Channel 60 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	60
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.042
$R_{DS(on)}$ (Ω) at V_{GS} = 4.5 V	0.063
I_D (A)	7
Configuration	Single

TSOP-6 Single



Top View



N-Channel MOSFET

Marking Code: 8Q

FEATURES

- TrenchFET® power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

HALOGEN FREE

ORDERING INFORMATION	
Package	TSOP-6
Lead (Pb)-free and Halogen-free	SQ3426EV-T1-GE3

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

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current	T_C = 25 °C	I_D	7	A
	T_C = 125 °C		4	
Continuous Source Current (Diode Conduction)		I_S	6	
Pulsed Drain Current [a]		I_{DM}	29	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	10	
Single Pulse Avalanche Energy		E_{AS}	5	mJ
Maximum Power Dissipation [a]	T_C = 25 °C	P_D	5	W
	T_C = 125 °C		1.6	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to +175	°C

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount [b]	R_{thJA}	110	°C/W
Junction-to-Foot (Drain)		R_{thJF}	30	

Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. When mounted on 1" square PCB (FR4 material).

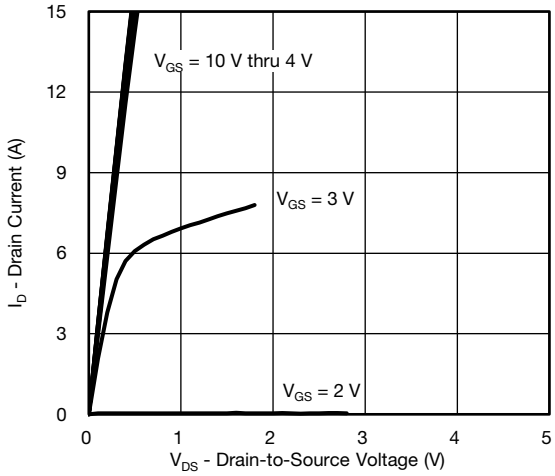
SPECIFICATIONS (T_C = 25 °C, unless otherwise noted)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static							
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0, I_D = 250 µA		60	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA		1.5	2	2.5	
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 12 V		-	-	± 100	nA
		V_{DS} = 0 V, V_{GS} = ± 20 V		-	-	± 300	
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V	V_{DS} = 60 V	-	-	1	µA
		V_{GS} = 0 V	V_{DS} = 60 V, T_J = 125 °C	-	-	50	
		V_{GS} = 0 V	V_{DS} = 60 V, T_J = 175 °C	-	-	150	
On-State Drain Current [a]	$I_{D(on)}$	V_{GS} = 10 V	V_{DS} ≥ 5 V	10	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 5 A	-	0.032	0.042	Ω
		V_{GS} = 10 V	I_D = 5 A, T_J = 125 °C	-	0.056	-	
		V_{GS} = 10 V	I_D = 5 A, T_J = 175 °C	-	0.071	-	
		V_{GS} = 4.5 V	I_D = 4 A	-	0.035	0.063	
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 4 A		-	21	-	S
Dynamic [b]							
Input Capacitance	C_{iss}	V_{GS} = 0 V	V_{DS} = 30 V, f = 1 MHz	-	560	720	pF
Output Capacitance	C_{oss}			-	85	110	
Reverse Transfer Capacitance	C_{rss}			-	55	70	
Total Gate Charge [c]	Q_g	V_{GS} = 4.5 V	V_{DS} = 30 V, I_D = 4 A	-	6.3	12	nC
Gate-Source Charge [c]	Q_{gs}			-	2.1	-	
Gate-Drain Charge [c]	Q_{gd}			-	4.1	-	
Gate Resistance	R_g	f = 1 MHz		1.9	3.8	5.7	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 7.5 Ω I_D ≅ 4 A, V_{GEN} = 10 V, R_g = 1 Ω		-	9	14	ns
Rise Time [c]	t_r			-	12	18	
Turn-Off Delay Time [c]	$t_{d(off)}$			-	19	29	
Fall Time [c]	t_f			-	7	11	
Source-Drain Diode Ratings and Characteristics [b]							
Pulsed Current [a]	I_{SM}			-	-	29	A
Forward Voltage	V_{SD}	I_F = 1.6 A, V_{GS} = 0		-	0.75	1.2	V

