

# BUK9E08-55B,127-VB Datasheet

## N-Channel 60 V (D-S) 175 °C MOSFET

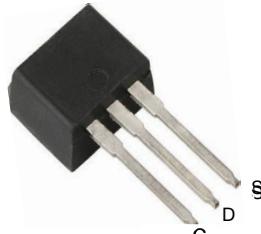
PRODUCT SUMMARY	
$V_{DS}$ (V)	60
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 10$ V	0.006
$I_D$ (A)	120
Configuration	Single
Package	TO-262

### FEATURES

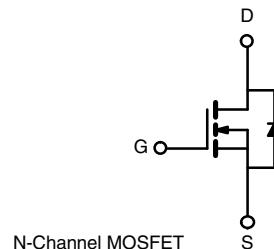
- Trench power MOSFET
- Package with low thermal resistance
- AEC-Q101 qualified <sup>d</sup>
- 100 %  $R_g$  and UIS tested



TO-262



Top View



ABSOLUTE MAXIMUM RATINGS ( $T_C = 25$ °C, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current	$I_D$	120	A
		80	
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	120	
Pulsed Drain Current <sup>b</sup>	$I_{DM}$	480	
Single Pulse Avalanche Current	$I_{AS}$	65	mJ
Single Pulse Avalanche Energy	$E_{AS}$	211	
Maximum Power Dissipation <sup>b</sup>	$P_D$	230	W
		76	
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)	$R_{thJC}$	0.65	

#### Notes

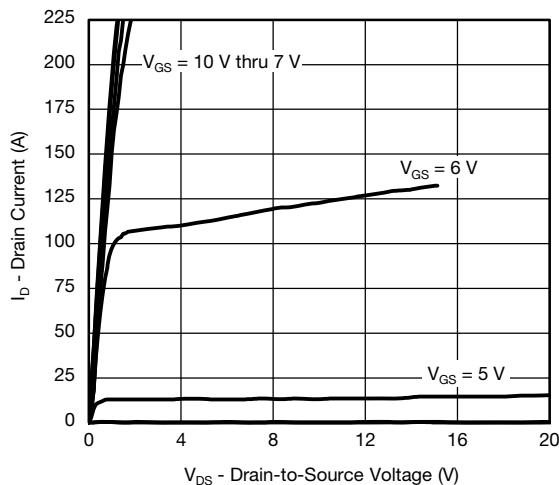
- Package limited.
- Pulse test; pulse width  $\leq 300$   $\mu$ s, duty cycle  $\leq 2$  %.
- When mounted on 1" square PCB (FR4 material).
- Parametric verification ongoing.

<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	$V_{DS}$	$V_{GS} = 0$ , $I_D = 250 \mu\text{A}$		60	-	-	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	$I_{DSS}$	$V_{GS} = 0 \text{ V}$	$V_{DS} = 60 \text{ V}$	-	-	1	$\mu\text{A}$	
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 60 \text{ V}$ , $T_J = 125^\circ\text{C}$	-	-	50		
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 60 \text{ V}$ , $T_J = 175^\circ\text{C}$	-	-	250		
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>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$	$I_D = 30 \text{ A}$	-	0.0060	-	$\Omega$	
		$V_{GS} = 10 \text{ V}$	$I_D = 30 \text{ A}$ , $T_J = 125^\circ\text{C}$	-	0.0104	-		
		$V_{GS} = 10 \text{ V}$	$I_D = 30 \text{ A}$ , $T_J = 175^\circ\text{C}$	-	0.0129	-		
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}$ , $I_D = 30 \text{ A}$		-	94	-	S	
<b>Dynamic</b> <sup>b</sup>								
Input Capacitance	$C_{iss}$	$V_{GS} = 0 \text{ V}$	$V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$	-	5196	6495	pF	
Output Capacitance	$C_{oss}$			-	708	885		
Reverse Transfer Capacitance	$C_{rss}$			-	336	420		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{GS} = 10 \text{ V}$	$V_{DS} = 30 \text{ V}$ , $I_D = 75 \text{ A}$	-	96.5	145	nC	
Gate-Source Charge	$Q_{gs}$			-	24.6	-		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			-	27.2	-		
Gate Resistance	$R_g$	$f = 1 \text{ MHz}$		0.3	1	1.7	$\Omega$	
Turn-On Delay Time <sup>c</sup>	$t_{d(\text{on})}$	$V_{DD} = 30 \text{ V}$ , $R_L = 0.4 \Omega$ $I_D \geq 75 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_g = 1 \Omega$		-	16	24	ns	
Rise Time <sup>c</sup>	$t_r$			-	14	21		
Turn-Off Delay Time <sup>c</sup>	$t_{d(\text{off})}$			-	34	51		
Fall Time <sup>c</sup>	$t_f$			-	9	14		
<b>Source-Drain Diode Ratings and Characteristics</b> <sup>b</sup>								
Pulsed Current <sup>a</sup>	$I_{SM}$			-	-	480	A	
Forward Voltage	$V_{SD}$	$I_F = 75 \text{ A}$ , $V_{GS} = 0$		-	0.9	1.5	V	

