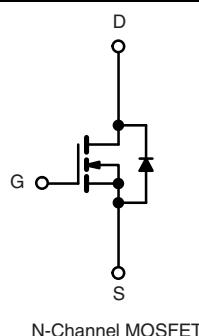
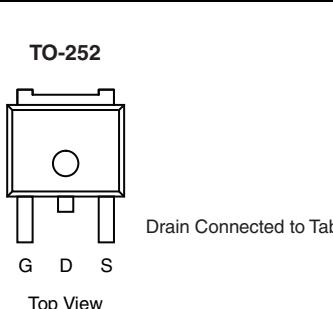


PRODUCT SUMMARY	
$V_{DS}$ (V)	40
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 10$ V	0.010
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 4.5$ V	0.014
$I_D$ (A)	42
Configuration	Single


**FEATURES**

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- Package with Low Thermal Resistance
- 100 %  $R_g$  and UIS Tested
- AEC-Q101 Qualified<sup>d</sup>
- Compliant to RoHS Directive 2002/95/EC



ORDERING INFORMATION	
Package	TO-252
Lead (Pb)-free and Halogen-free	SQD40N04-10A-GE3

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25$ °C, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$I_D$ ( $T_C = 25$ °C)	42	A
	$I_D$ ( $T_C = 125$ °C)	35	
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	42	
Pulsed Drain Current <sup>b</sup>	$I_{DM}$	168	
Single Pulse Avalanche Current	$I_{AS}$	30	
Single Pulse Avalanche Energy	$E_{AS}$	45	mJ
Maximum Power Dissipation <sup>b</sup>	$P_D$ ( $T_C = 25$ °C)	71	W
	$P_D$ ( $T_C = 125$ °C)	24	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to + 175	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient	$R_{thJA}$	50	°C/W
Junction-to-Case (Drain)	$R_{thJC}$	2.1	

