

## DESCRIPTION

The SSF2616E uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V.

## GENERAL FEATURES

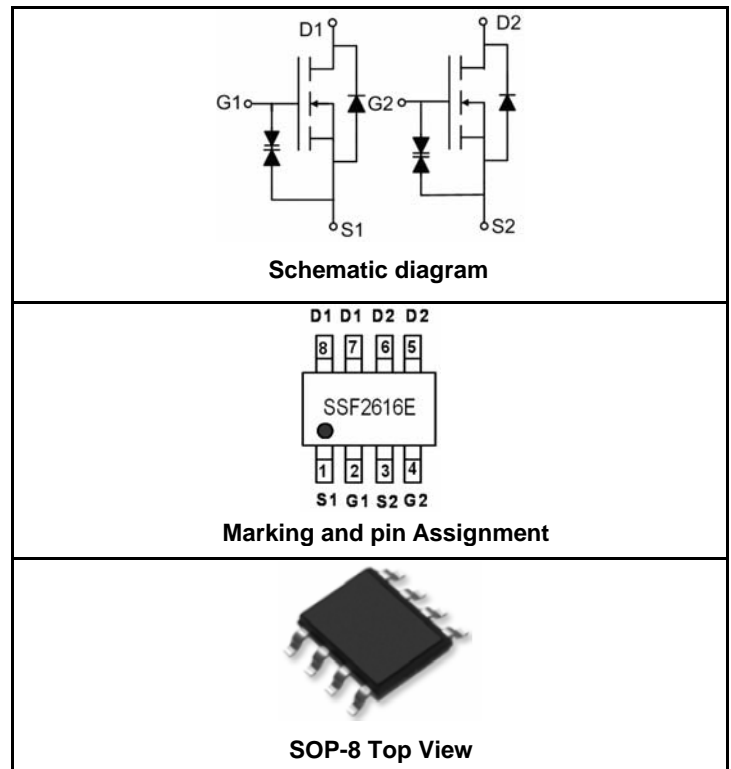
- $V_{DS} = 20V, I_D = 7A$
- $R_{DS(ON)} < 30m\Omega @ V_{GS}=2.5V$
- $R_{DS(ON)} < 26m\Omega @ V_{GS}=3.1V$
- $R_{DS(ON)} < 23m\Omega @ V_{GS}=4V$
- $R_{DS(ON)} < 22m\Omega @ V_{GS}=4.5V$

ESD Rating: 2000V HBM

- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

## Application

- Battery protection
- Load switch
- Power management



## PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
SSF2616E	SSF2616E	SOP-8	Ø330mm	12mm	2500 units

## ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	±12	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_D(25^\circ C)$	7	A
	$I_D(70^\circ C)$	5	A
	$I_{DM}$	25	A
Maximum Power Dissipation	$P_D$	1.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

## THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	83	°C/W
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## ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

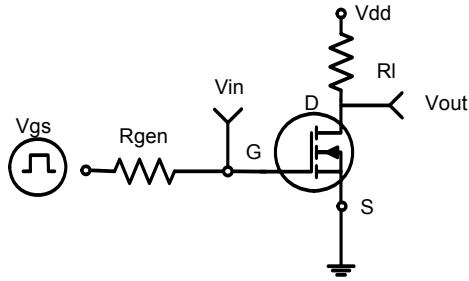
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						

Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 4.5V, V_{DS}=0V$			$\pm 200$	nA
		$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 10$	$\mu A$
<b>ON CHARACTERISTICS (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.6	0.75	1.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=6.5A$		16.5	22	m $\Omega$
		$V_{GS}=4V, I_D=6A$		17	23	m $\Omega$
		$V_{GS}=3.1V, I_D=5.5A$		19	26	m $\Omega$
		$V_{GS}=2.5V, I_D=5.5A$		22	30	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=6.5A$		6.6		S
<b>DYNAMIC CHARACTERISTICS (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=8V, V_{GS}=0V, F=1.0MHz$		600		PF
Output Capacitance	$C_{oss}$			330		PF
Reverse Transfer Capacitance	$C_{rss}$			140		PF
<b>SWITCHING CHARACTERISTICS (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=1A, V_{GS}=4.5V, R_{GEN}=6\Omega$		10	20	nS
Turn-on Rise Time	$t_r$			11	25	nS
Turn-Off Delay Time	$t_{d(off)}$			35	70	nS
Turn-Off Fall Time	$t_f$			30	60	nS
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=7A, V_{GS}=4.5V$		10	15	nC
Gate-Source Charge	$Q_{gs}$			2.3		nC
Gate-Drain Charge	$Q_{gd}$			3		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1.5A$		0.84	1.2	V

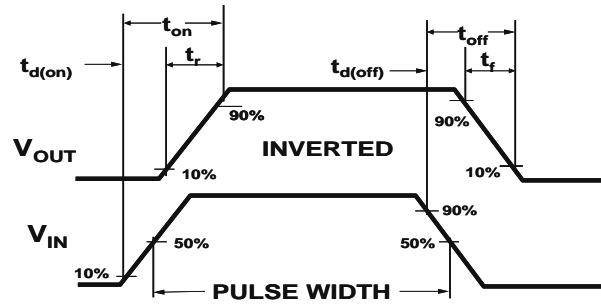
## NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in<sup>2</sup> FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production testing.

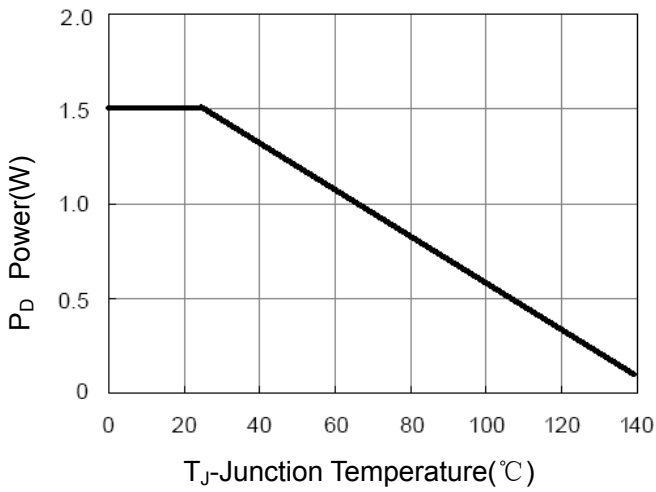
## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



