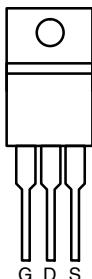


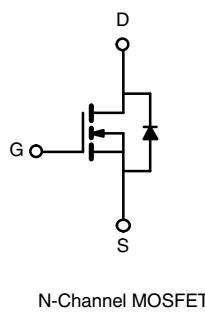
## Automotive N-Channel 100 V (D-S) 175 °C MOSFET

<b>PRODUCT SUMMARY</b>	
$V_{DS}$ (V)	100
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 10$ V	0.0038
$I_D$ (A)	120
Configuration	Single

TO-220



Top View



### ORDERING INFORMATION

Package	TO-220
Lead (Pb)-free and Halogen-free	SQP120N10-3m8-GE3

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

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		$V_{DS}$	100	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current	$T_C = 25$ °C <sup>a</sup>	$I_D$	120	A
	$T_C = 125$ °C		102	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	120	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	480	
Single Pulse Avalanche Current	$L = 0.1$ mH	$I_{AS}$	73	mA
Single Pulse Avalanche Energy		$E_{AS}$	266	
Maximum Power Dissipation <sup>b</sup>	$T_C = 25$ °C	$P_D$	250	W
	$T_C = 125$ °C		83	
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 <sup>c</sup>	$R_{thJA}$	40	°C/W
Junction-to-Case (Drain)		$R_{thJC}$	0.6	

#### Notes

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

AUTOMOTIVE GRADE

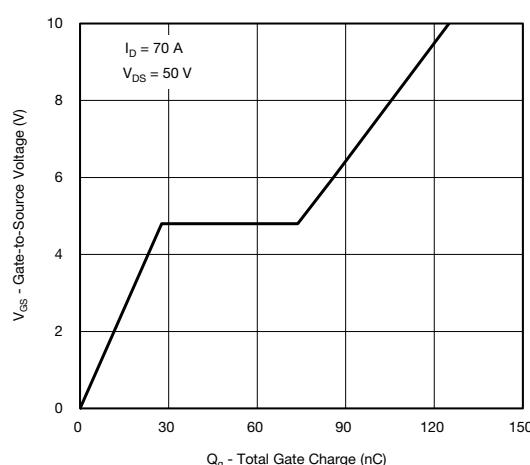
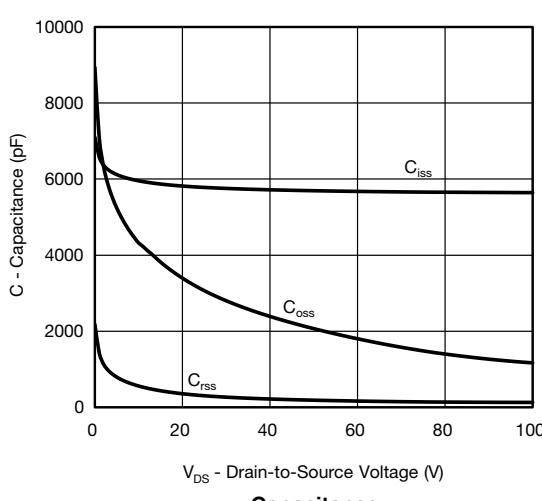
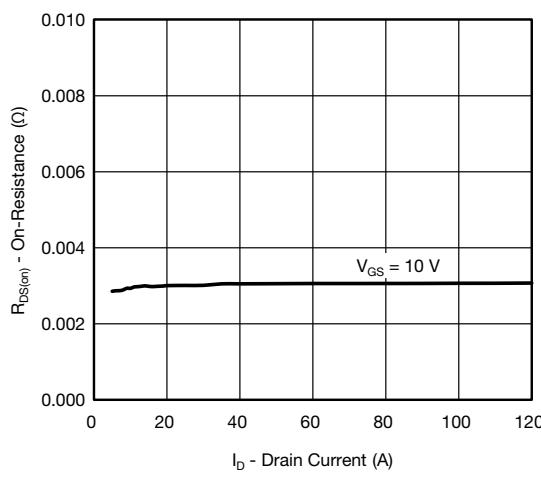
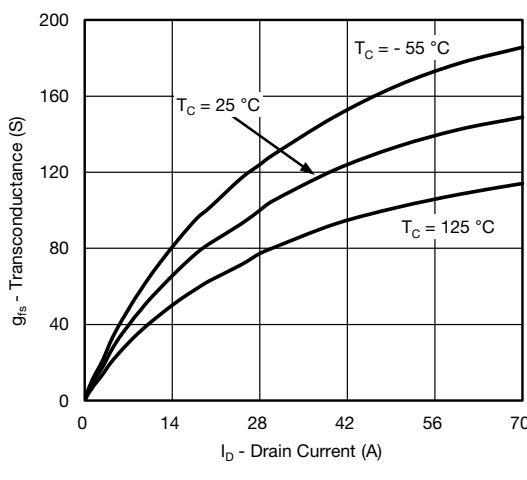
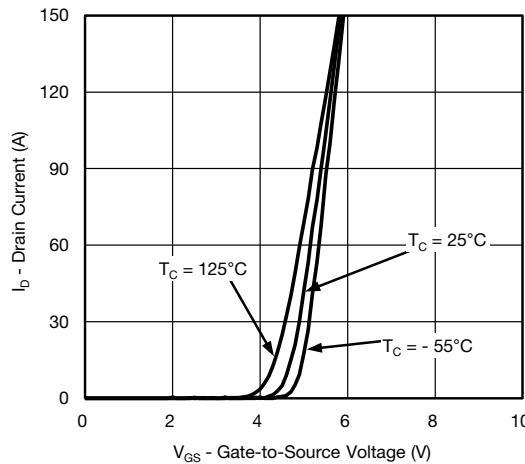
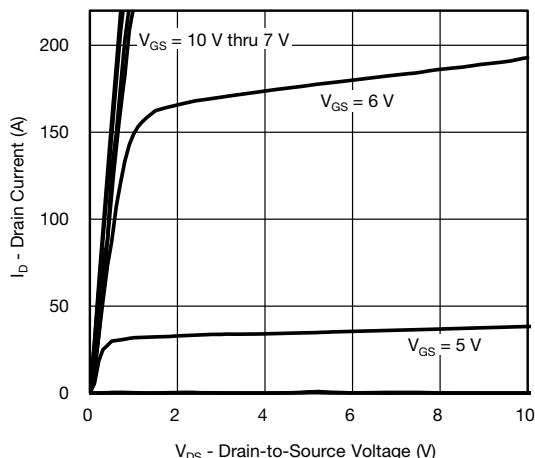

