



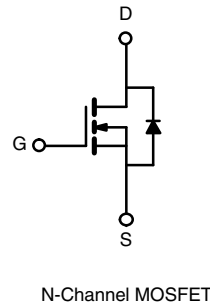
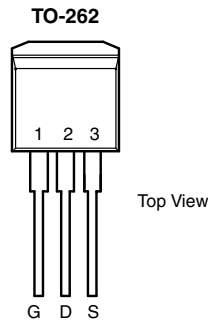
# Automotive N-Channel 100 V (D-S) 175 °C MOSFET



PRODUCT SUMMARY	
V <sub>DS</sub> (V)	100
R <sub>DS(on)</sub> (Ω) at V <sub>GS</sub> = 10 V	0.0038
I <sub>D</sub> (A)	120
Configuration	Single

## FEATURES

- TrenchFET® Power MOSFET
- Package with Low Thermal Resistance
- AEC-Q101 Qualified<sup>d</sup>
- 100 % R<sub>g</sub> and UIS Tested
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



ORDERING INFORMATION	
Package	TO-262
Lead (Pb)-free and Halogen-free	SQV120N10-3m8-GE3

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted)				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V <sub>DS</sub>	100	V	
Gate-Source Voltage	V <sub>GS</sub>	± 20		
Continuous Drain Current	I <sub>D</sub>	T <sub>C</sub> = 25 °C <sup>a</sup>	120	
		T <sub>C</sub> = 125 °C	102	
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	120	A	
Pulsed Drain Current <sup>b</sup>	I <sub>DM</sub>	480		
Single Pulse Avalanche Current	I <sub>AS</sub>	73		
Single Pulse Avalanche Energy	E <sub>AS</sub>	L = 0.1 mH	266	mJ
Maximum Power Dissipation <sup>b</sup>			T <sub>C</sub> = 25 °C	
		T <sub>C</sub> = 125 °C	83	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to + 175	°C	

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient	R <sub>thJA</sub>	40	°C/W
Junction-to-Case (Drain)			

### Notes

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



SPECIFICATIONS ( $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0, I_D = 250\text{ }\mu\text{A}$	100	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.5	3.0	3.5	
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}, V_{DS} = 100\text{ V}$	-	-	1	$\mu\text{A}$
		$V_{GS} = 0\text{ V}, V_{DS} = 100\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}, V_{DS} = 100\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	500	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{GS} = 10\text{ V}, V_{DS} \geq 5\text{ V}$	120	-	-	A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	0.0030	0.0038	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.0064	
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.0080	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$	-	82	-	S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	5780	7230	$\mu\text{F}$
Output Capacitance	$C_{oss}$		-	3070	3840	
Reverse Transfer Capacitance	$C_{rss}$		-	305	385	
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{GS} = 10\text{ V}, V_{DS} = 50\text{ V}, I_D = 70\text{ A}$	-	125	190	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$		-	28	-	
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$		-	46	-	
Gate Resistance	$R_g$	$f = 1\text{ MHz}$	1.6	3.3	5	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 0.7\text{ }\Omega, I_D \cong 70\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$	-	16	25	ns
Rise Time <sup>c</sup>	$t_r$		-	110	165	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$		-	40	60	
Fall Time <sup>c</sup>	$t_f$		-	12	20	
<b>Source-Drain Diode Ratings and Characteristics<sup>b</sup></b>						
Pulsed Current <sup>a</sup>	$I_{SM}$		-	-	480	A
Forward Voltage	$V_{SD}$	$I_F = 100\text{ A}, V_{GS} = 0$	-	0.9	1.5	V

