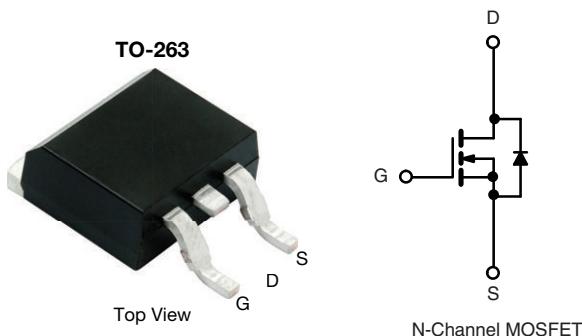


Automotive N-Channel 150 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY	
V _{DS} (V)	150
R _{DS(on)} (Ω) at V _{GS} = 10 V	0.019
I _D (A)	85
Configuration	Single
Package	TO-263

FEATURES

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



ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	150	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current	I _D	85	A
T _C = 25 °C		50	
Continuous Source Current (Diode Conduction) ^a	I _S	120	
Pulsed Drain Current ^b	I _{DM}	140	
Single Pulse Avalanche Current	I _{AS}	52	
Single Pulse Avalanche Energy	E _{AS}	135	mJ
Maximum Power Dissipation ^b	P _D	375	W
T _C = 125 °C		125	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to 175	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient	R _{thJA}	40	°C/W
Junction-to-Case (Drain)	R _{thJC}	0.4	