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

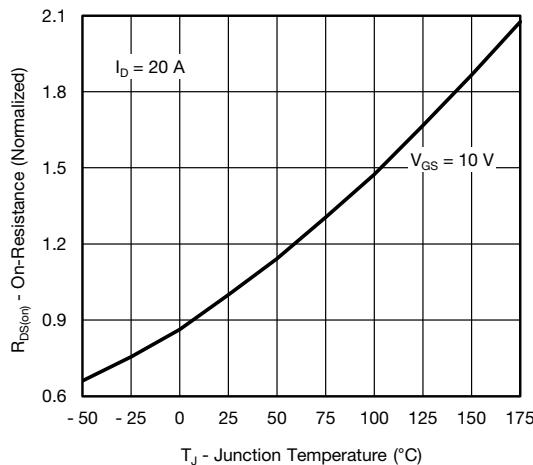
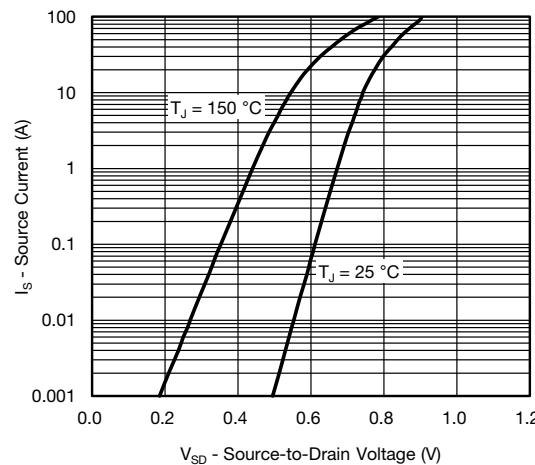
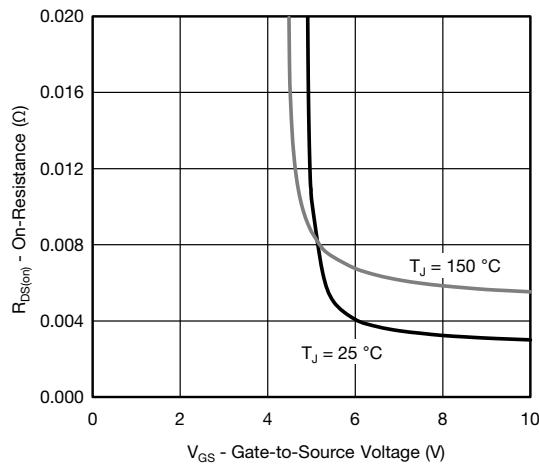
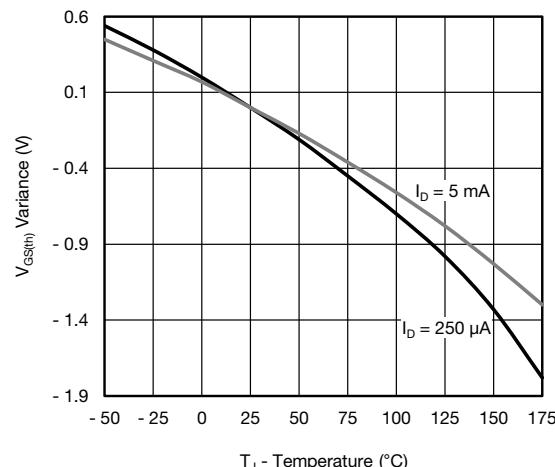
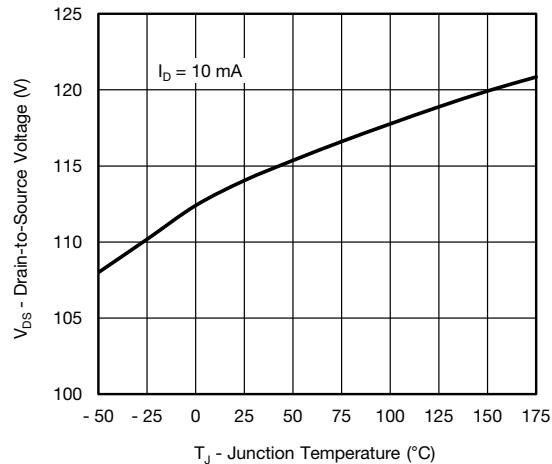
<b>SPECIFICATIONS</b> ( $T_C = 25^\circ\text{C}$ , unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
<b>Static</b>								
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0$ , $I_D = 250 \mu\text{A}$		100	-	-	V	
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$		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	$\mu\text{A}$	
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 100 \text{ V}$ , $T_J = 125^\circ\text{C}$	-	-	50		
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 100 \text{ V}$ , $T_J = 175^\circ\text{C}$	-	-	500		
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{GS} = 10 \text{ V}$	$V_{DS} \geq 5 \text{ V}$	120	-	-	A	
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$	-	0.0030	0.0038	$\Omega$	
		$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$ , $T_J = 125^\circ\text{C}$	-	-	0.0064		
		$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$ , $T_J = 175^\circ\text{C}$	-	-	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	pF	
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>	$t_{d(\text{on})}$	$V_{DD} = 50 \text{ V}$ , $R_L = 0.7 \Omega$ $I_D \cong 70 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_g = 1 \Omega$		-	16	25	ns	
Rise Time <sup>c</sup>	$t_r$			-	110	165		
Turn-Off Delay Time <sup>c</sup>	$t_{d(\text{off})}$			-	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	

