

**DESCRIPTION**

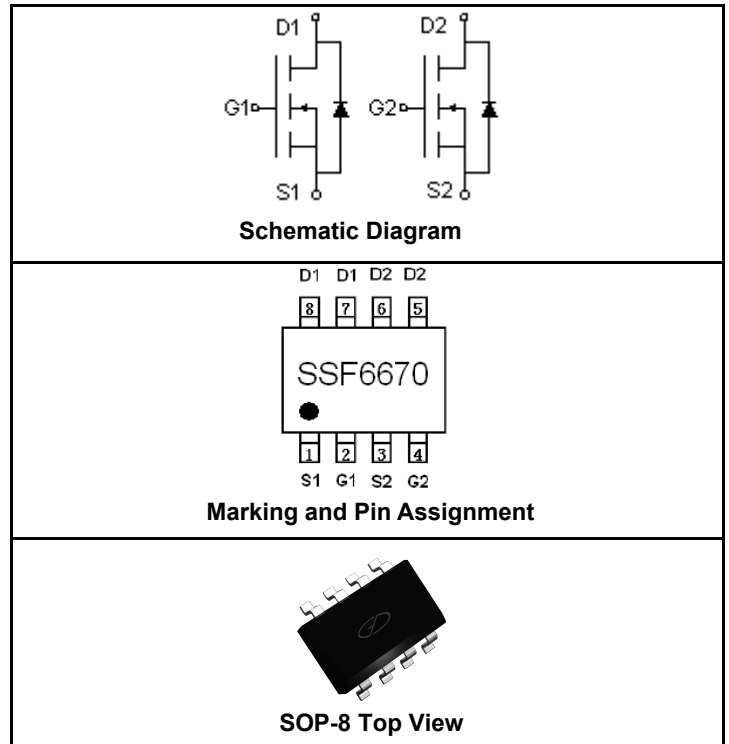
The SSF6670 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge .

**FEATURES**

- $V_{DS} = 60V, I_D = 3.5A$   
 $R_{DS(ON)} < 120m\Omega @ V_{GS}=4.5V$   
 $R_{DS(ON)} < 90m\Omega @ V_{GS}=10V$
- High power and current handling capability
- Lead free product
- Surface Mount Package

**APPLICATIONS**

- PWM applications
- Load switch
- Power management



**PACKAGE MARKING AND ORDERING INFORMATION**

Device Marking	Device	Device Package	Reel Size	Tape Width	Quantity
SSF6670	SSF6670	SOP-8	Ø330mm	12mm	2500 units

**ABSOLUTE MAXIMUM RATINGS** ( $T_A=25^{\circ}C$  unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 25$	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_D(25^{\circ}C)$	3.5	A
	$I_D(70^{\circ}C)$	2.8	A
	$I_{DM}$	20	A
Maximum Power Dissipation	$P_D$	2.4	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 175	$^{\circ}C$

**THERMAL CHARACTERISTICS**

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62.5	$^{\circ}C/W$
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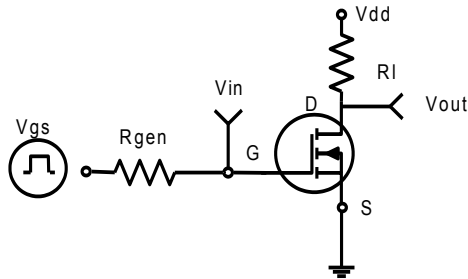
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			10	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 25V, V_{DS}=0V$			$\pm 100$	nA
<b>ON CHARACTERISTICS (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1		3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=2A$		80	120	m $\Omega$
		$V_{GS}=10V, I_D=3A$		65	90	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=3A$	3			S
<b>DYNAMIC CHARACTERISTICS (Note 4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$		500		PF
Output Capacitance	$C_{oss}$			50		PF
Reverse Transfer Capacitance	$C_{rss}$			40		PF
<b>SWITCHING CHARACTERISTICS (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=30V, V_{GS}=10V, R_{GEN}=3\Omega$ $I_D=1A$		6		nS
Turn-on Rise Time	$t_r$			5		nS
Turn-Off Delay Time	$t_{d(off)}$			16		nS
Turn-Off Fall Time	$t_f$			3		nS
Total Gate Charge	$Q_g$	$V_{DS}=48V, I_D=3A, V_{GS}=4.5V$		7		nC
Gate-Source Charge	$Q_{gs}$			2		nC
Gate-Drain Charge	$Q_{gd}$			3		nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_F=4A, di/dt=100A/\mu s$		27		nS
Body Diode Reverse Recovery Charge	$Q_{rr}$			32		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1.7A$			1.2	V

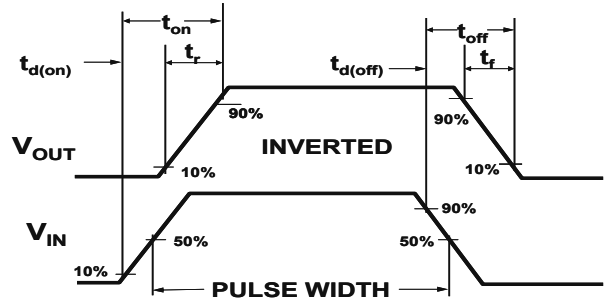
**NOTES:**

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.