Notes

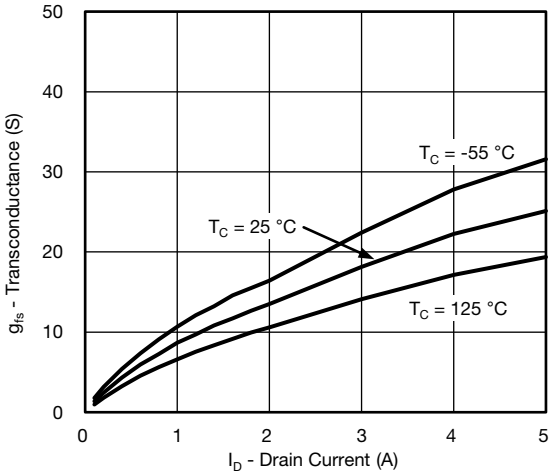
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

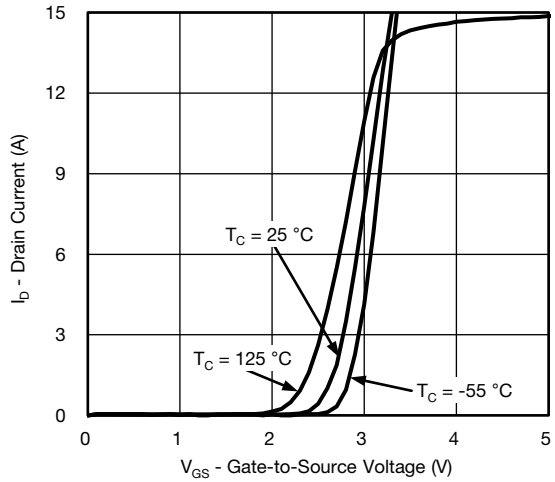
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