Notes

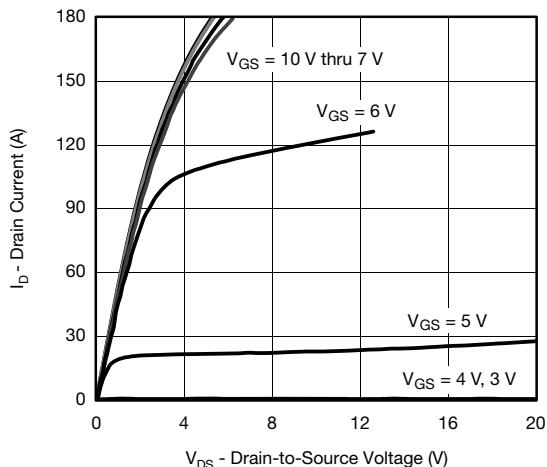
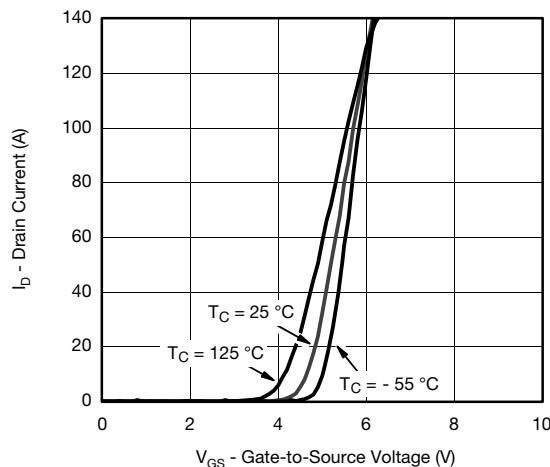
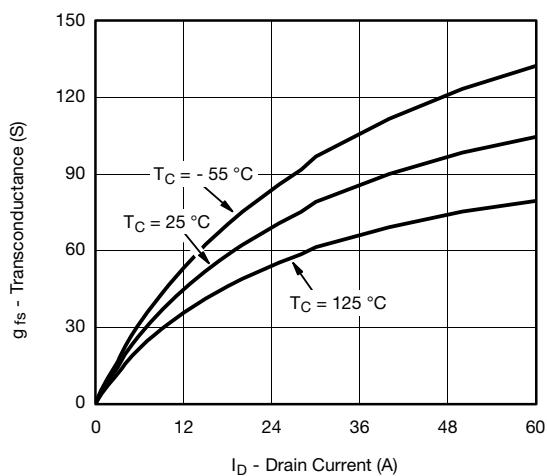
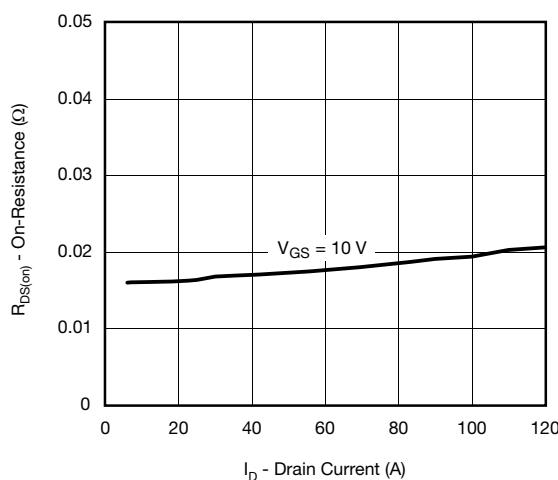
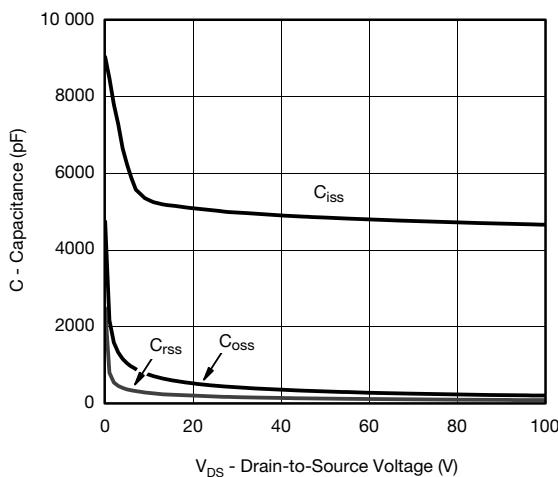
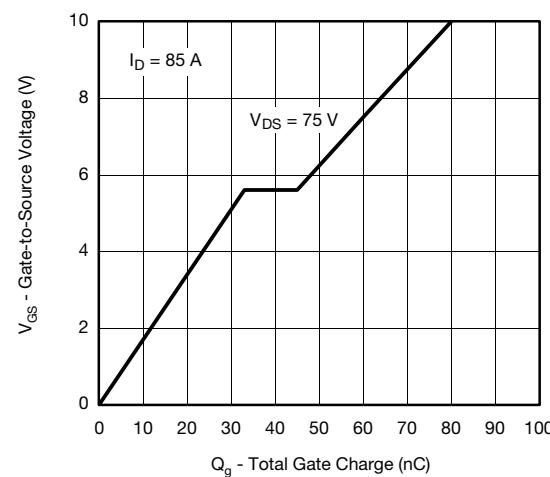
- Package limited.
- Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR4 material).
- Parametric verification ongoing.