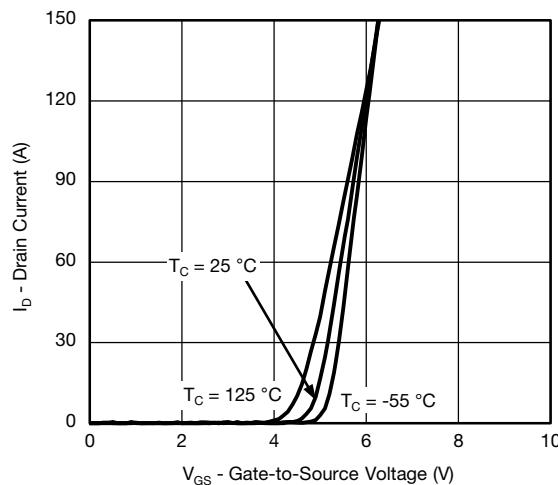
**Notes**

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

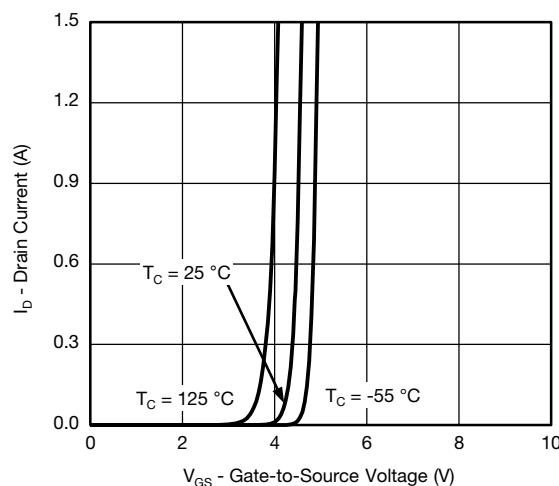
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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