**Notes**

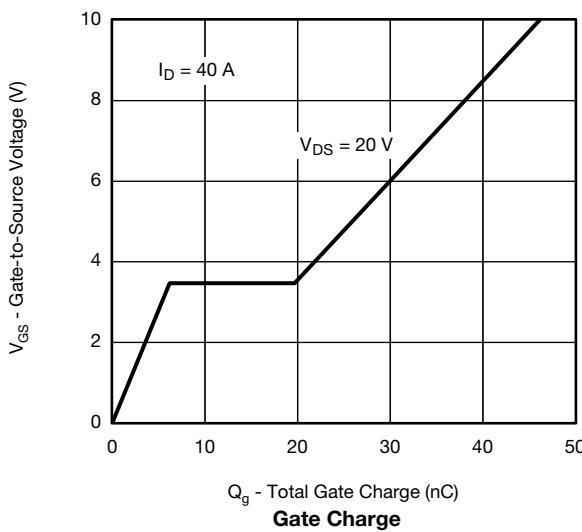
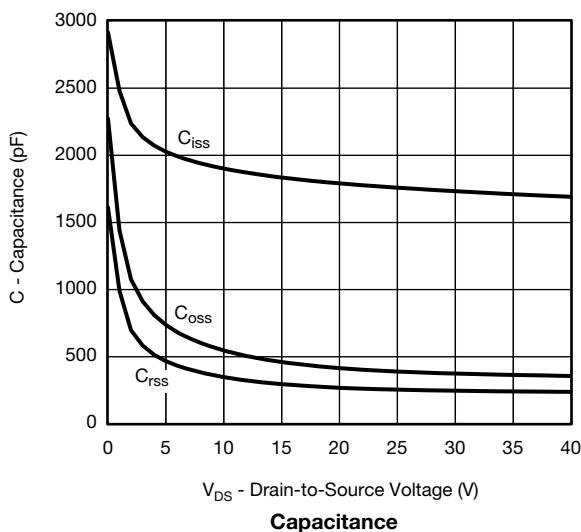
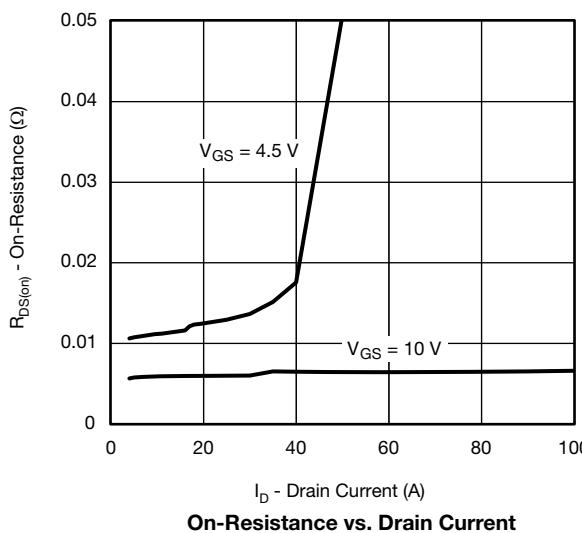
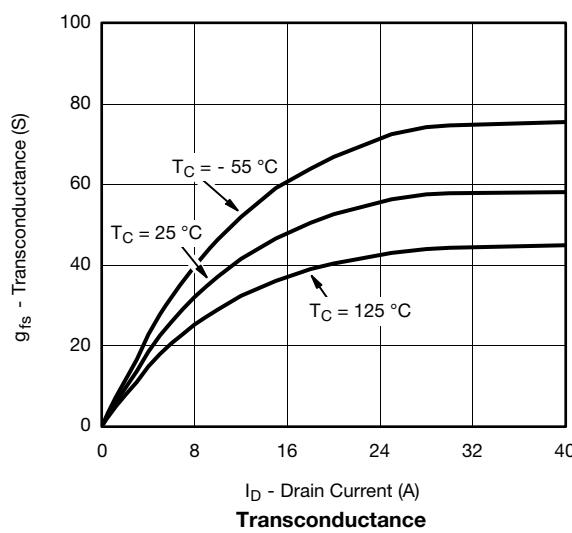
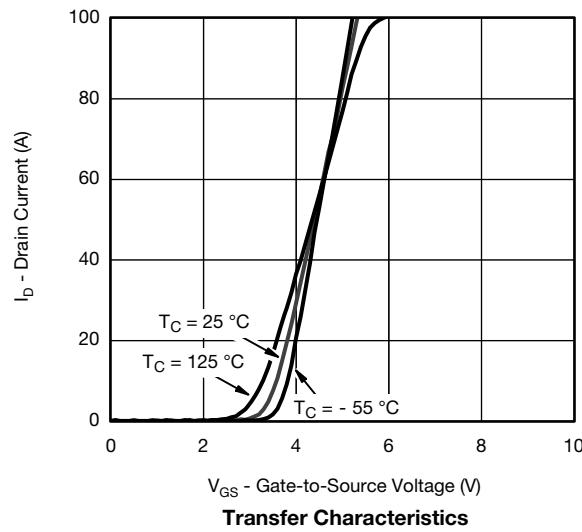
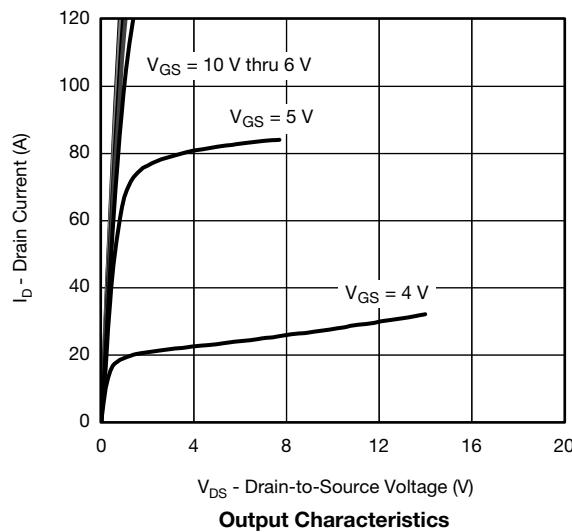
- Package limited.
- Pulse test; pulse width  $\leq 300$   $\mu$ s, duty cycle  $\leq 2$  %.
- When mounted on 1" square PCB (FR-4 material).
- Parametric verification ongoing.

