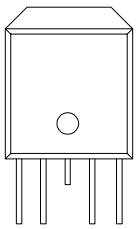
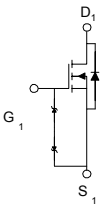
P & N-Channel 40-V (D-S) MOSFET

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $r_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

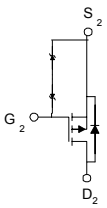
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ m(Ω)	I_D (A)
40	46 @ V_{GS} = 4.5V	28
	36 @ V_{GS} = 10V	33
-40	48 @ V_{GS} = -4.5V	-28
	38 @ V_{GS} = -10V	-33

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe DPAK saves board space
- Fast switching speed
- High performance trench technology





N-Channel MOSFET



P-Channel MOSFET

ESD Protected
2000V

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		V_{DS}	40	-40	V
Gate-Source Voltage		V_{GS}	20	-20	
Continuous Drain Current[a]	T_A=25°C	I_D	33	-33	A
Pulsed Drain Current[b]		I_{DM}	±40	±40	
Continuous Source Current (Diode Conduction)[a]		I_S	30	-30	A
Power Dissipation[a]	T_A=25°C	P_D	50	50	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	-55 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient[a]	$R_{\theta JA}$	50	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	3.0	°C/W

Notes

a. Surface Mounted on 1" x 1" FR4 Board.

b. Pulse width limited by maximum junction temperature

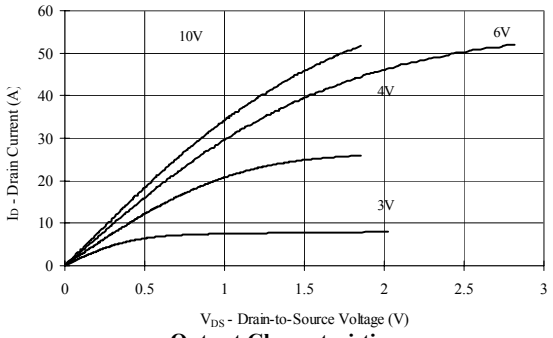
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)							
Parameter	**Symbol**	**Test Conditions**	**Limits**				**Unit**
			Ch	**Min**	**Typ**	**Max**	
Static							
Gate-Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 250 uA	N	1			V
		V_{GS} = V_{DS}, I_D = -250 uA	P	-1			
Gate-Body Leakage	I_{GSS}	V_{GS} = -20 V, V_{DS} = 0 V	P			±100	nA
		V_{GS} = 20 V, V_{DS} = 0 V	N			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -24 V, V_{GS} = 0 V	P			-1	uA
		V_{DS} = 24 V, V_{GS} = 0 V	N			1	
On-State Drain Current[A]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	N	20			A
		V_{DS} = -5 V, V_{GS} = -10 V	P	-50			
Drain-Source On-Resistance[A]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 33 A	N			36	mΩ
		V_{GS} = 4.5 V, I_D = 28 A				46	
		V_{GS} = -10 V, I_D = -33 A	P			38	
		V_{GS} = -4.5 V, I_D = -28 A				48	
Forward Tranconductance[A]	g_{fs}	V_{DS} = 15 V, I_D = 33 A	N		40		S
		V_{DS} = -15 V, I_D = -33 A	P		31		
Dynamic							
Total Gate Charge	Q_g	N-Channel V_{DS}=15V, V_{GS}=4.5V, I_D=33A P-Channel V_{DS}=-15V, V_{GS}=-4.5V, I_D=-33A	N		12		nC
			P		13		
Gate-Source Charge	Q_{gs}		N		3.3		
			P		5.8		
Gate-Drain Charge	Q_{gd}		N		4.5		
			P		12		
Switching							
Turn-On Delay Time	$t_{d(on)}$	N-Chaneel V_{DD}=15V, V_{GS}=10V, I_D=1A , R_{GEN}=25Ω, P-Channel V_{DD}=-15V, V_{GS}=-10V, I_D=-1A R_{GEN}=15Ω	N		20		nS
			P		15		
Rise Time	t_r		N		9		
			P		16		
Turn-Off Delay Time	$t_{d(off)}$		N		70		
			P		62		
Fall-Time	t_f		N		20		
			P		46		