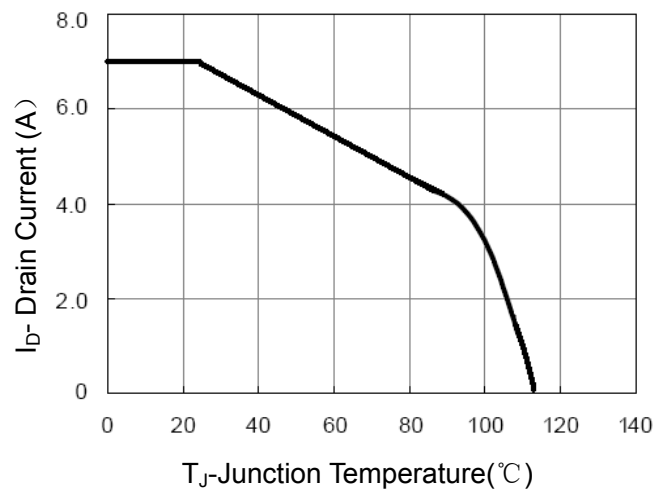
**Figure 1: Switching Test Circuit**



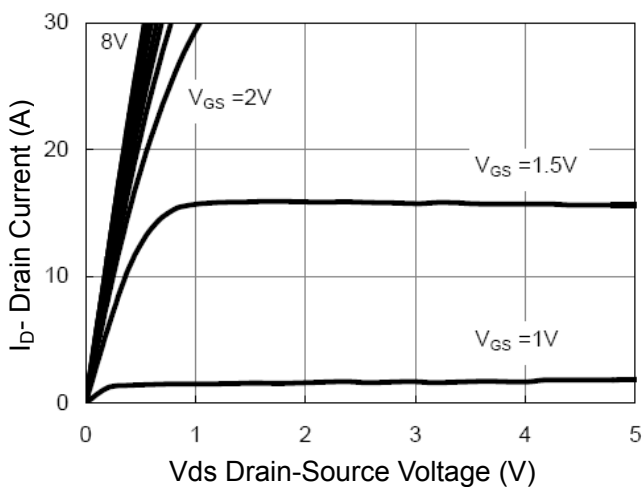
**Figure 2: Switching Waveforms**



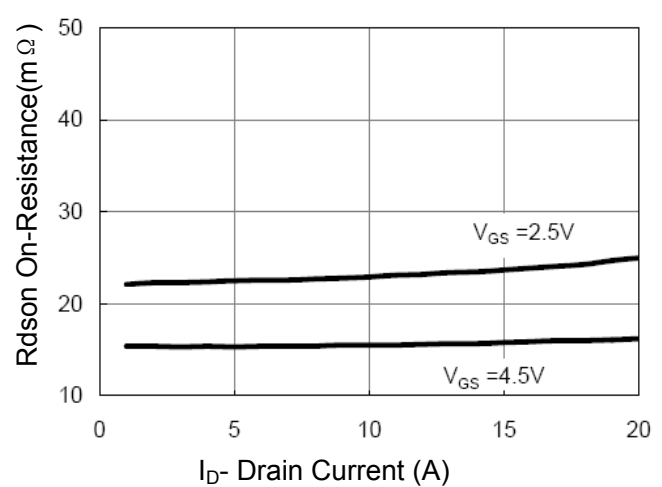
**Figure 3 Power Dissipation**



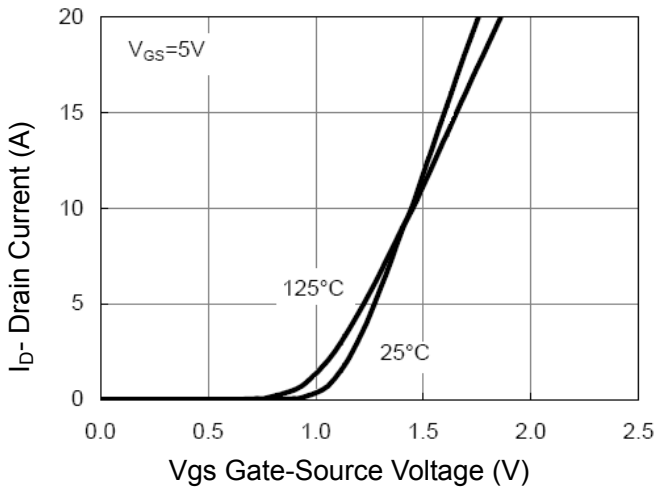
**Figure 4 Drain Current**



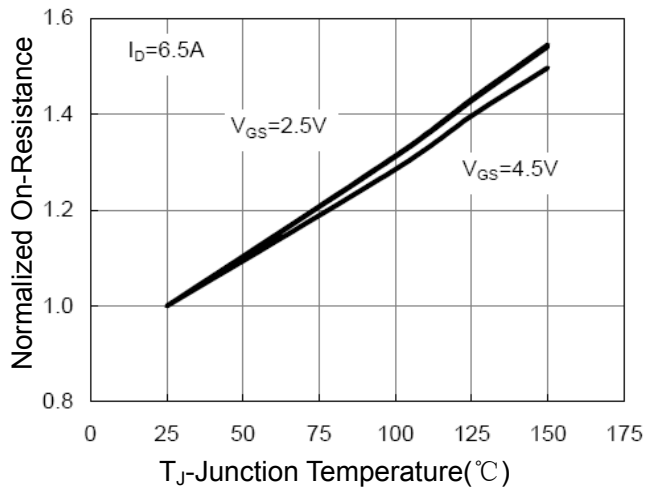
**Figure 5 Output CHARACTERISTICS**



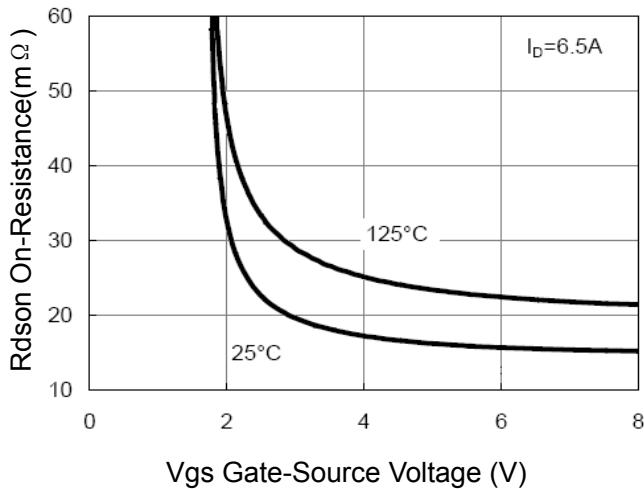
**Figure 6 Drain-Source On-Resistance**



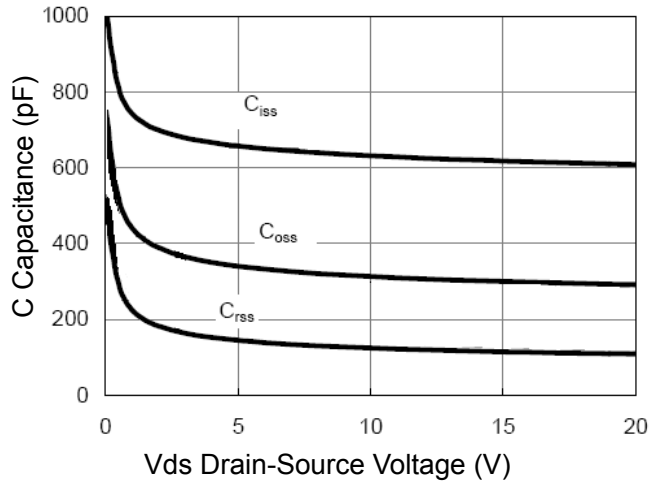