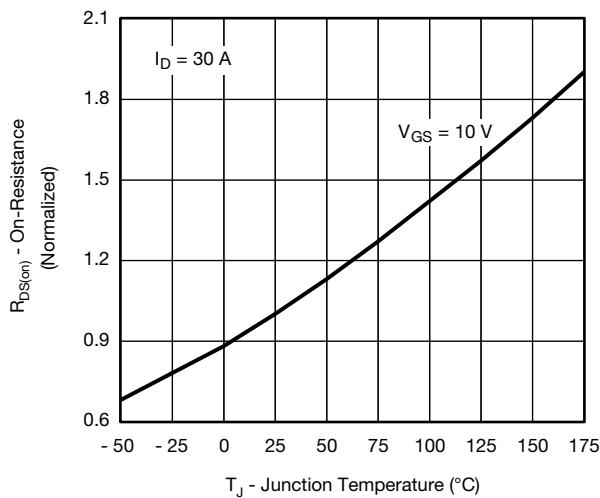
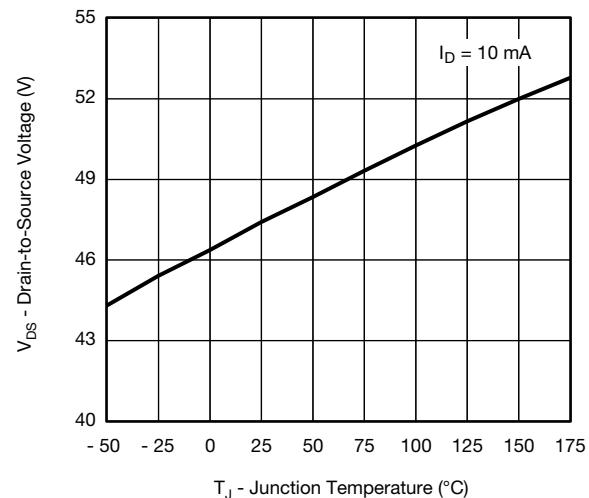
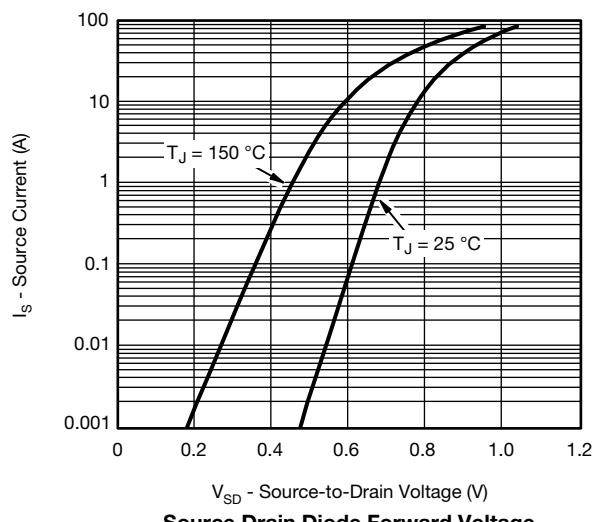
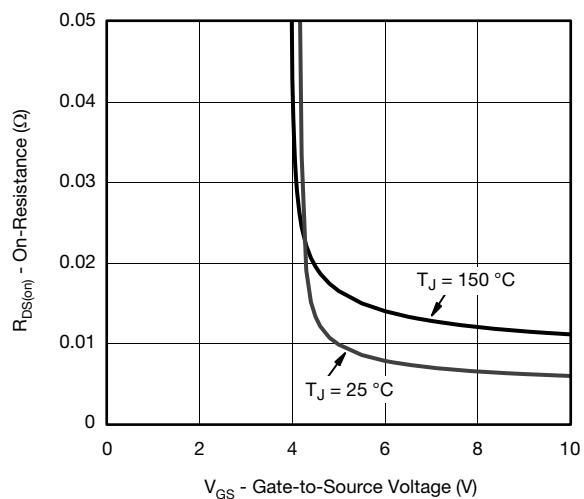
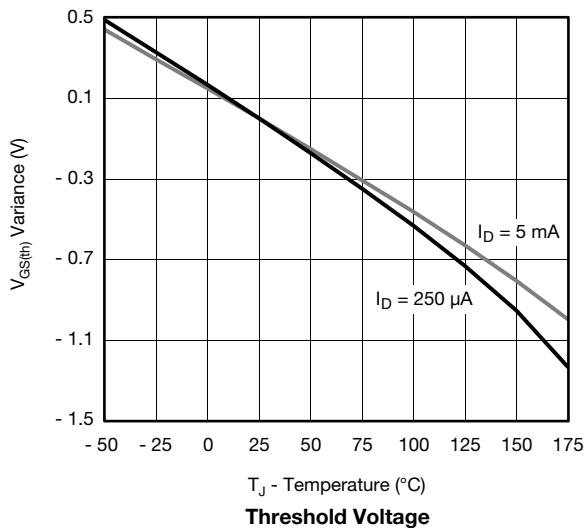
<b>SPECIFICATIONS</b> ( $T_C = 25^\circ\text{C}$ , unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
<b>Static</b>								
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$		40	-	-	V	
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$		1.5	2.0	2.5		
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}$ , $V_{GS} = \pm 20 \text{ V}$		-	-	$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0 \text{ V}$	$V_{DS} = 40 \text{ V}$	-	-	1.0	$\mu\text{A}$	
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 40 \text{ V}$ , $T_J = 125^\circ\text{C}$	-	-	50		
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 40 \text{ V}$ , $T_J = 175^\circ\text{C}$	-	-	150		
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{GS} = 10 \text{ V}$	$V_{DS} \geq 5 \text{ V}$	50	-	-	A	
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$	-	0.006	0.010	$\Omega$	
		$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$ , $T_J = 125^\circ\text{C}$	-	-	0.016		
		$V_{GS} = 10 \text{ V}$	$I_D = 20 \text{ A}$ , $T_J = 175^\circ\text{C}$	-	-	0.019		
		$V_{GS} = 4.5 \text{ V}$	$I_D = 20 \text{ A}$	-	0.011	0.014		
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}$ , $I_D = 40 \text{ A}$		-	58	-	S	
<b>Dynamic<sup>b</sup></b>								
Input Capacitance	$C_{iss}$	$V_{GS} = 0 \text{ V}$	$V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$	-	1755	2190	pF	
Output Capacitance	$C_{oss}$			-	385	480		
Reverse Transfer Capacitance	$C_{rss}$			-	250	315		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{GS} = 10 \text{ V}$	$V_{DS} = 20 \text{ V}$ , $I_D = 40 \text{ A}$	-	46	70	nC	
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			-	6.2	-		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			-	13.5	-		
Gate Resistance	$R_g$	$f = 1 \text{ MHz}$		1.1	2.2	3.3	$\Omega$	
Turn-On Delay Time <sup>c</sup>	$t_{d(\text{on})}$	$V_{DD} = 20 \text{ V}$ , $R_L = 0.5 \Omega$ $I_D \approx 40 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_g = 1 \Omega$		-	7	10	ns	
Rise Time <sup>c</sup>	$t_r$			-	10	15		
Turn-Off Delay Time <sup>c</sup>	$t_{d(\text{off})}$			-	25	37		
Fall Time <sup>c</sup>	$t_f$			-	9	14		
<b>Source-Drain Diode Ratings and Characteristics<sup>b</sup></b>								
Pulsed Current <sup>a</sup>	$I_{SM}$			-	-	168	A	
Forward Voltage	$V_{SD}$	$I_F = 40 \text{ A}$ , $V_{GS} = 0 \text{ V}$		-	0.8	1.2	V	