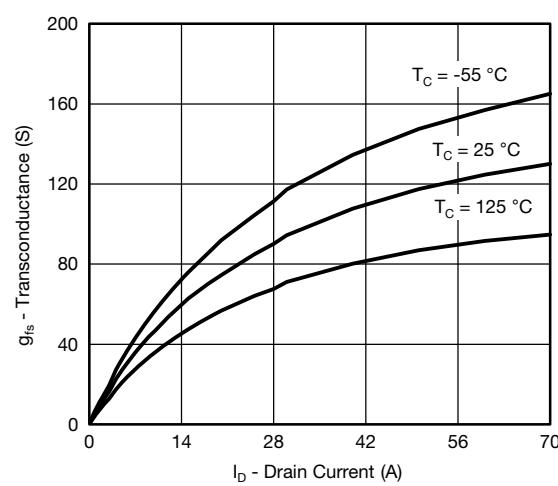
Output Characteristics



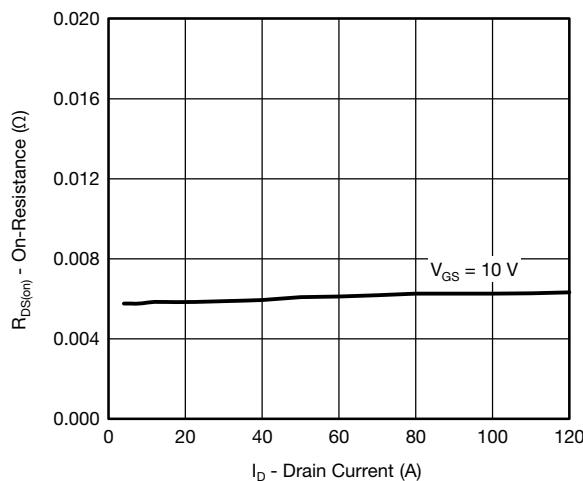
Transfer Characteristics



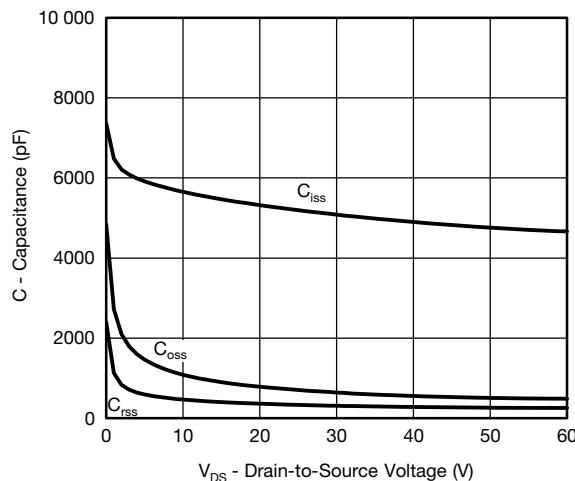
Transfer Characteristics



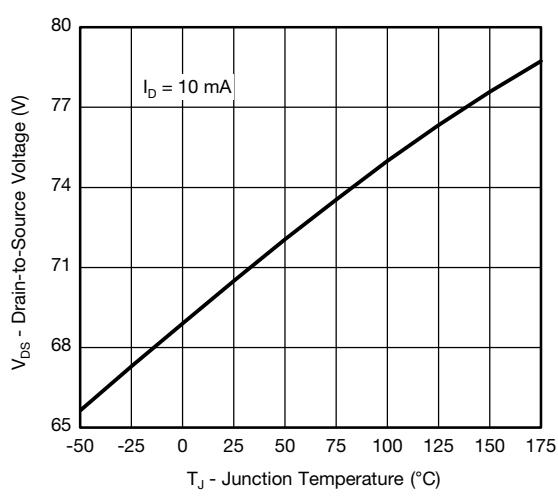