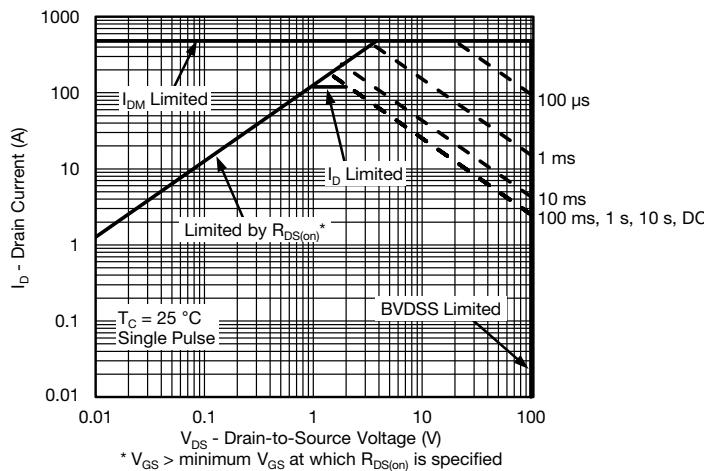
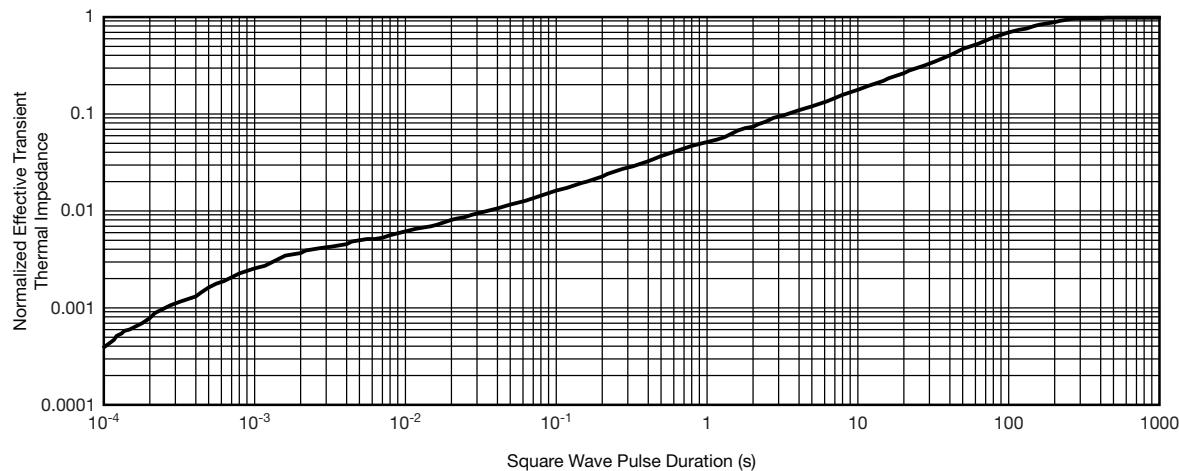
**Notes**

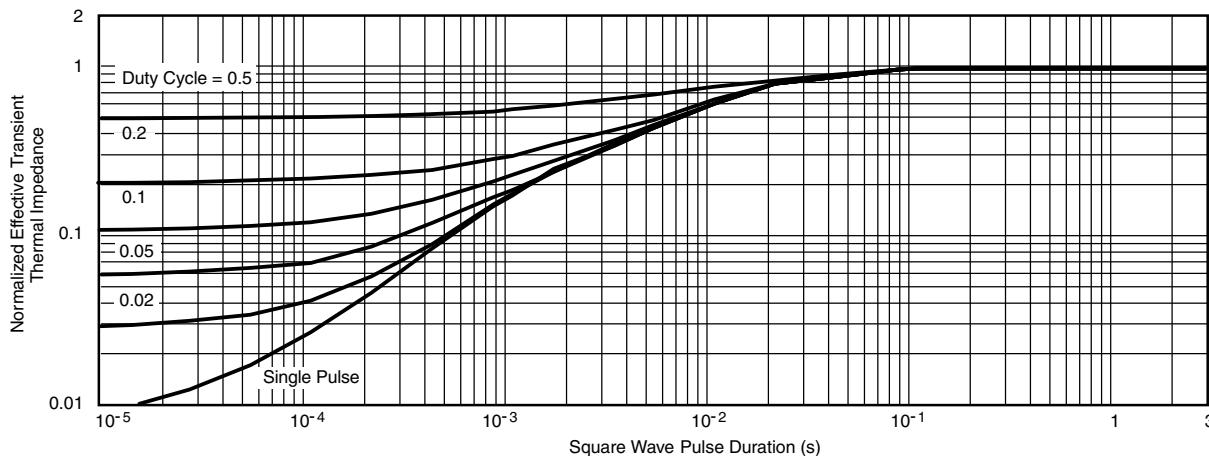
- a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2 \%$ .
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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


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

**Safe Operating Area**

**Normalized Thermal Transient Impedance, Junction-to-Ambient**

**THERMAL RATINGS** ( $T_A = 25^\circ\text{C}$ , 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 ( $25^\circ\text{C}$ )
  - Normalized Transient Thermal Impedance Junction to Case ( $25^\circ\text{C}$ )

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?63403](http://www.vishay.com/ppg?63403).