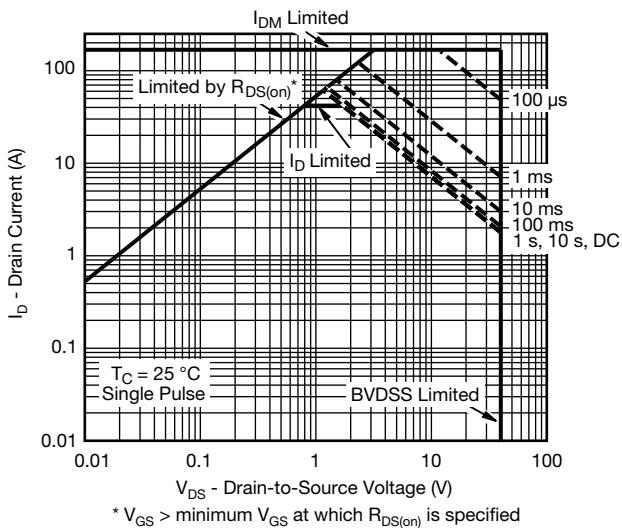
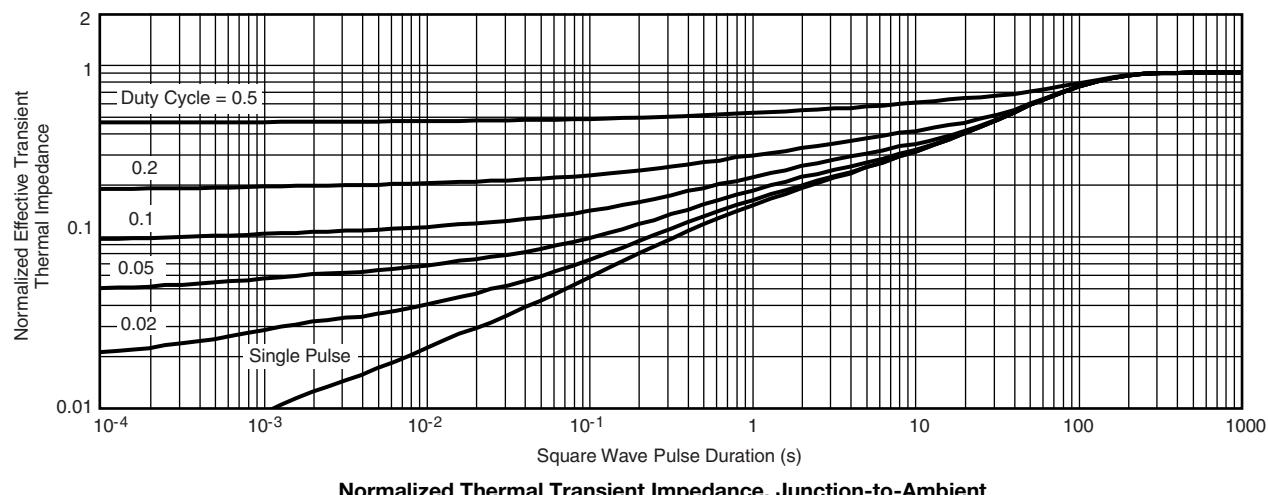
**Notes**