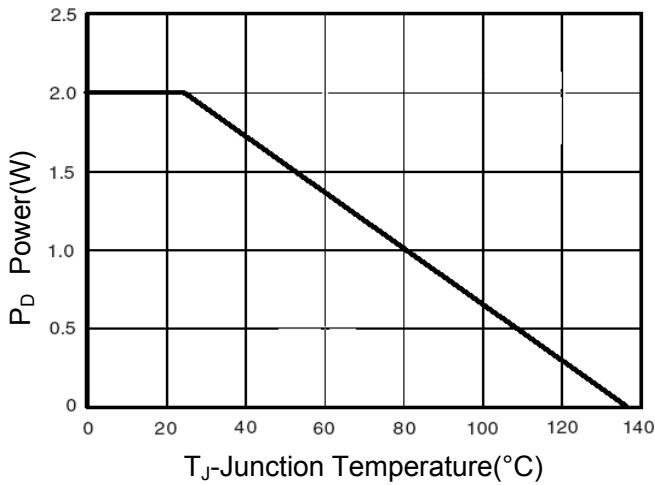
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



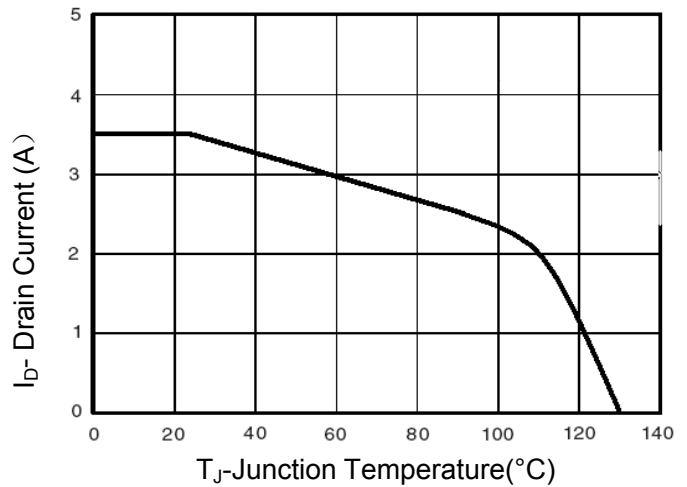
**Figure 1. Switching Test Circuit**



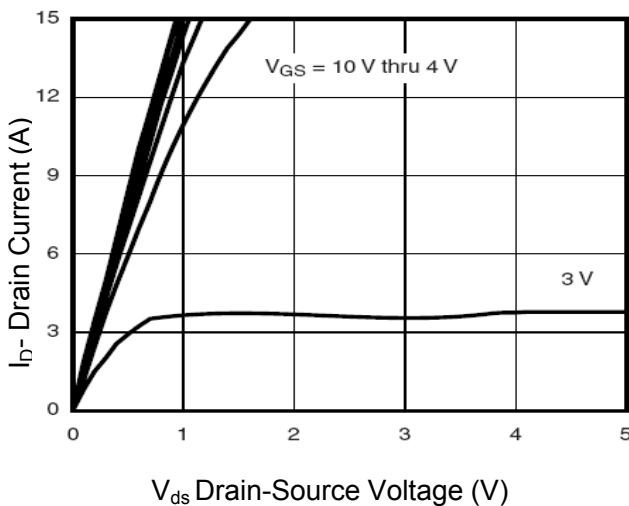
**Figure 2. Switching Waveforms**



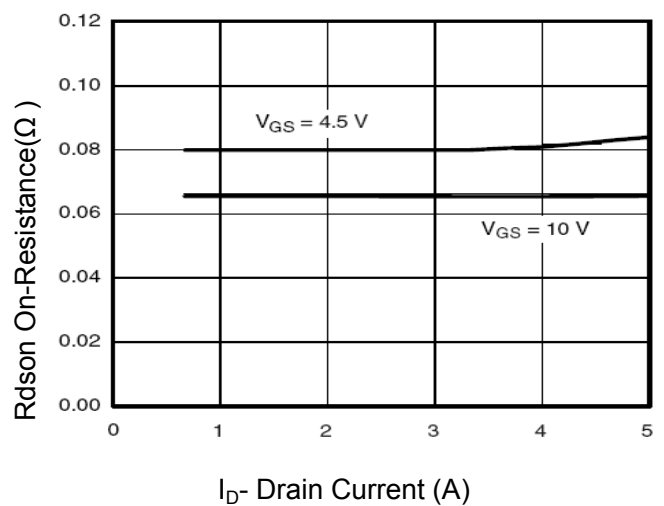