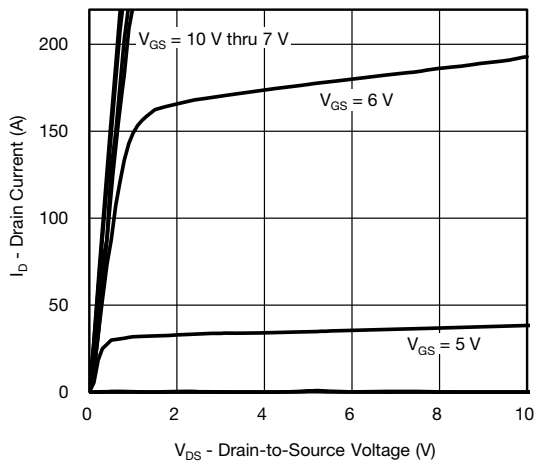
**Notes**

- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

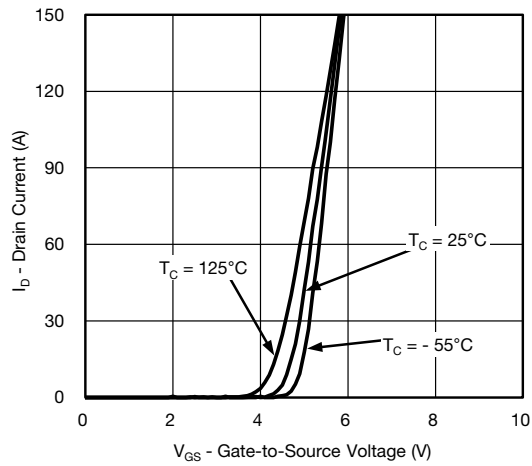
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



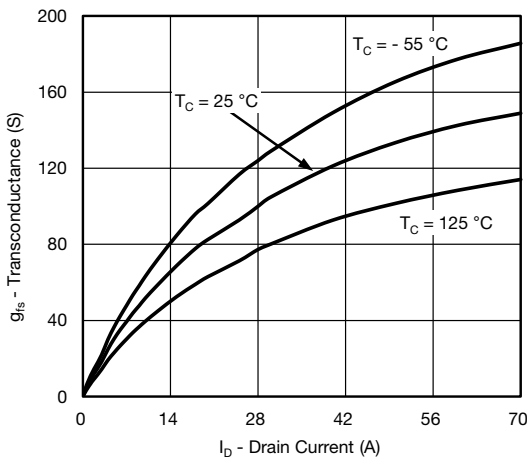
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, unless otherwise noted)