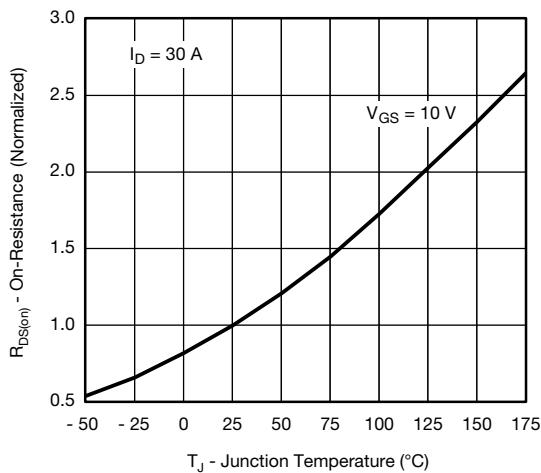
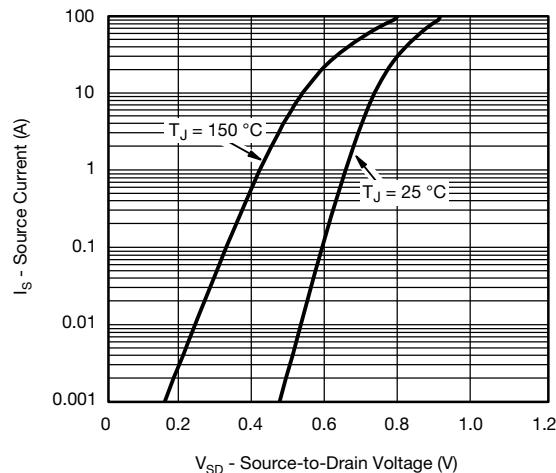
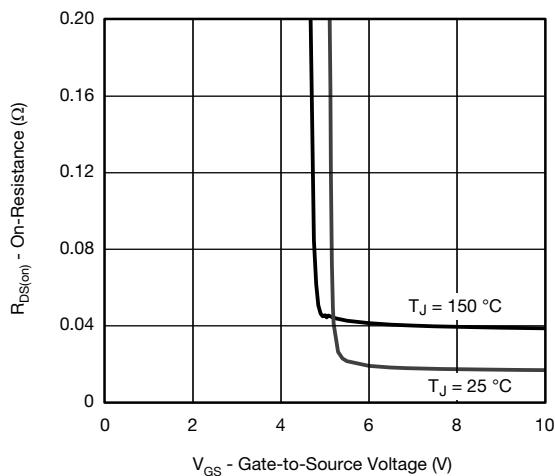
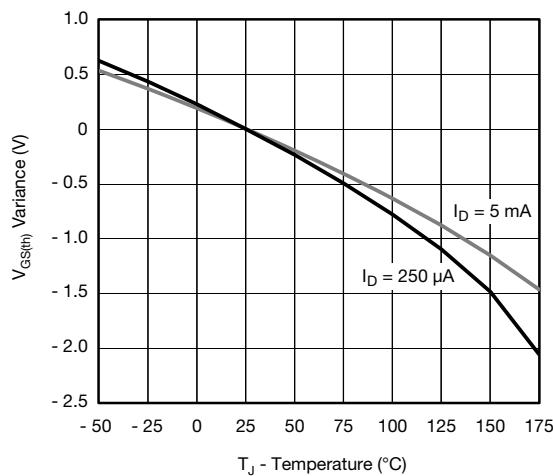
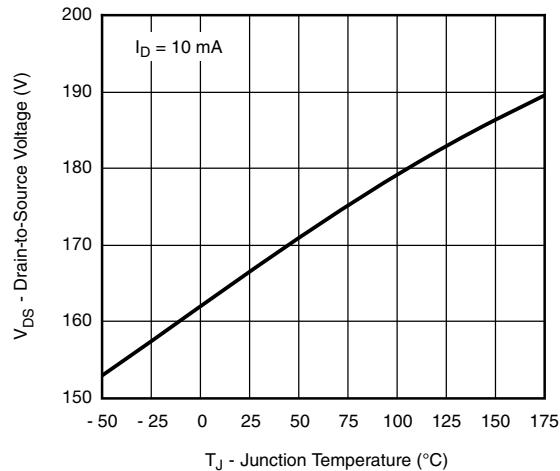
SPECIFICATIONS ($T_C = 25^\circ\text{C}$, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static								
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$		150	-	-	V	
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$		2.5	3.0	3.5		
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$		-	-	± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 150\text{ V}$	-	-	1	μA	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 150\text{ V}$, $T_J = 125^\circ\text{C}$	-	-	50		
		$V_{GS} = 0\text{ V}$	$V_{DS} = 150\text{ V}$, $T_J = 175^\circ\text{C}$	-	-	300		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	120	-	-	A	
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10\text{ V}$	$I_D = 30\text{ A}$	-	0.016	0.019	Ω	
		$V_{GS} = 10\text{ V}$	$I_D = 30\text{ A}$, $T_J = 125^\circ\text{C}$	-	-	0.039		
		$V_{GS} = 10\text{ V}$	$I_D = 30\text{ A}$, $T_J = 175^\circ\text{C}$	-	-	0.051		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 30\text{ A}$		-	79	-	S	
Dynamic ^b								
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	-	5026	6285	pF	
Output Capacitance	C_{oss}			-	450	565		
Reverse Transfer Capacitance	C_{rss}			-	216	270		
Total Gate Charge ^c	Q_g	$V_{GS} = 10\text{ V}$	$V_{DS} = 75\text{ V}$, $I_D = 85\text{ A}$	-	80	120	nC	
Gate-Source Charge ^c	Q_{gs}			-	33	-		
Gate-Drain Charge ^c	Q_{gd}			-	12	-		
Gate Resistance	R_g	$f = 1\text{ MHz}$		0.5	1.6	2.6	Ω	
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 75\text{ V}$, $R_L = 0.88\text{ }\Omega$ $I_D \approx 85\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\text{ }\Omega$		-	17	26	ns	
Rise Time ^c	t_r			-	24	36		
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			-	35	53		
Fall Time ^c	t_f			-	11	17		
Source-Drain Diode Ratings and Characteristics ^b								
Pulsed Current ^a	I_{SM}			-	-	140	A	
Forward Voltage	V_{SD}	$I_F = 85\text{ A}$, $V_{GS} = 0\text{ V}$		-	0.9	1.5	V	

