

FNK N-Channel Enhancement Mode Power MOSFET

Description

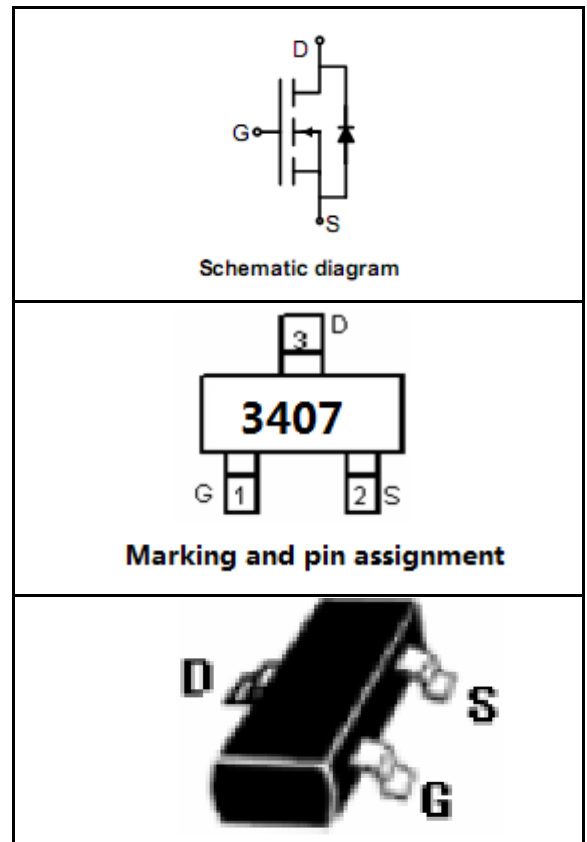
The FNK3407 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