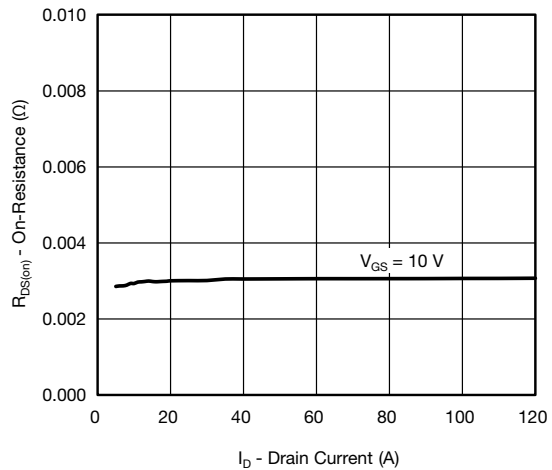
Output Characteristics



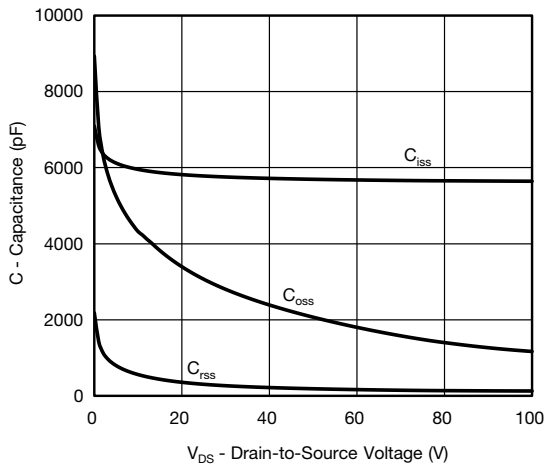
Transfer Characteristics



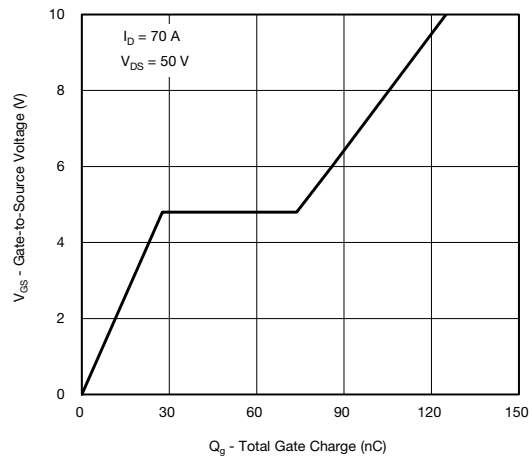
Transconductance



On-Resistance vs. Drain Current



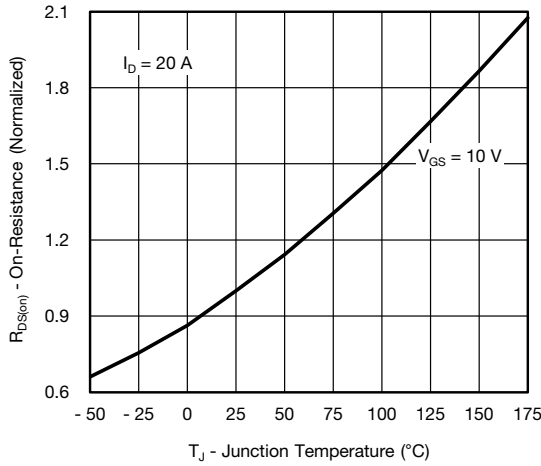
Capacitance



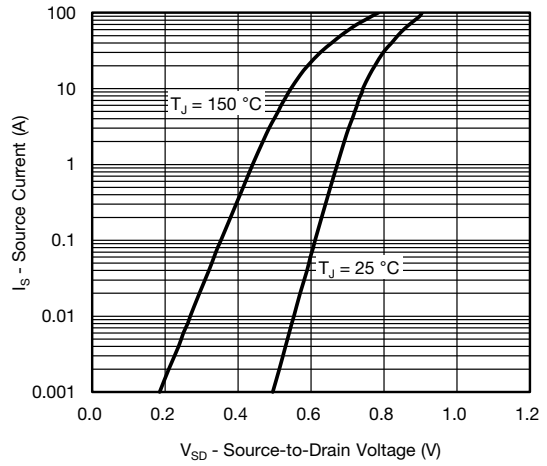
Gate Charge



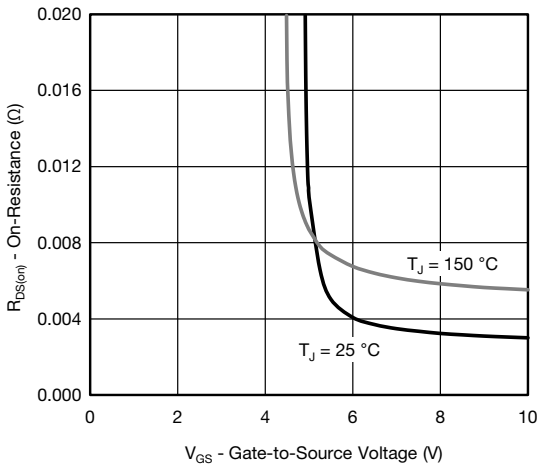
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



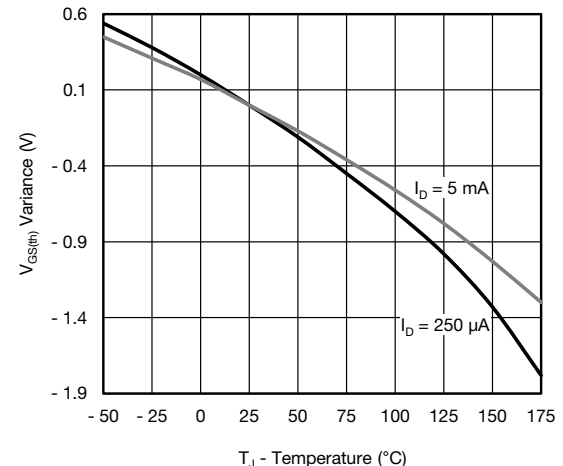
**On-Resistance vs. Junction Temperature**