**Figure 3. Power Dissipation**



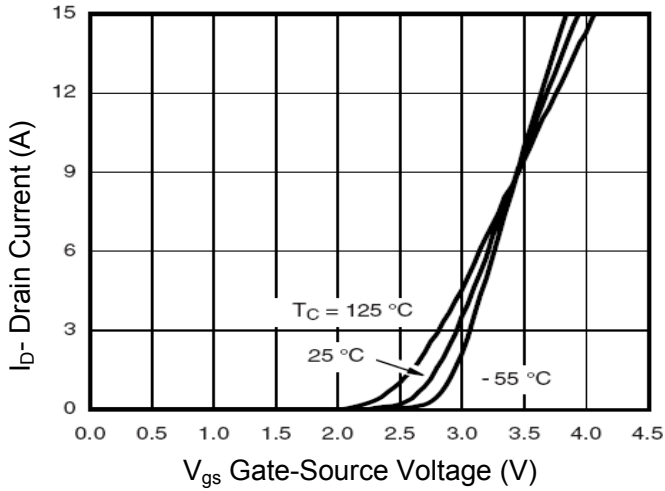
**Figure 4. Drain Current**



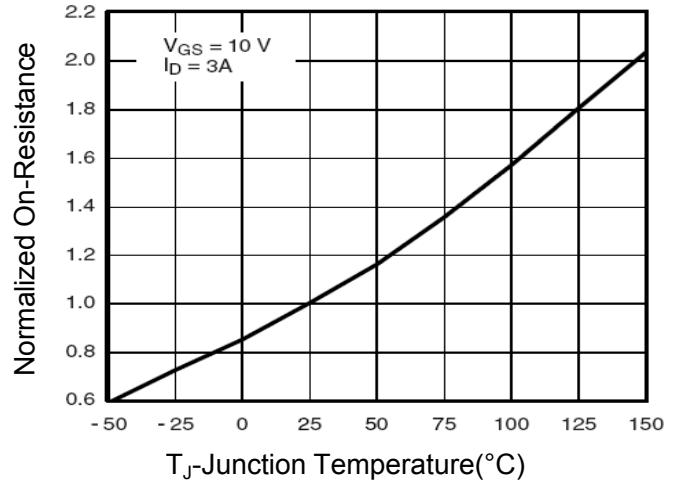
**Figure 5. Output Characteristics**



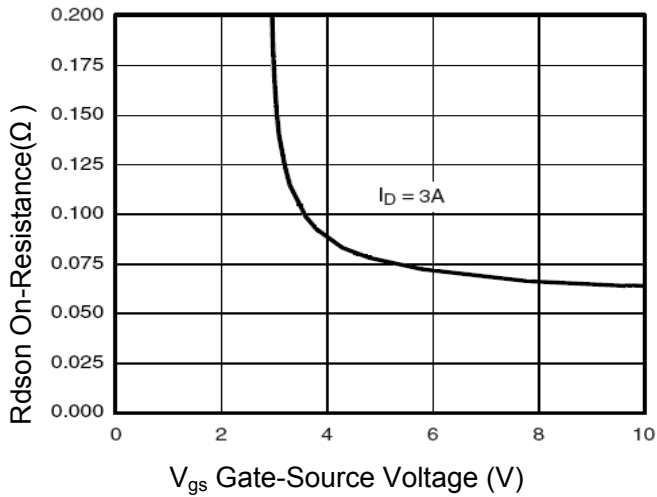
**Figure 6. Drain-Source On-Resistance**