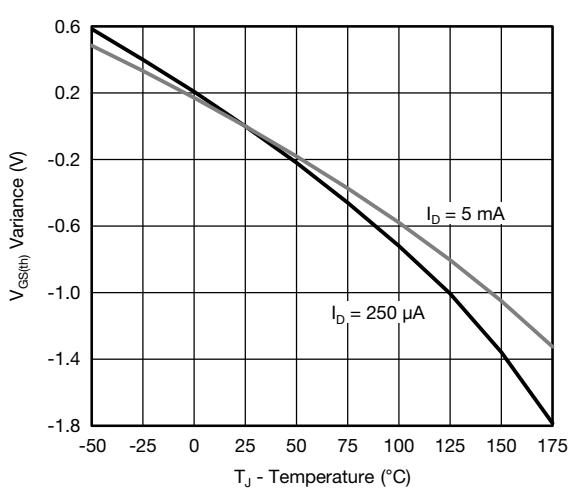
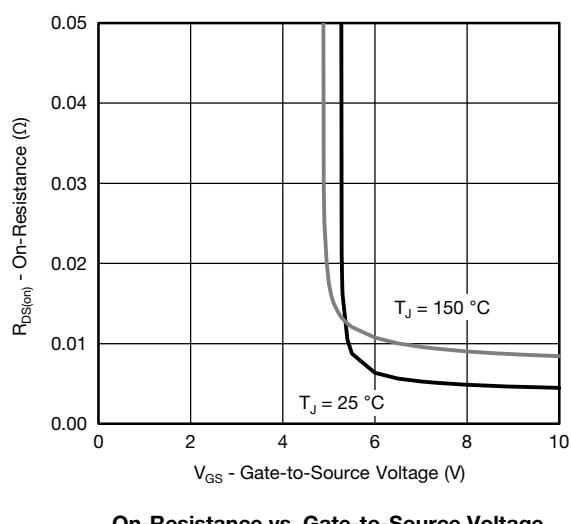
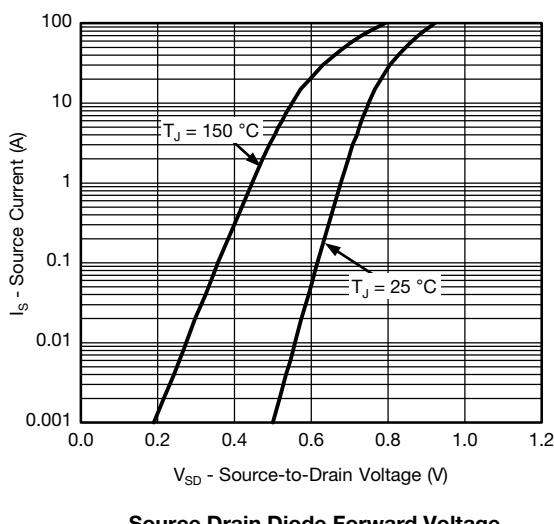
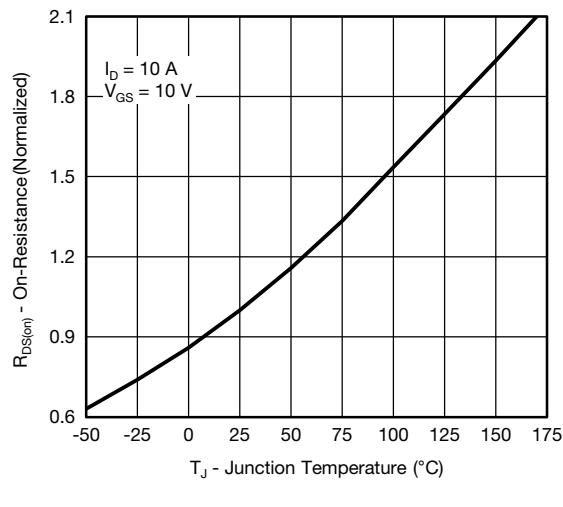
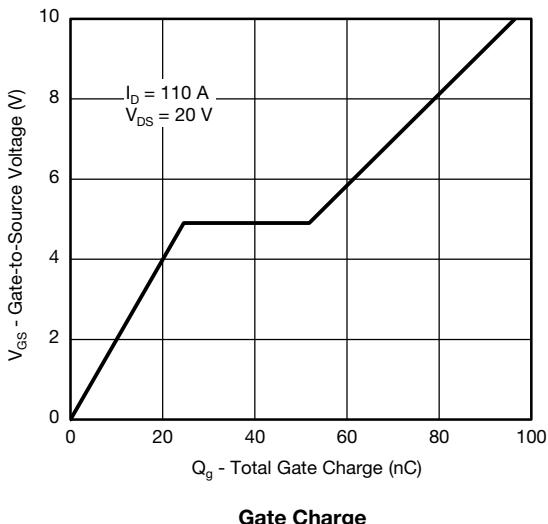
Transconductance