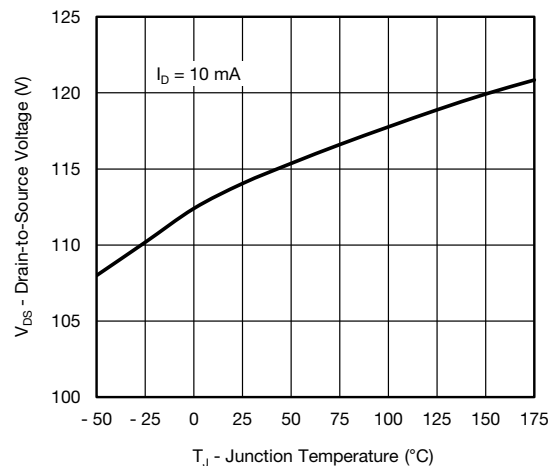
**Source Drain Diode Forward Voltage**



**On-Resistance vs. Gate-to-Source Voltage**



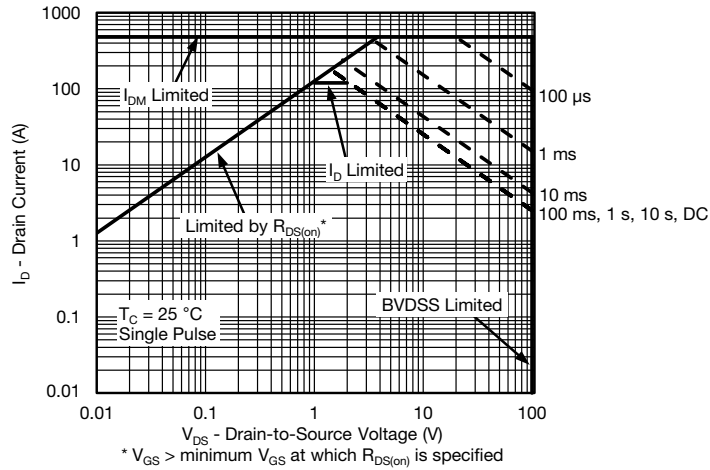
**Threshold Voltage**



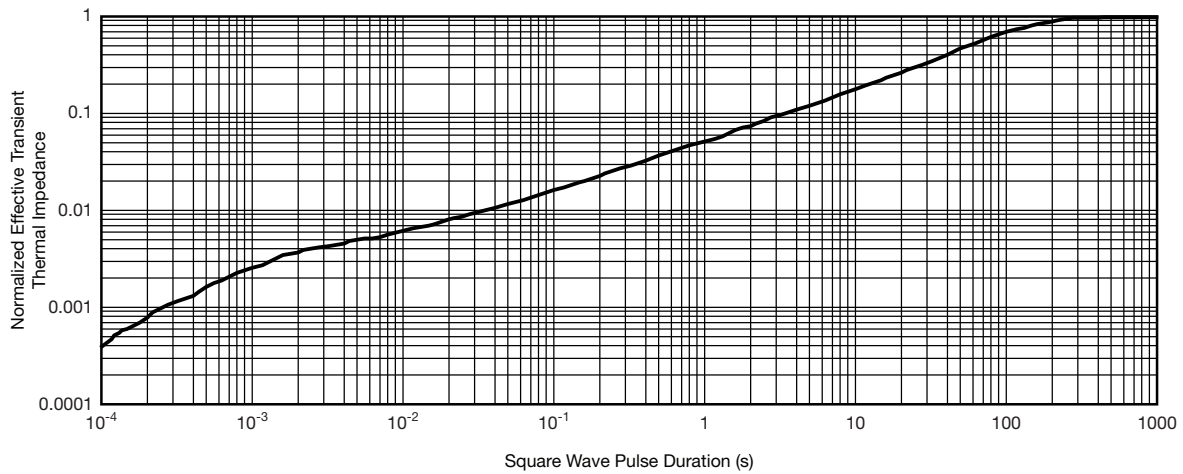
**Drain Source Breakdown vs. Junction Temperature**