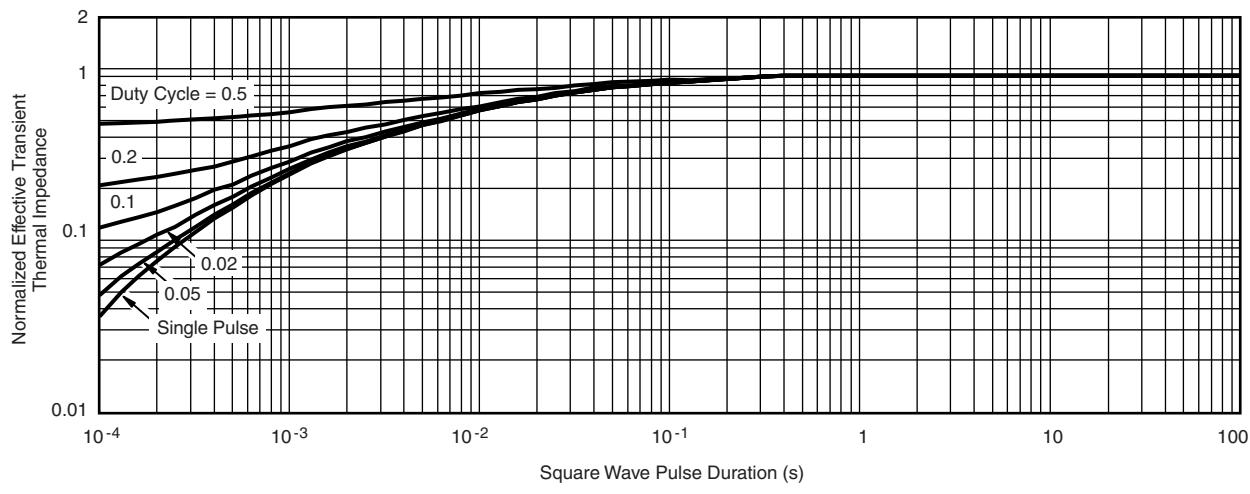
- a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2 \%$ .
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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**