**Figure 7 Transfer Characteristics**



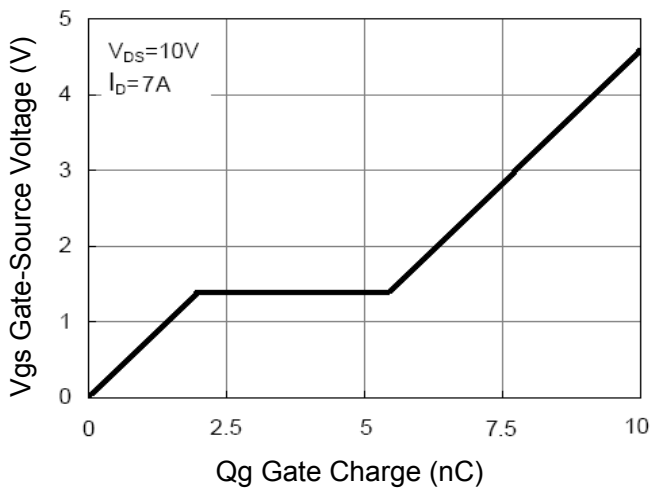
**Figure 8 Drain-Source On-Resistance**



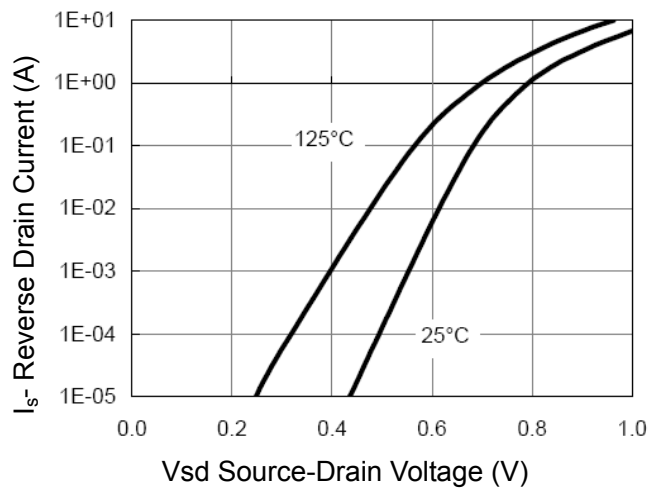
**Figure 9 Rdson vs Vgs**



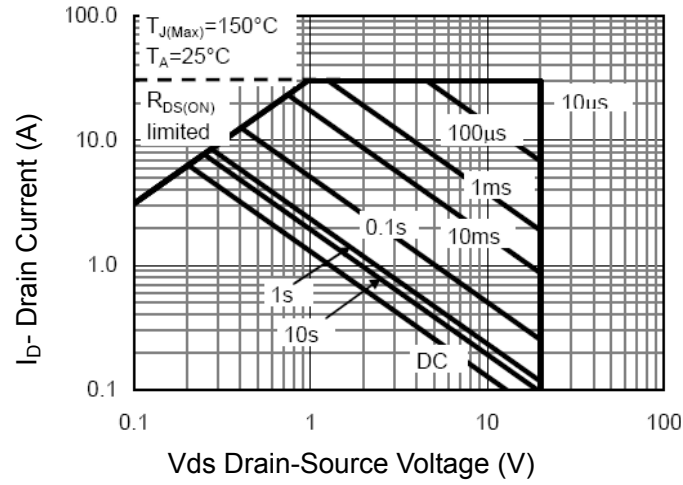
**Figure 10 Capacitance vs Vds**



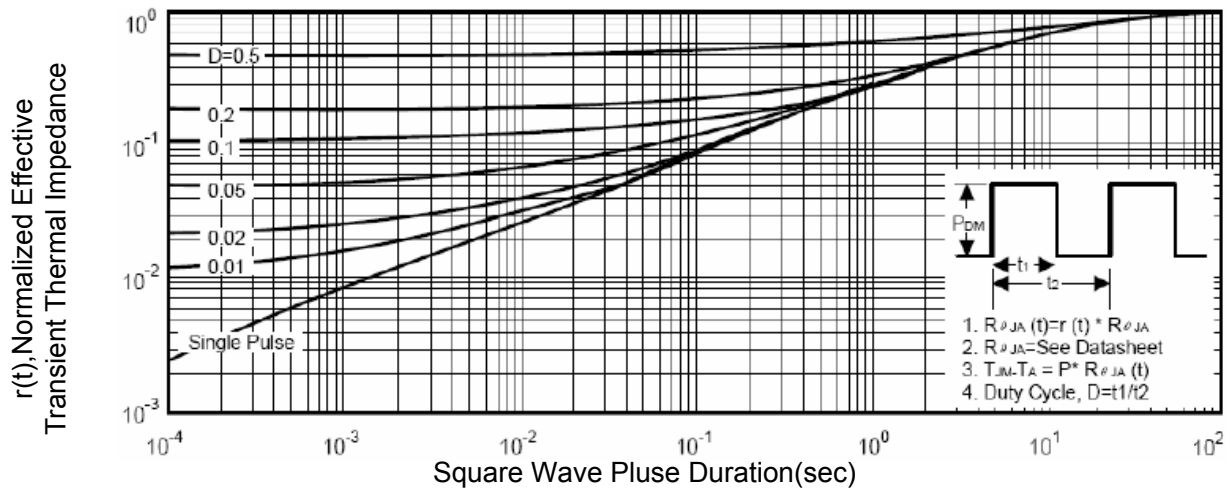
**Figure 11 Gate Charge**



**Figure 12 Source- Drain Diode Forward**

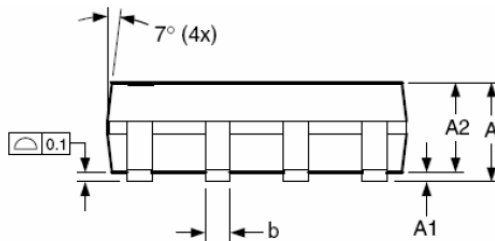
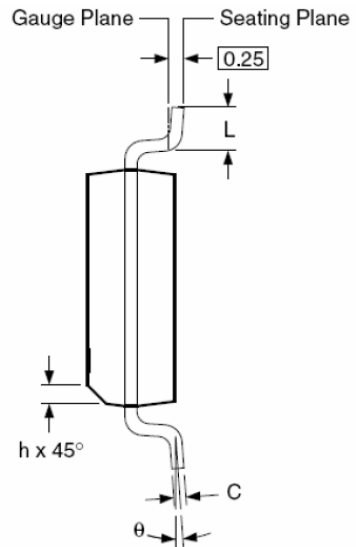