- $V_{DS} = -30V, I_D = 4.1A$
 $R_{DS(ON)} < 53m\Omega @ V_{GS} = -4.5V$
 $R_{DS(ON)} < 40m\Omega @ V_{GS} = -10V$
- 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
FNK3407	FNK3407	SOT-23	Ø180mm	8mm	3000 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_D(25^\circ C)$	-4.1	A
	I_{DM}	-16.4	A
Maximum Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	°C/W
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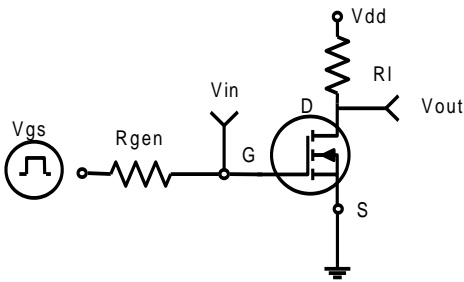
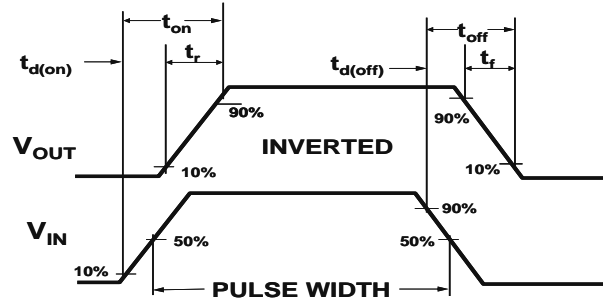
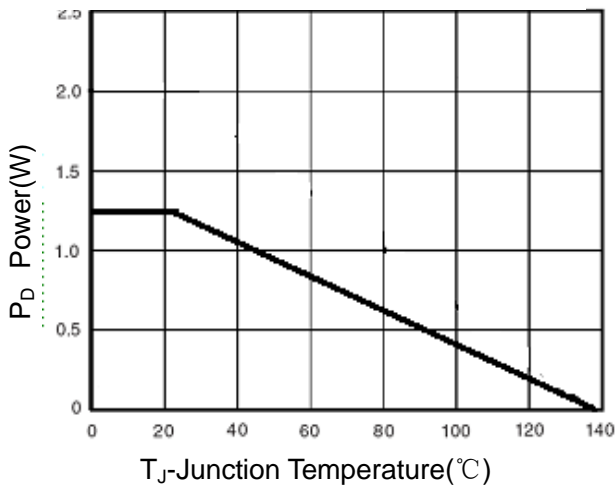
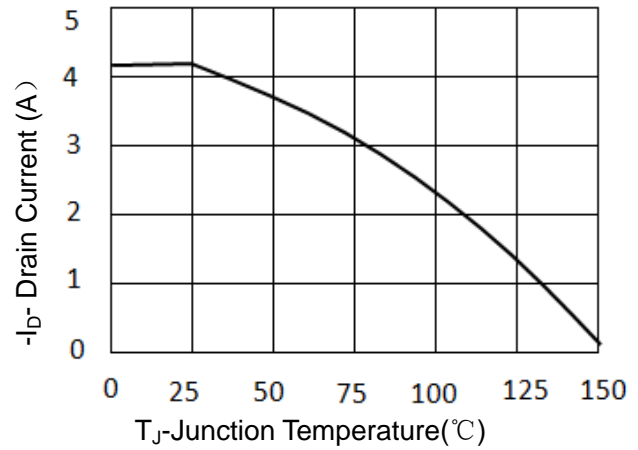
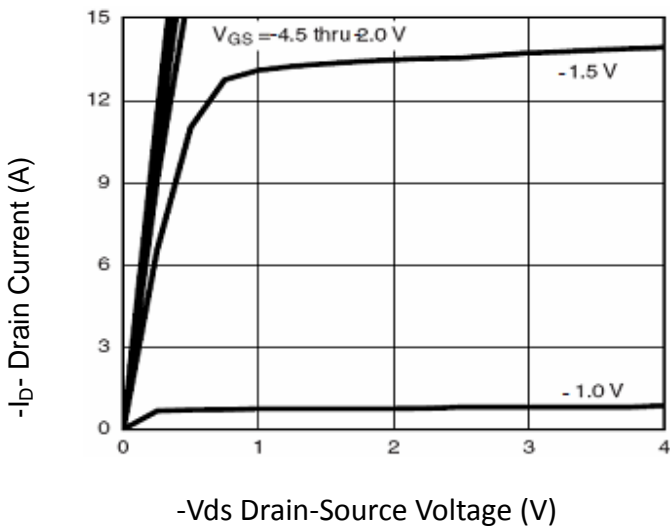
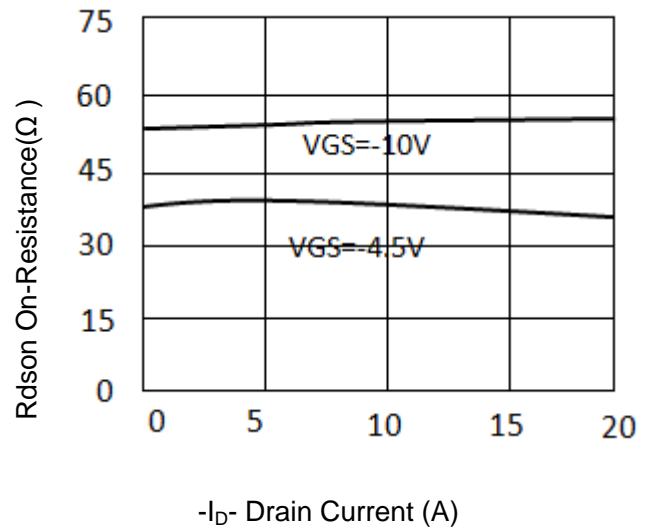
ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

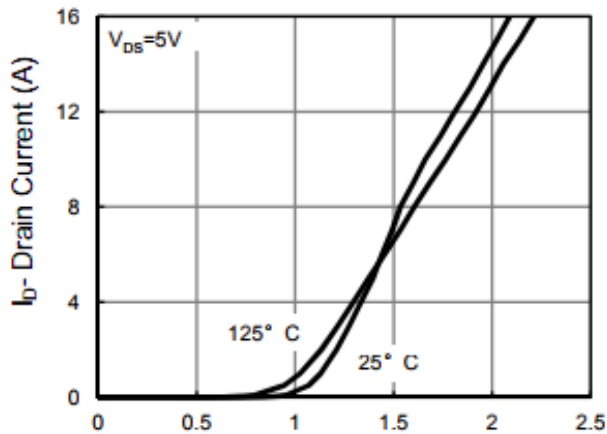
Parameter	Symbol	Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-33		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$		-1.5		V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-2.5A$		38	54	$m\Omega$
		$V_{GS}=-10V, I_D=-4.1A$		52	67	$m\Omega$
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$				PF
Output Capacitance	C_{oss}					PF
Reverse Transfer Capacitance	C_{rss}					PF
SWITCHING CHARACTERISTICS (Note 4)						
Delay Time	$t_{d(on)}$	$V_{DS}=-10V, V_{GS}=-4.5V, R_{GEN}=6\Omega$ $I_D=-1A$		9		nS
Turn-on Rise Time	t_r			30		nS
Turn-Off Delay Time	$t_{d(off)}$			35		nS
Turn-Off Fall Time	t_f			10		nS
Total Gate Charge	Q_g	$V_{DS}=-10V, I_D=-5A, V_{GS}=-4.5V$		11.4		nC
Gate-Source Charge	Q_{gs}			2.3		nC
Gate-Drain Charge	Q_{gd}			2.9		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-1A$		-0.7	-1.2	V
Diode Forward Current (Note 2)	I_S				-5	A