**Drain Source Breakdown vs. Junction Temperature**

**Source Drain Diode Forward Voltage**

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

**Threshold Voltage**

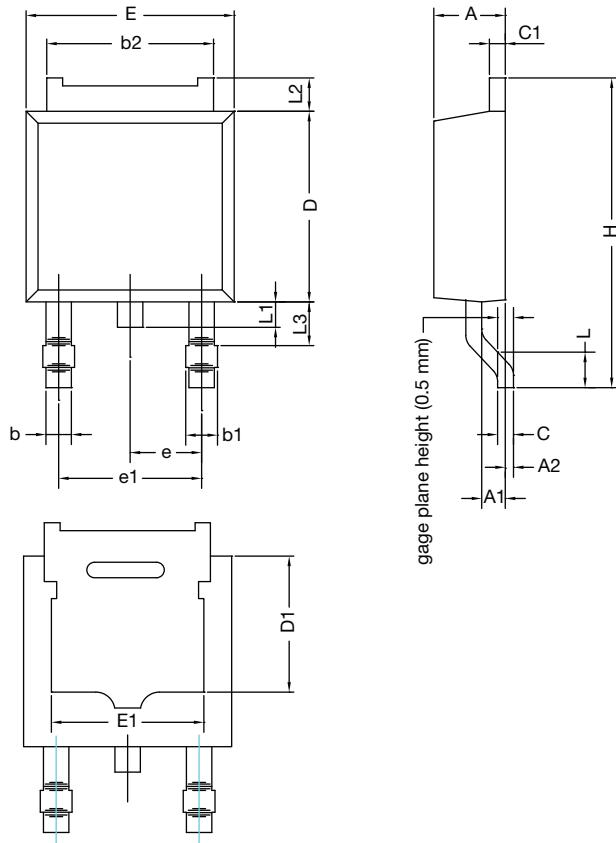
**THERMAL RATINGS** ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

**Safe Operating Area**


**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.

**TO-252AA CASE OUTLINE**



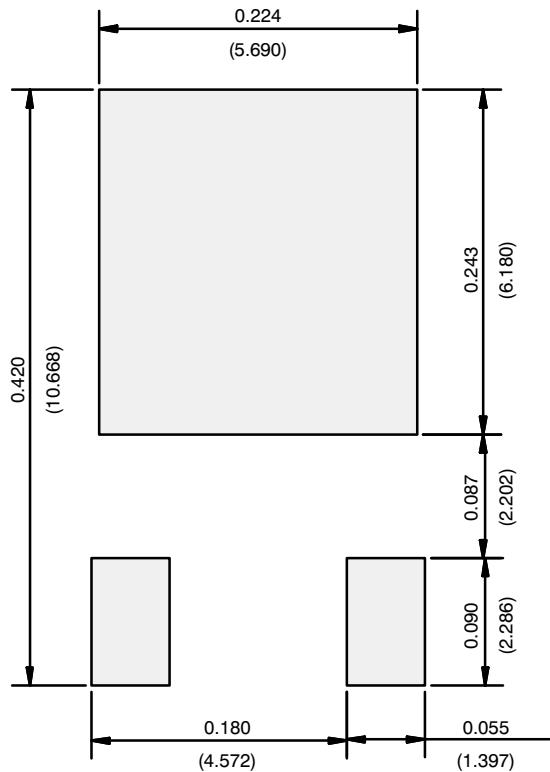
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.21	2.38	0.087	0.094
A1	0.89	1.14	0.035	0.045
A2	0.030	0.127	0.001	0.005
b	0.71	0.88	0.028	0.035
b1	0.76	1.14	0.030	0.045
b2	5.23	5.44	0.206	0.214
C	0.46	0.58	0.018	0.023
C1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.10	4.45	0.161	0.175
E	6.48	6.73	0.255	0.265
E1	4.49	5.50	0.177	0.217
e	2.28 BSC		0.090 BSC	
e1	4.57 BSC		0.180 BSC	
H	9.65	10.41	0.380	0.410
L	1.40	1.78	0.055	0.070
L1	0.64	1.02	0.025	0.040
L2	0.89	1.27	0.035	0.050
L3	1.15	1.52	0.040	0.060

ECN: T11-0110-Rev. L, 18-Apr-11  
DWG: 5347

**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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