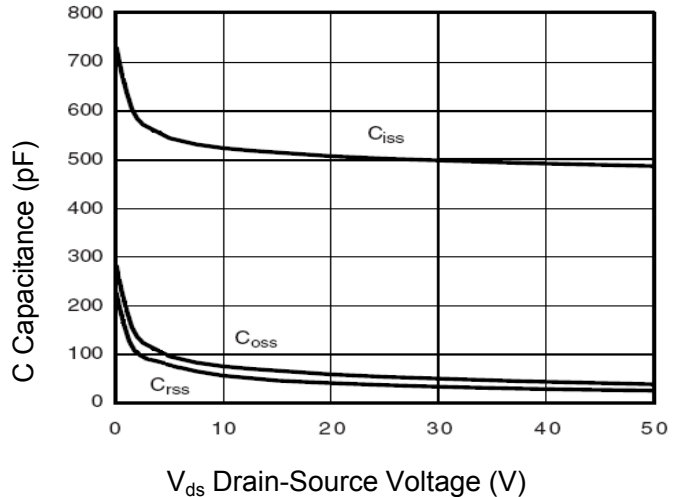
**Figure 7. Transfer Characteristics**



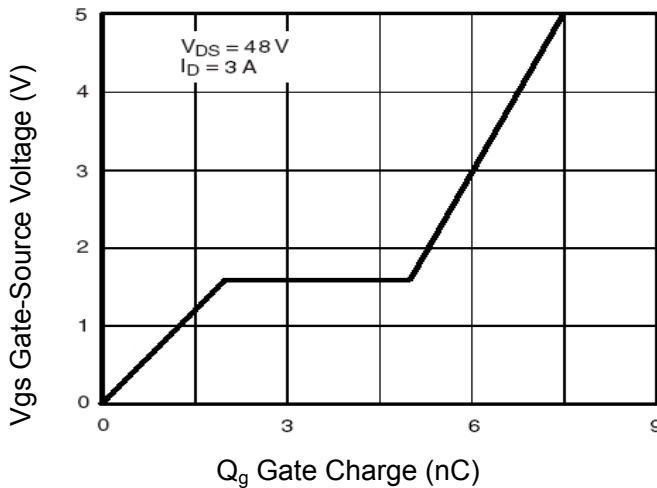
**Figure 8. Drain-Source On-Resistance**