NOTES:

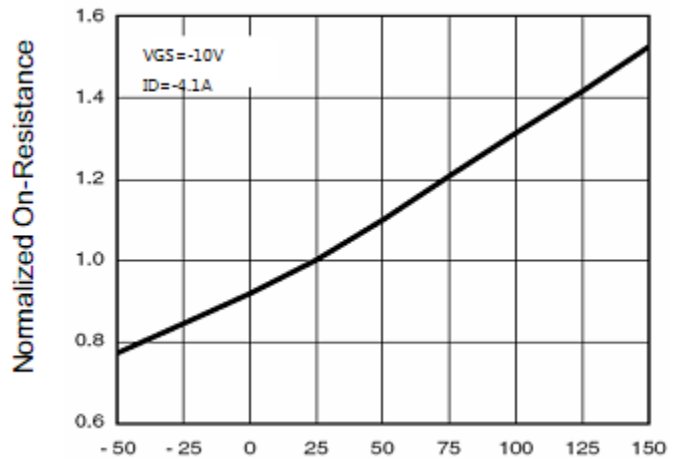
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in² FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing

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 Rds(on)-Drain Current



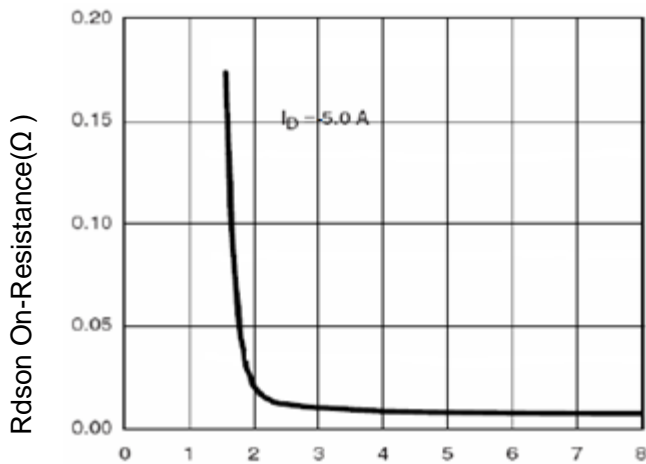
-Vgs Gate-Source Voltage (V)

Figure 7 Transfer Characteristics



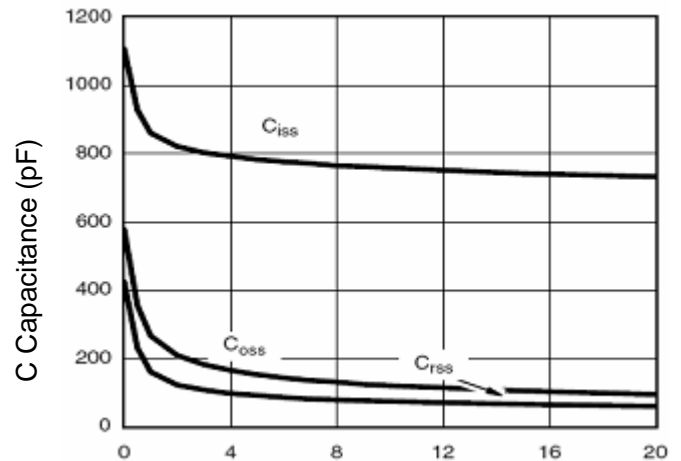
T_J-Junction Temperature(°C)