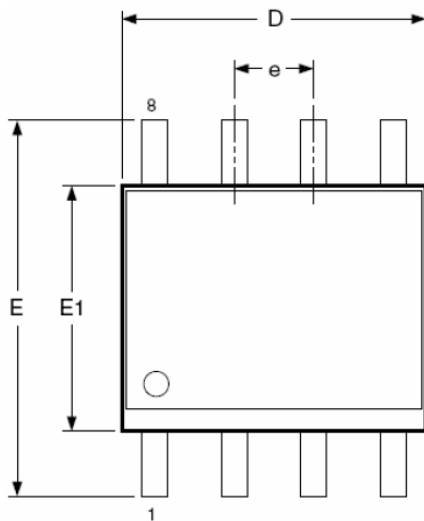


**Figure 13 Safe Operation Area**

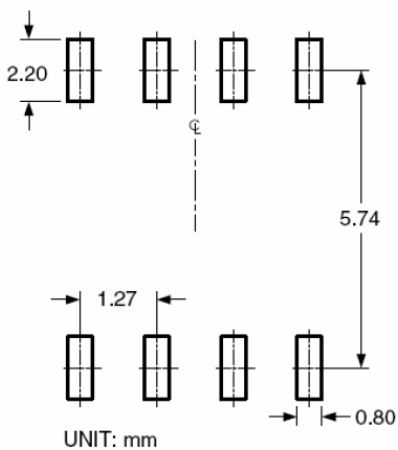


**Figure 14 Normalized Maximum Transient Thermal Impedance**

## SOP-8 PACKAGE INFORMATION



### RECOMMENDED LAND PATTERN



### Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	1.35	1.65	1.75
A1	0.10	—	0.25
A2	1.25	1.50	1.65
b	0.31	—	0.51
c	0.17	—	0.25
D	4.80	4.90	5.00
E1	3.80	3.90	4.00
e	1.27 BSC		
E	5.80	6.00	6.20
h	0.25	—	0.50
L	0.40	—	1.27
θ	0°	—	8°

### Dimensions in inches

Symbols	Min.	Nom.	Max.
A	0.053	0.065	0.069
A1	0.004	—	0.010
A2	0.049	0.059	0.065
b	0.012	—	0.020
c	0.007	—	0.010
D	0.189	0.193	0.197
E1	0.150	0.154	0.157
e	0.050 BSC		
E	0.228	0.236	0.244
h	0.010	—	0.020
L	0.016	—	0.050
θ	0°	—	8°

### NOTES:

1. Dimensions are inclusive of plating
2. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
3. Dimension L is measured in gauge plane.
4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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