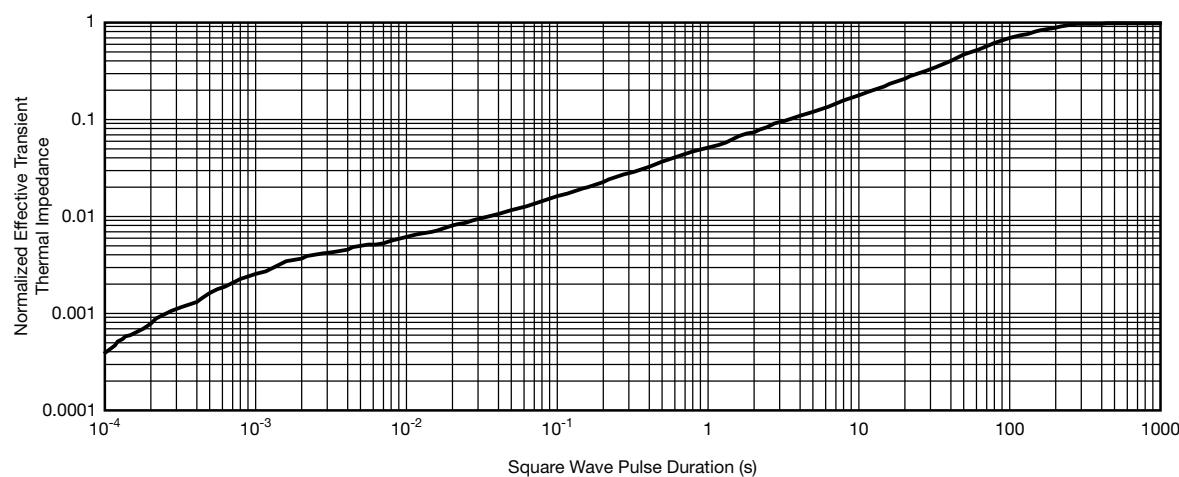
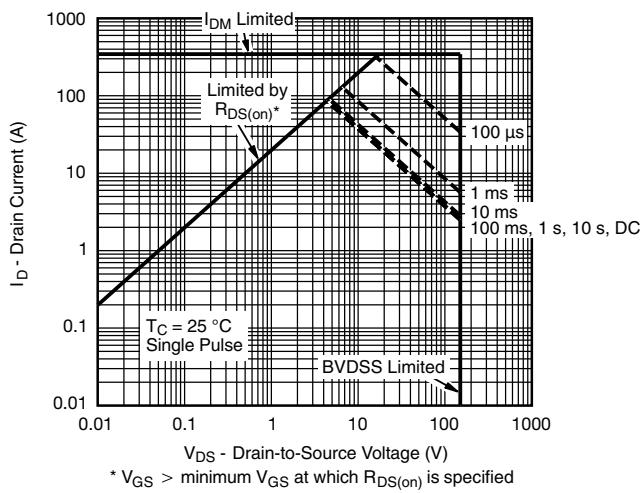
Notes