Figure 8 Drain-Source On-Resistance



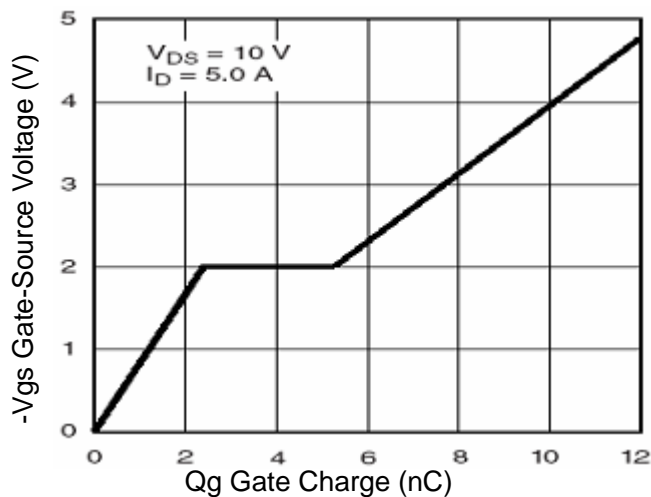
-Vgs Gate-Source Voltage (V)

Figure 9 Rdson vs Vgs



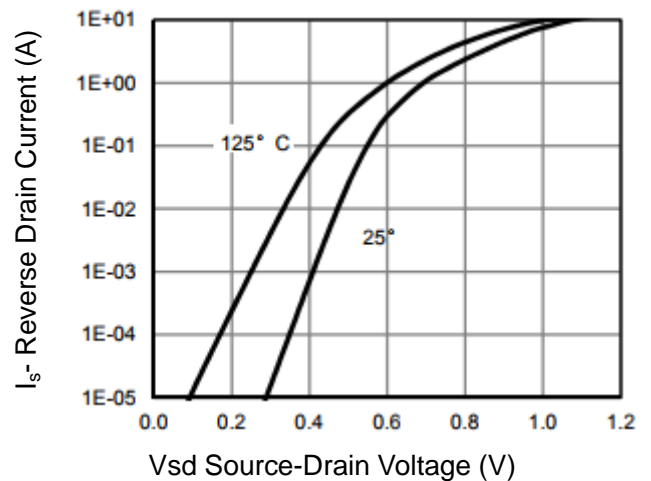
-Vds Drain-Source Voltage (V)

Figure 10 Capacitance vs Vds



Qg Gate Charge (nC)

Figure 11 Gate Charge



Vsd Source-Drain Voltage (V)