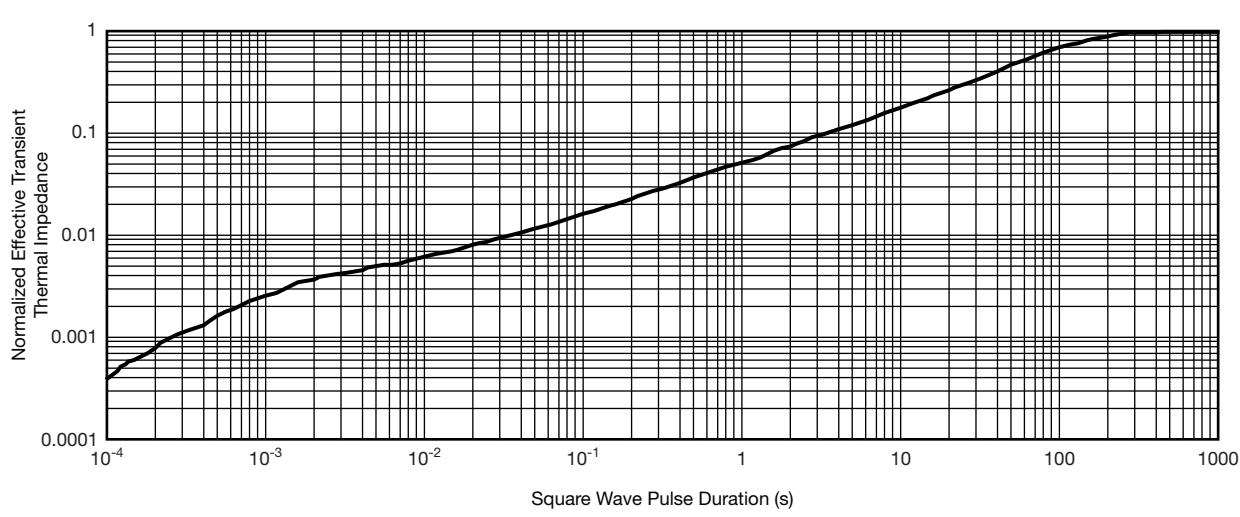
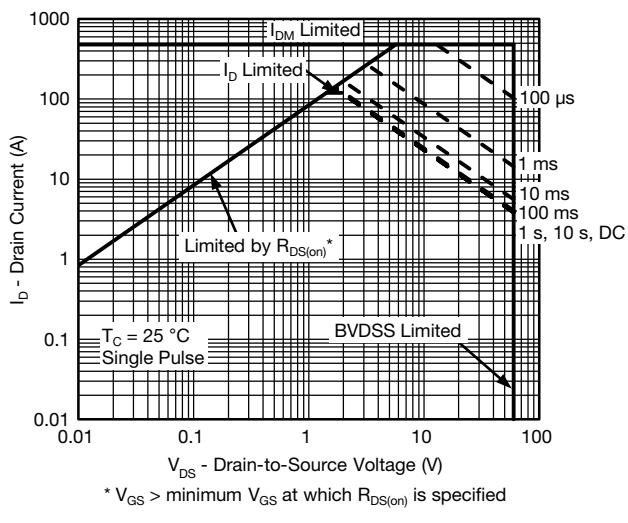