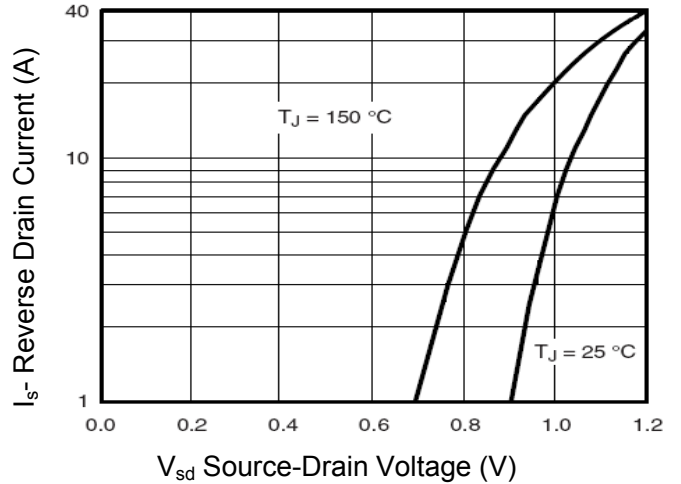
**Figure 9.  $R_{dson}$  vs  $V_{gs}$**



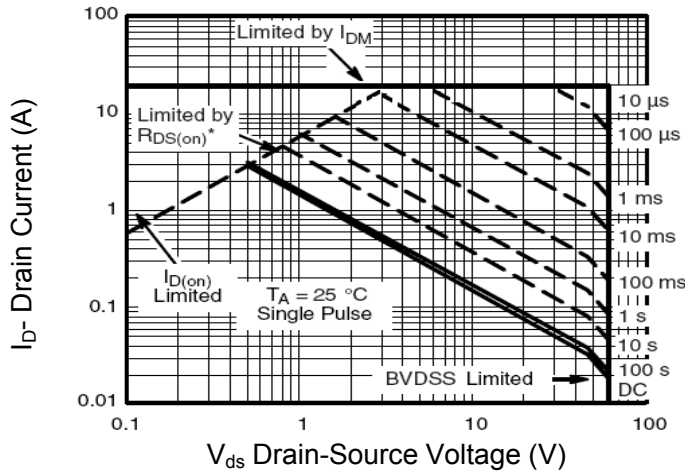
**Figure 10. Capacitance vs  $V_{ds}$**



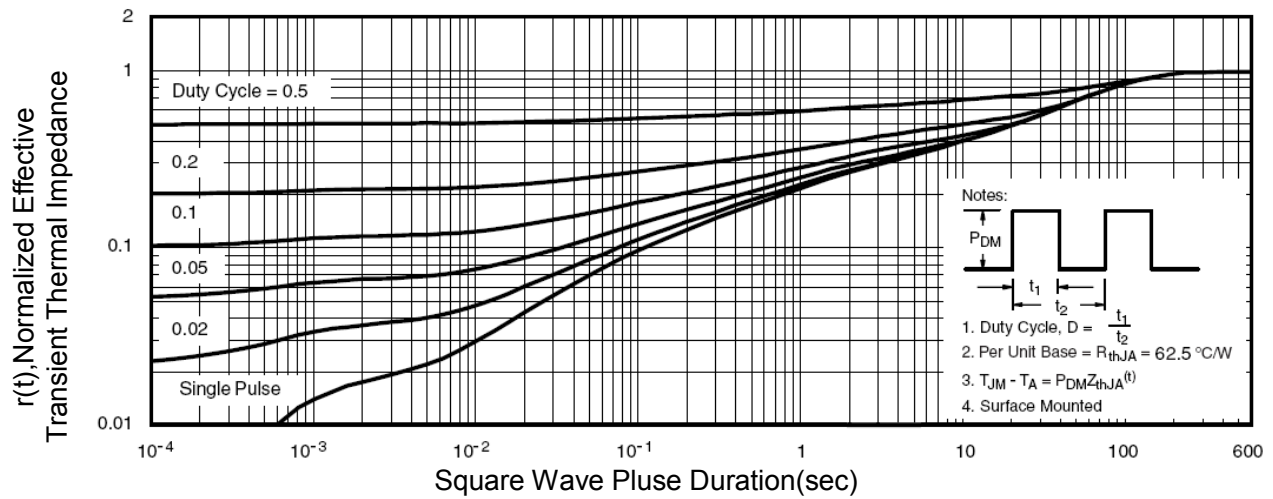
**Figure 11. Gate Charge**



**Figure 12. Source- Drain Diode Forward**

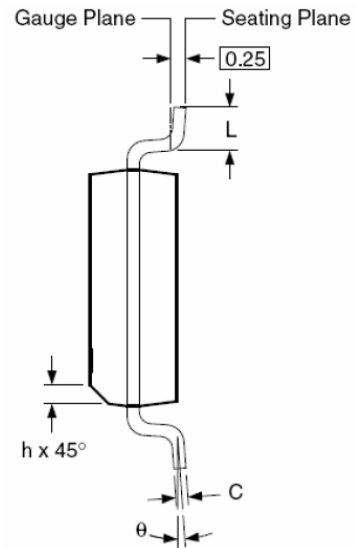
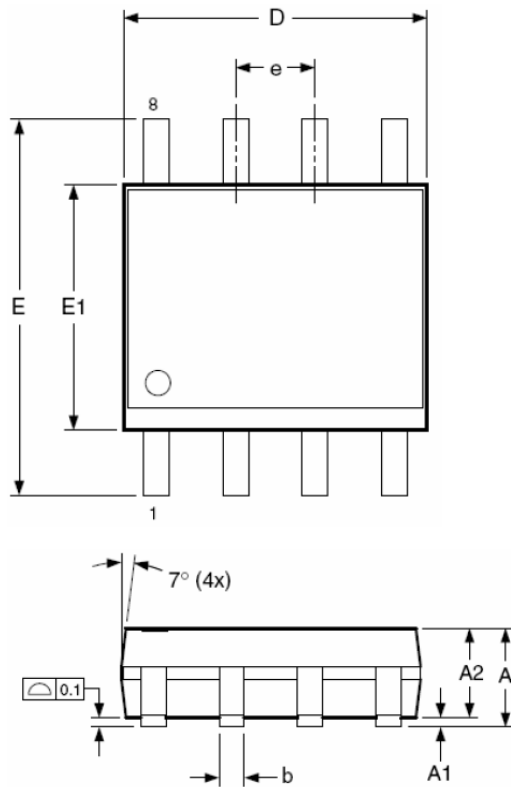


**Figure 13. Safe Operation Area**

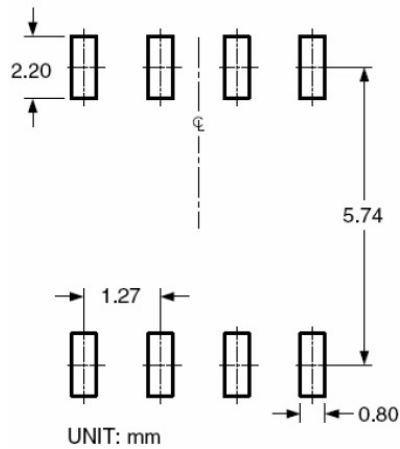


**Figure 14. Normalized Maximum Transient Thermal Impedance**

**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.