Figure 12 Source- Drain Diode Forward

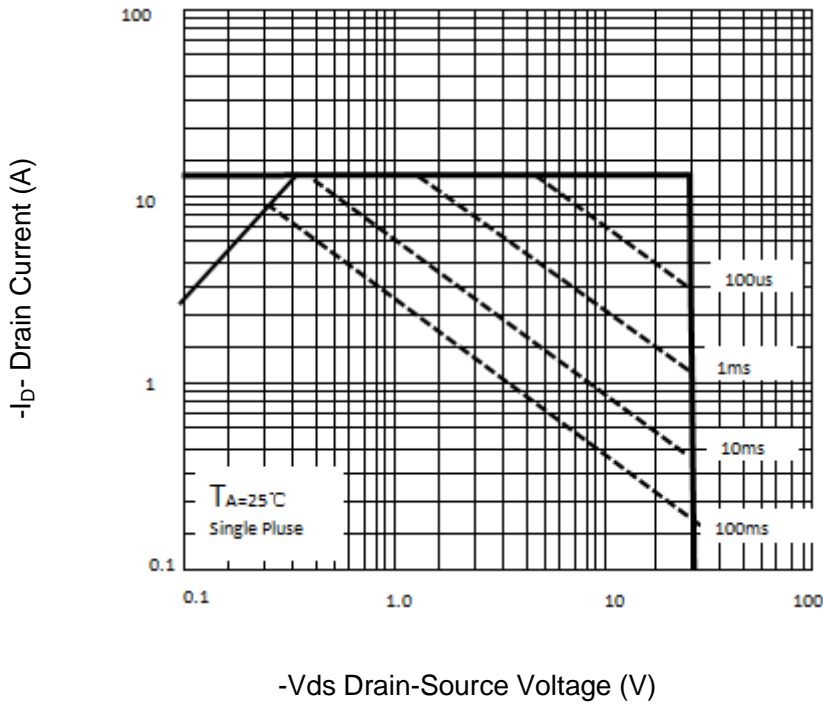


Figure 13 Safe Operation Area

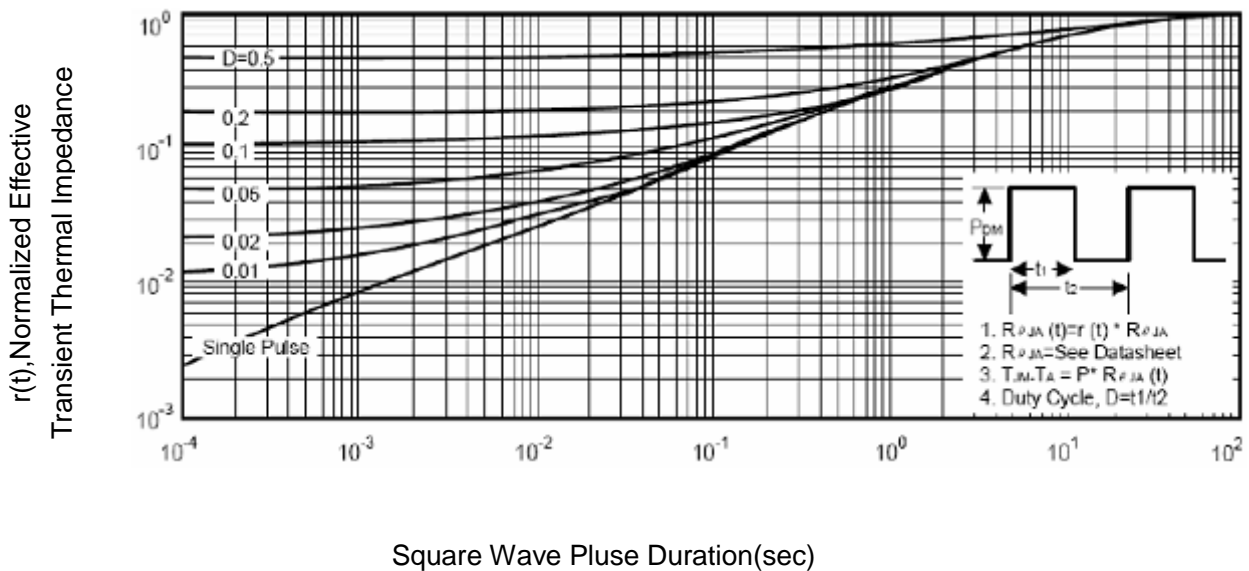
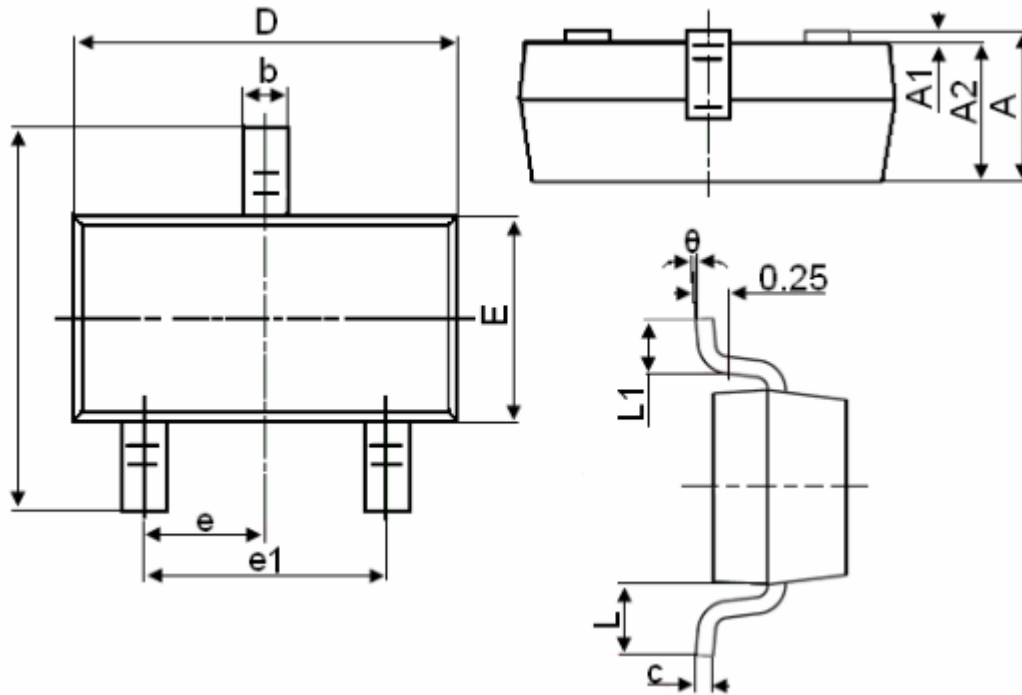


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 PACKAGE INFORMATION


Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Notes

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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