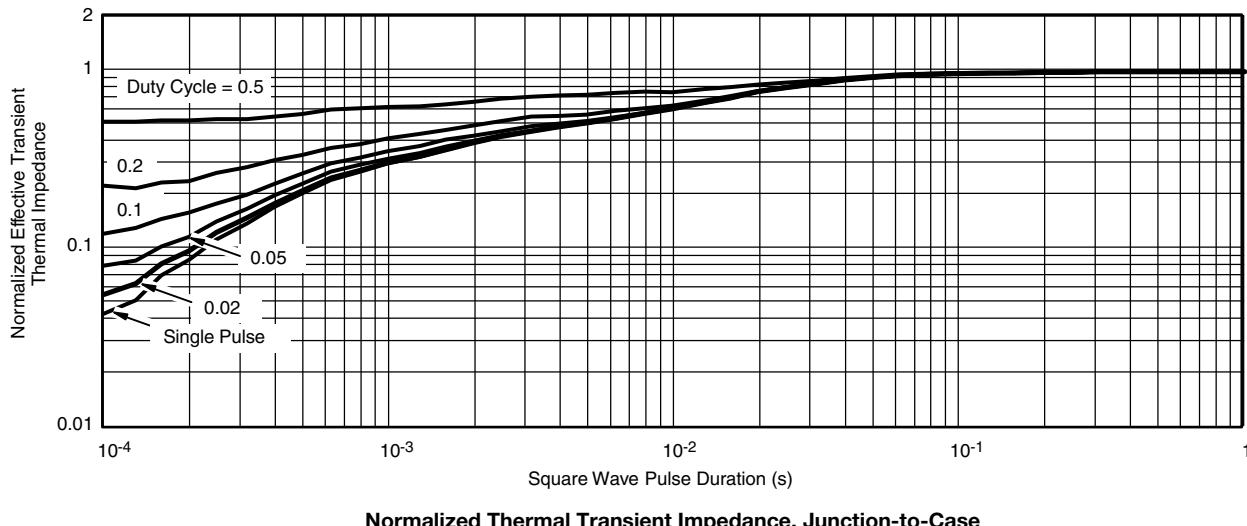
On-Resistance vs. Drain Current



Capacitance

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


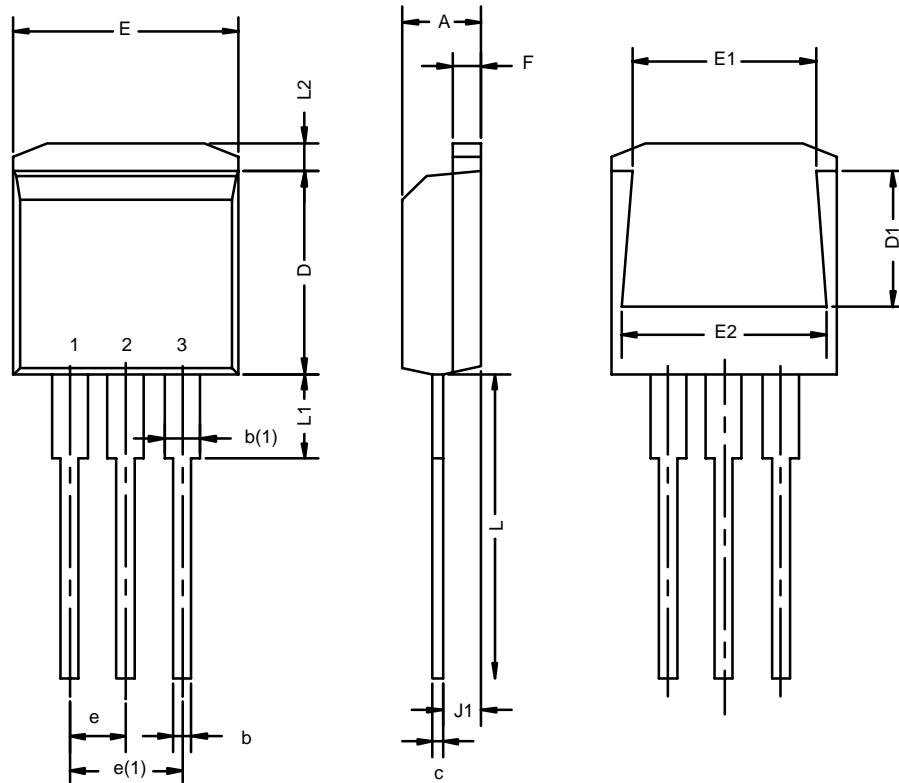
**THERMAL RATINGS** ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)


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**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-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

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 DWG: 5855

\*Use millimeters as the primary measurement

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