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



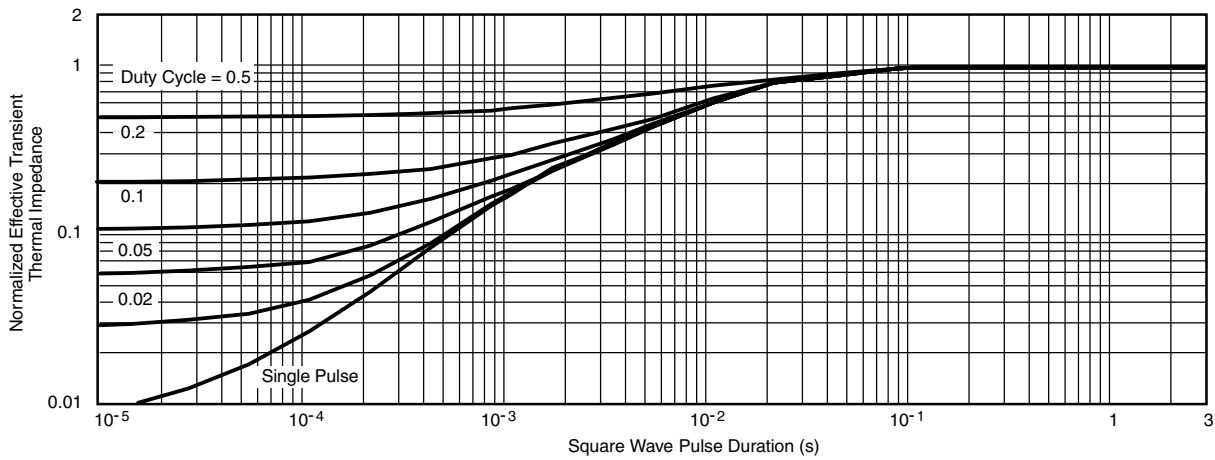
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



**THERMAL RATINGS** ( $T_A = 25\text{ }^\circ\text{C}$ , 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.

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D<sup>2</sup>PAK / TO-263 and TO-262

Ordering codes for the SQ rugged series power MOSFETs in the D<sup>2</sup>PAK / TO-263 and TO-262 packages:

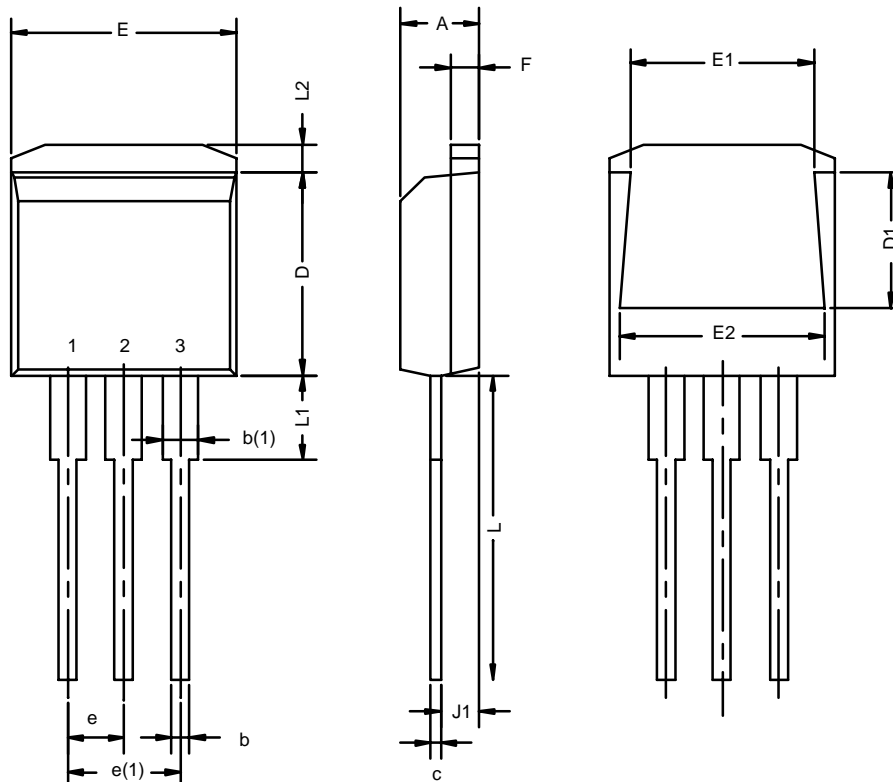
DATASHEET PART NUMBER	OLD ORDERING CODE <sup>a</sup>	NEW ORDERING CODE
SQM100N04-2m7	SQM100N04-2M7-GE3	SQM100N04-2M7_GE3
SQM100N10-10	SQM100N10-10-GE3	SQM100N10-10_GE3
SQM110N05-06L	SQM110N05-06L-GE3	SQM110N05-06L_GE3
SQM110P06-8m9L	SQM110P06-8M9L-GE3	SQM110P06-8M9L_GE3
SQM120N02-1m3L	SQM120N02-1M3L-GE3	SQM120N02-1M3L_GE3
SQM120N03-1m5L	SQM120N03-1M5L-GE3	SQM120N03-1M5L_GE3
SQM120N04-1m7	SQM120N04-1M7-GE3	SQM120N04-1M7_GE3
SQM120N04-1m7L	SQM120N04-1M7L-GE3	SQM120N04-1M7L_GE3
SQM120N04-1m9	SQM120N04-1M9-GE3	SQM120N04-1M9_GE3
SQM120N06-06	SQM120N06-06-GE3	SQM120N06-06_GE3
SQM120N06-3m5L	SQM120N06-3M5L-GE3	SQM120N06-3M5L_GE3
SQM120N10-09	SQM120N10-09-GE3	SQM120N10-09_GE3
SQM120N10-3m8	SQM120N10-3M8-GE3	SQM120N10-3M8_GE3
SQM120P04-04L	SQM120P04-04L-GE3	SQM120P04-04L_GE3
SQM120P06-07L	SQM120P06-07L-GE3	SQM120P06-07L_GE3
SQM200N04-1m1L	SQM200N04-1M1L-GE3	SQM200N04-1M1L_GE3
SQM200N04-1m7L	SQM200N04-1M7L-GE3	SQM200N04-1M7L_GE3
SQM200N04-1m8	SQM200N04-1M8-GE3	SQM200N04-1M8_GE3
SQM25N15-52	SQM25N15-52-GE3	SQM25N15-52_GE3
SQM35N30-97	SQM35N30-97-GE3	SQM35N30-97_GE3
SQM40N10-30	SQM40N10-30-GE3	SQM40N10-30_GE3
SQM40N15-38	SQM40N15-38-GE3	SQM40N15-38_GE3
SQM40P10-40L	SQM40P10-40L-GE3	SQM40P10-40L_GE3
SQM47N10-24L	SQM47N10-24L-GE3	SQM47N10-24L_GE3
SQM50020EL	-	SQM50020EL_GE3
SQM50N04-4m0L	SQM50N04-4M0L-GE3	SQM50N04-4M0L_GE3
SQM50N04-4m1	SQM50N04-4M1-GE3	SQM50N04-4M1_GE3
SQM50P03-07	SQM50P03-07-GE3	SQM50P03-07_GE3
SQM50P04-09L	SQM50P04-09L-GE3	SQM50P04-09L_GE3
SQM50P06-15L	SQM50P06-15L-GE3	SQM50P06-15L_GE3
SQM50P08-25L	SQM50P08-25L-GE3	SQM50P08-25L_GE3
SQM60N06-15	SQM60N06-15-GE3	SQM60N06-15_GE3
SQM60N20-35	SQM60N20-35-GE3	SQM60N20-35_GE3
SQM85N15-19	SQM85N15-19-GE3	SQM85N15-19_GE3
SQV120N10-3m8	SQV120N10-3m8-GE3	SQV120N10-3m8_GE3
SQV120N06-4m7L	-	SQV120N06-4m7L_GE3

Note

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



**TO-262: 3-LEAD**



Dim	MILLIMETERS*		INCHES	
	Min	Max	Min	Max
<b>A</b>	4.32	4.70	0.170	0.185
<b>b</b>	0.64	1.00	0.025	0.039
<b>b(1)</b>	1.14	1.40	0.045	0.055
<b>c</b>	0.36	0.50	0.014	0.020
<b>D</b>	8.64	9.65	0.340	0.380
<b>D1</b>	5.59	6.10	0.220	0.240
<b>e</b>	2.41	2.67	0.095	0.105
<b>e(1)</b>	4.95	5.33	0.195	0.210
<b>E</b>	10.03	10.41	0.395	0.410
<b>E1</b>	7.87	8.64	0.310	0.340
<b>E2</b>	9.02	9.53	0.355	0.375
<b>F</b>	1.14	1.40	0.045	0.055
<b>J1</b>	2.41	2.79	0.095	0.110
<b>L</b>	13.08	14.22	0.515	0.560
<b>L1</b>	-	3.81	-	0.150
<b>L2</b>	1.02	1.40	0.040	0.055

ECN: T-02234—Rev. C, 14-Oct-02  
DWG: 5855

\*Use millimeters as the primary measurement





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