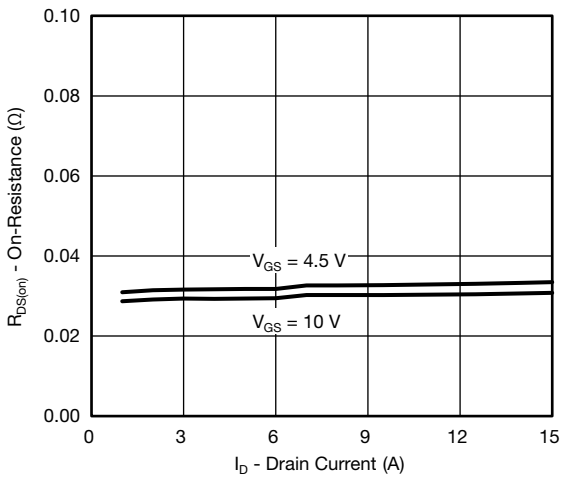
Output Characteristics



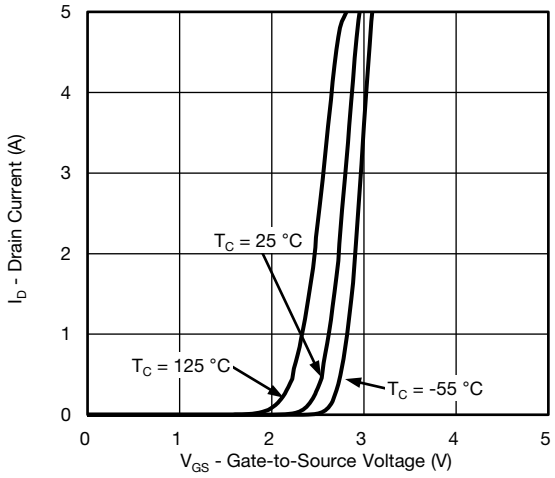
Transconductance



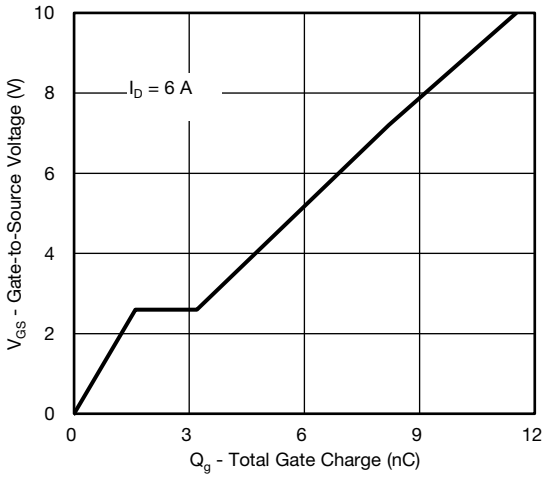
Transfer Characteristics



On-Resistance vs. Drain Current

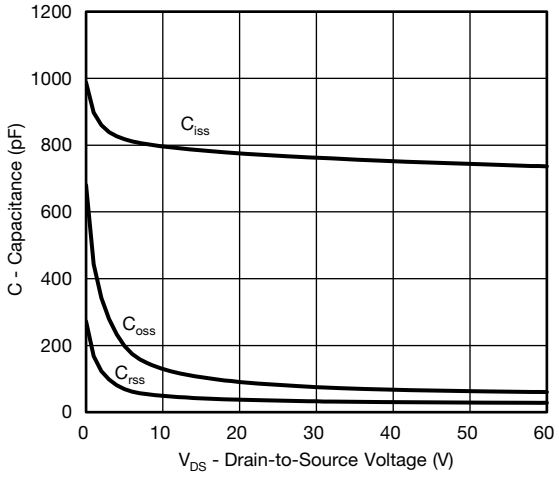


Transfer Characteristics

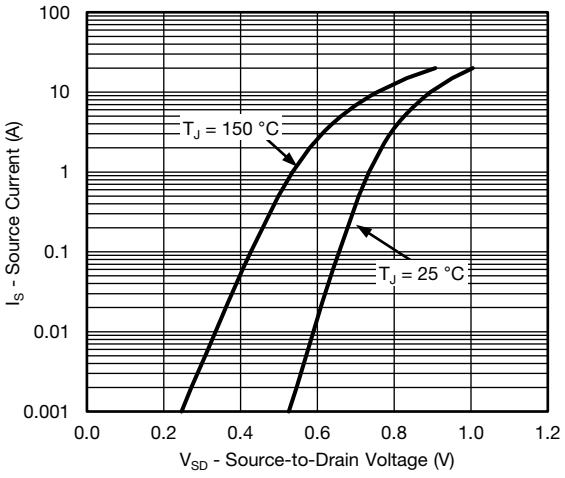


Gate Charge

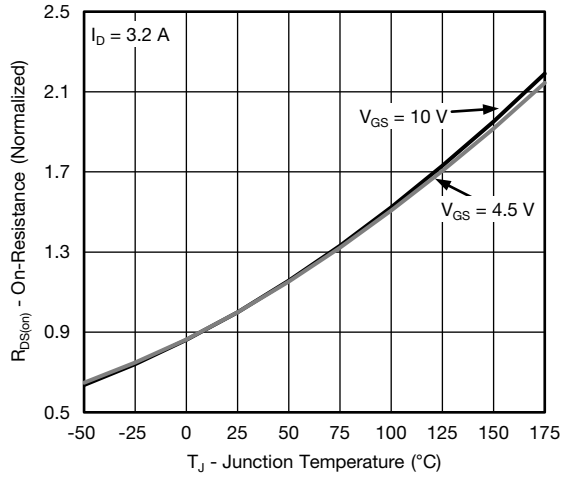
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