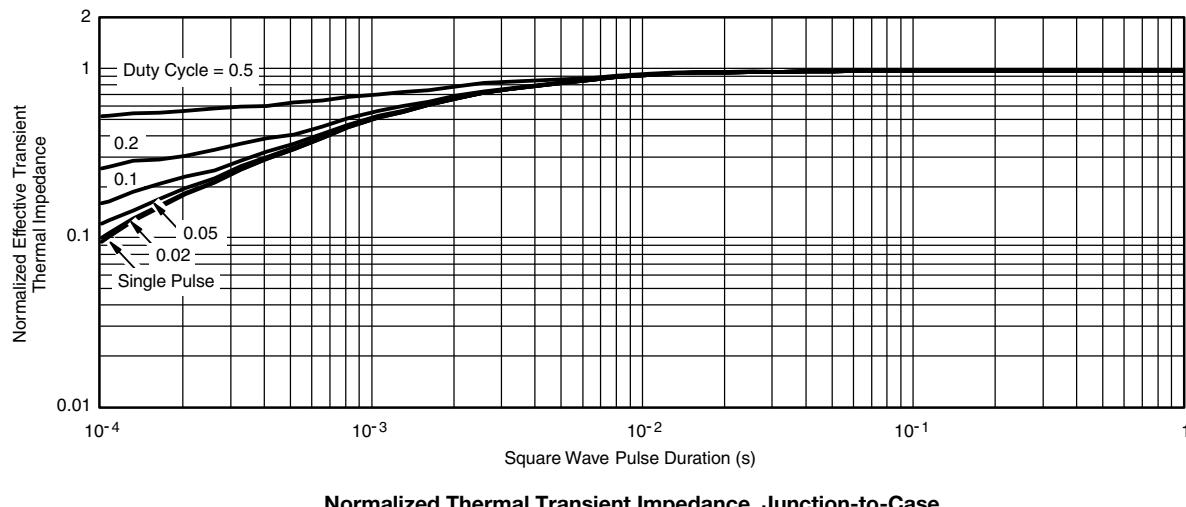
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\text{ \%}$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

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


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

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?68668.

REVISION HISTORY ^a

REVISION	DATE	DESCRIPTION OF CHANGE
E	14-Sep-15	• C_{rss} changed

Note

a. As of April 2014

D²PAK / TO-263 and TO-262

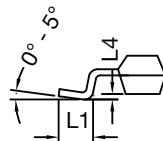
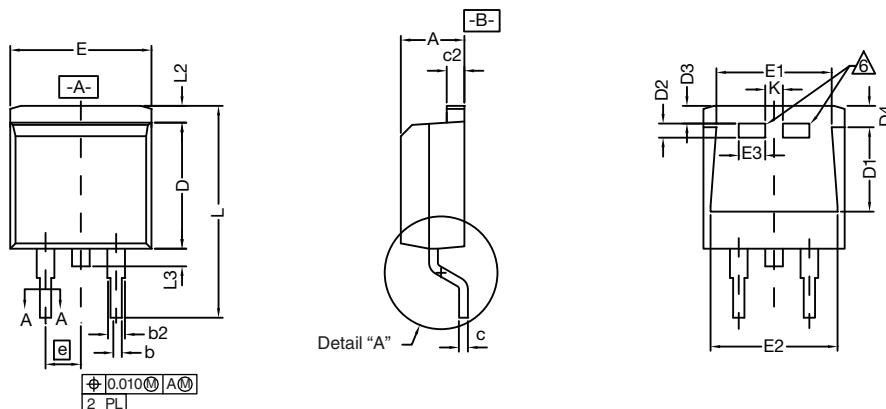
Ordering codes for the SQ rugged series power MOSFETs in the D²PAK / TO-263 and TO-262 packages:

DATASHEET PART NUMBER	OLD ORDERING CODE ^a	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
SQM120P10-10m1L	-	SQM120P10_10m1LGE3
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
SQM60030E	-	SQM60030E_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

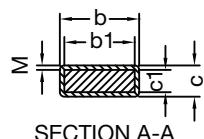
Note

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

TO-263 (D²PAK): 3-LEAD



DETAIL A (ROTATED 90°)

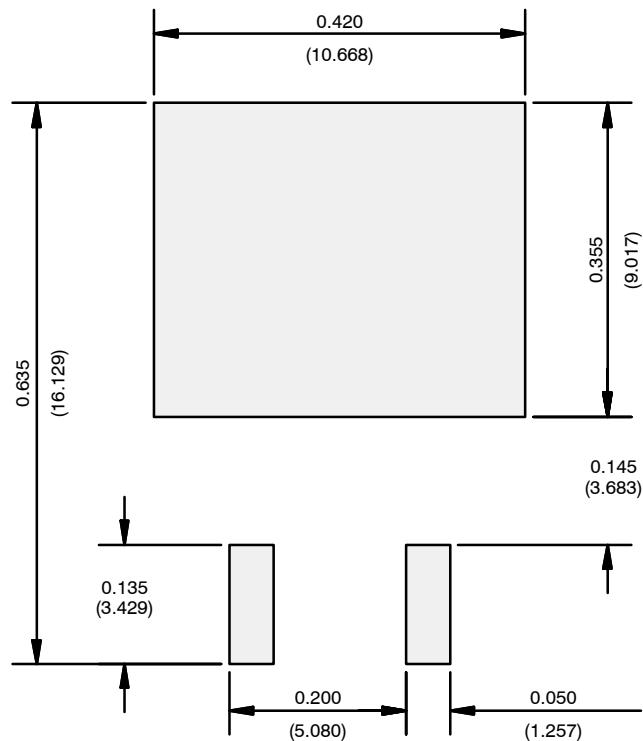


SECTION A-A

Notes

1. Plane B includes maximum features of heat sink tab and plastic.
2. No more than 25 % of L1 can fall above seating plane by max. 8 mils.
3. Pin-to-pin coplanarity max. 4 mils.
4. *: Thin lead is for SUB, SYB.
Thick lead is for SUM, SYM, SQM.
5. Use inches as the primary measurement.
6.  This feature is for thick lead.

DIM.	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
A	0.160	0.190	4.064	4.826	
b	0.020	0.039	0.508	0.990	
b1	0.020	0.035	0.508	0.889	
b2	0.045	0.055	1.143	1.397	
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2		0.045	0.055	1.143	1.397
D	0.340	0.380	8.636	9.652	
D1	0.220	0.240	5.588	6.096	
D2	0.038	0.042	0.965	1.067	
D3	0.045	0.055	1.143	1.397	
D4	0.044	0.052	1.118	1.321	
E	0.380	0.410	9.652	10.414	
E1	0.245	-	6.223	-	
E2	0.355	0.375	9.017	9.525	
E3	0.072	0.078	1.829	1.981	
e		0.100 BSC		2.54 BSC	
K	0.045	0.055	1.143	1.397	
L	0.575	0.625	14.605	15.875	
L1	0.090	0.110	2.286	2.794	
L2	0.040	0.055	1.016	1.397	
L3	0.050	0.070	1.270	1.778	
L4		0.010 BSC		0.254 BSC	
M	-	0.002	-	0.050	
ECN: T13-0707-Rev. K, 30-Sep-13					
DWG: 5843					

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead

Recommended Minimum Pads
Dimensions in Inches/(mm)

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