## TO-220

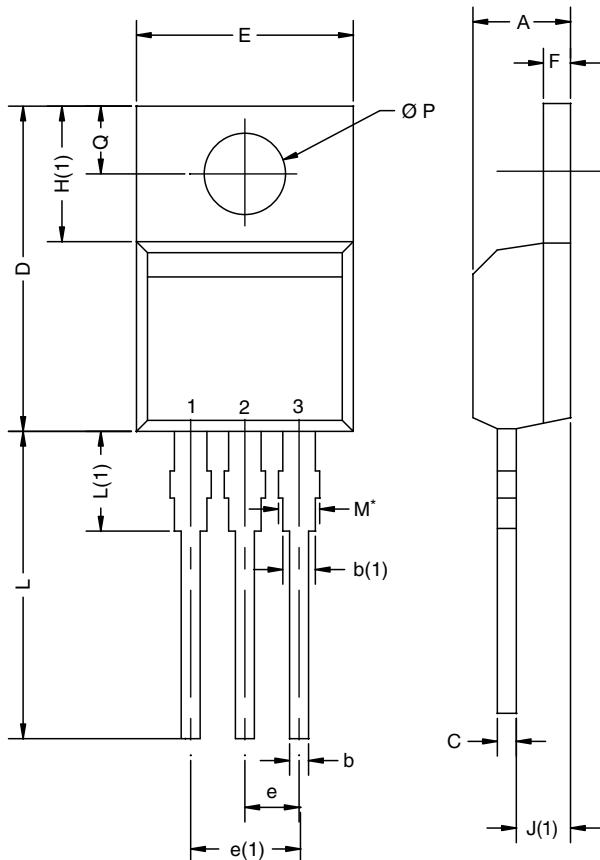
Ordering codes for the SQ rugged series power MOSFETs in the TO-220 package:

DATASHEET PART NUMBER	OLD ORDERING CODE <sup>a</sup>	NEW ORDERING CODE
SQP100N04-3m6	-	SQP100N04-3M6_GE3
SQP100P06-9m3L	-	SQP100P06-9M3L_GE3
SQP120N06-06	-	SQP120N06-06_GE3
SQP120N06-3m5L	SQP120N06-3M5L-GE3	SQP120N06-3M5L_GE3
SQP120N10-09	SQP120N10-09-GE3	SQP120N10-09_GE3
SQP120N10-3m8	SQP120N10-3M8-GE3	SQP120N10-3M8_GE3
SQP25N15-52	-	SQP25N15-52_GE3
SQP50N06-09L	SQP50N06-09L-GE3	SQP50N06-09L_GE3
SQP50P03-07	SQP50P03-07-GE3	SQP50P03-07_GE3
SQP60N06-15	SQP60N06-15-GE3	SQP60N06-15_GE3
SQP90P06-07L	SQP90P06-07L-GE3	SQP90P06-07L_GE3

**Note**

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

### TO-220AB

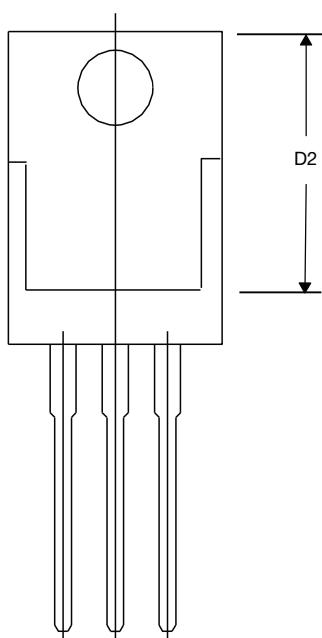


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: T14-0413-Rev. P, 16-Jun-14  
DWG: 5471

**Note**

\* M = 1.32 mm to 1.62 mm (dimension including protrusion)  
Heatsink hole for HVM





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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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Факс: 8 (812) 320-02-42

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