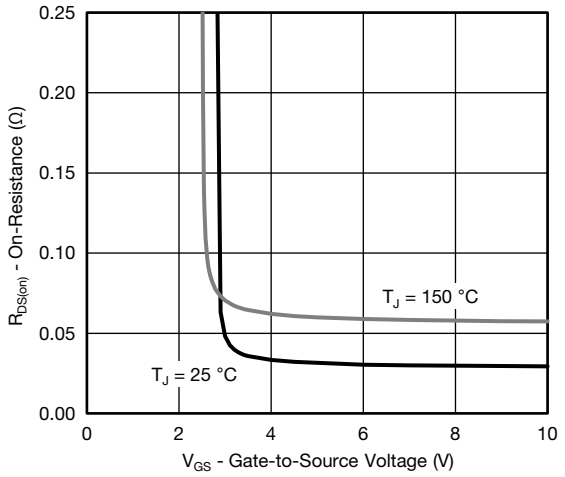
Capacitance



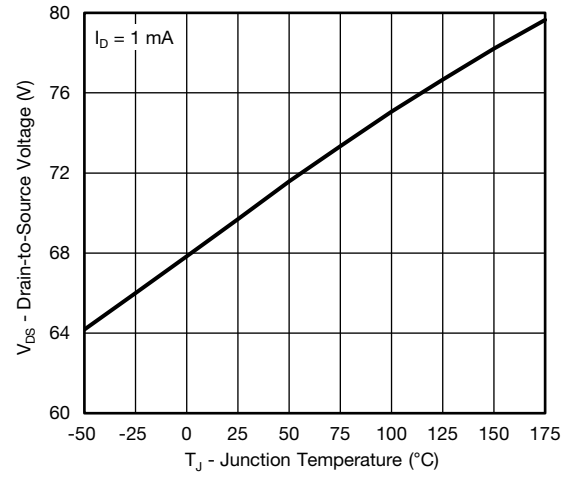
Source Drain Diode Forward Voltage



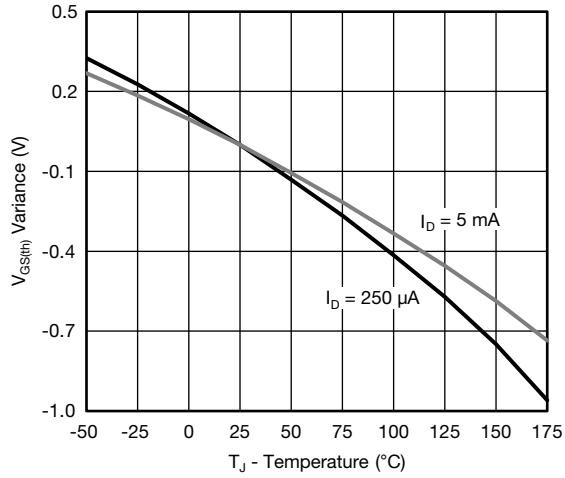
On-Resistance vs. Junction Temperature



On-Resistance vs. Gate-Source Voltage

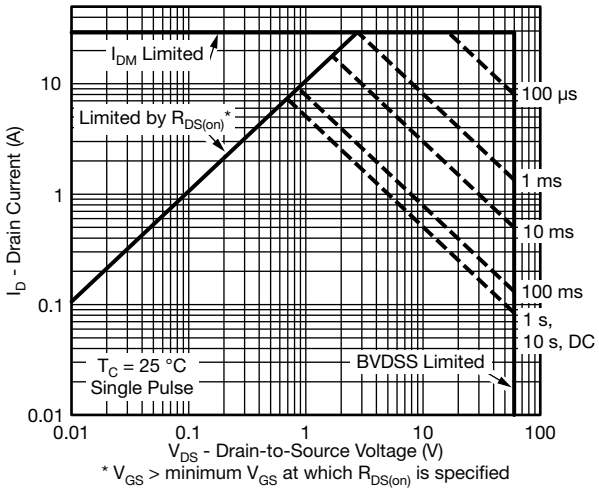


Drain Source Breakdown vs. Junction Temperature

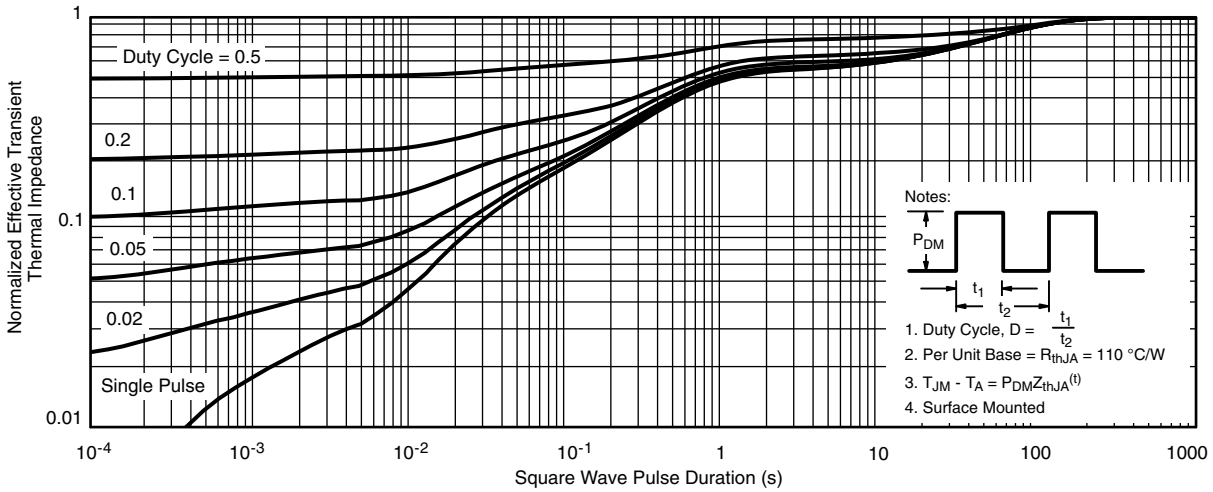


Threshold Voltage

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

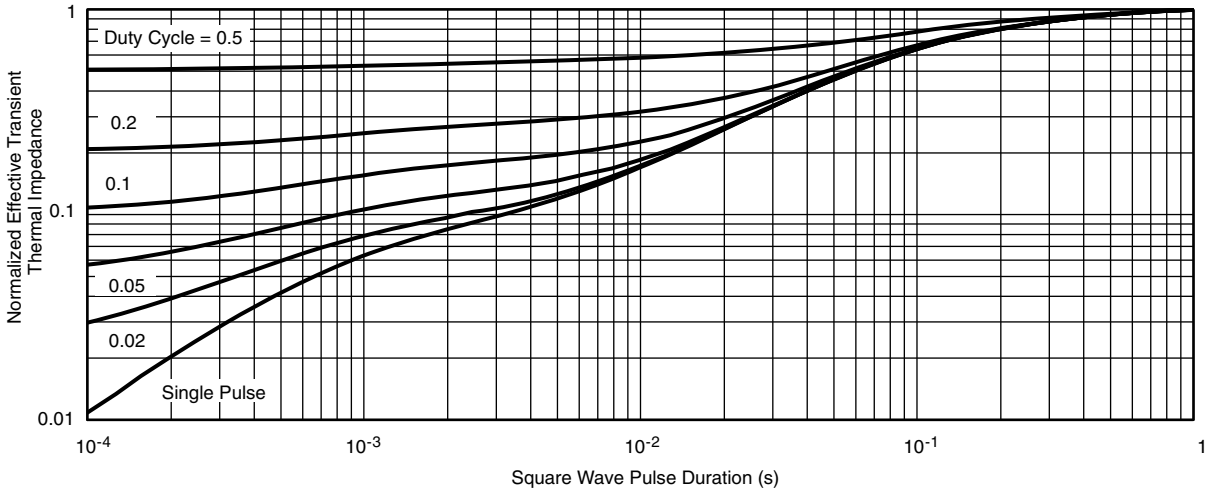


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

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



Normalized thermal Transient Impedance, Junction-to-Foot

Note

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction to Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction to Foot (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.

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TSOP-6

Ordering codes for the SQ rugged series power MOSFETs in the TSOP-6 package:

DATASHEET PART NUMBER	OLD ORDERING CODE [a]	NEW ORDERING CODE
SQ3410EV	SQ3410EV-T1-GE3	**SQ3410EV-T1_GE3**
SQ3418EV	-	**SQ3418EV-T1_GE3**
SQ3419AEEV	-	**SQ3419AEEV-T1_GE3**
SQ3419EV	-	**SQ3419EV-T1_GE3**
SQ3426AEEV	-	**SQ3426AEEV-T1_GE3**
SQ3426EV	-	**SQ3426EV-T1_GE3**
SQ3427AEEV	-	**SQ3427AEEV-T1_GE3**
SQ3427EV	-	**SQ3427EV-T1_GE3**
SQ3456BEV	SQ3456BEV-T1-GE3	**SQ3456BEV-T1_GE3**
SQ3457EV	SQ3457EV-T1-GE3	**SQ3457EV-T1_GE3**
SQ3460EV	SQ3460EV-T1-GE3	**SQ3460EV-T1_GE3**
SQ3461EV	-	**SQ3461EV-T1_GE3**
SQ3469EV	SQ3469EV-T1-GE3	**SQ3469EV-T1_GE3**
SQ3481EV	SQ3481EV-T1-GE3	**SQ3481EV-T1_GE3**
SQ3985EV	-	**SQ3985EV-T1_GE3**

Note

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

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