Notes

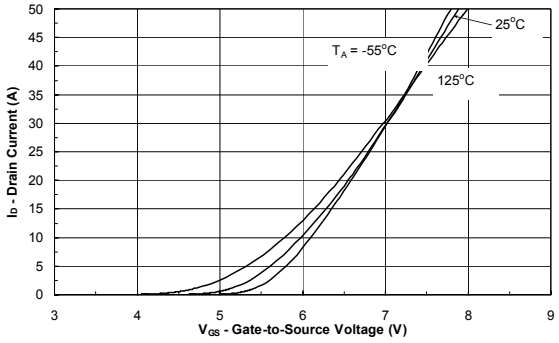
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

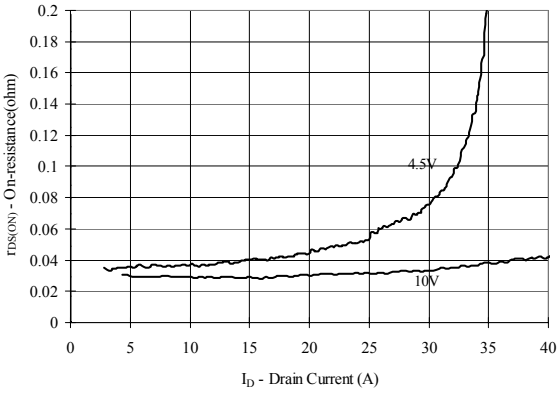
Typical Electrical Characteristics (N-Channel)



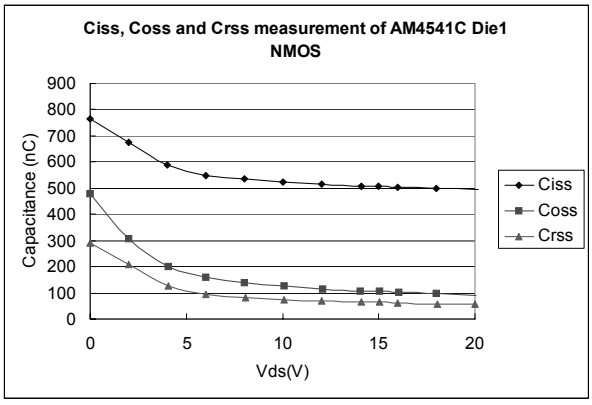
Output Characteristics



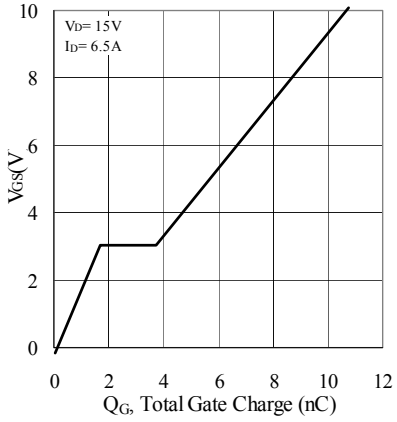
Transfer Characteristics



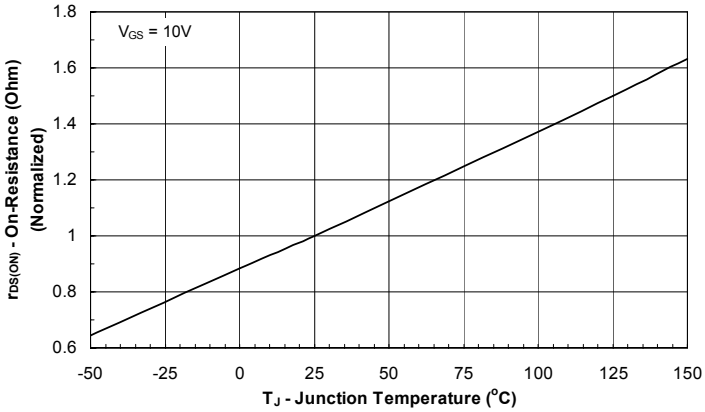
On Resistance vs. Drain Current



Capacitance

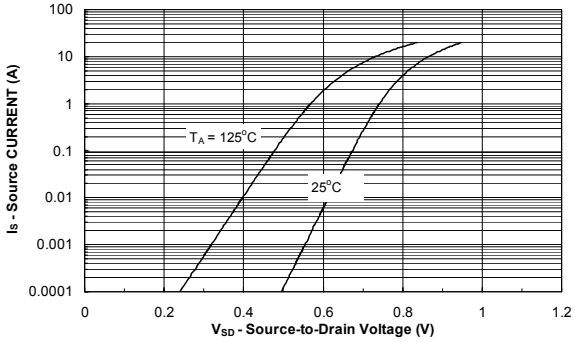


Gate Charge

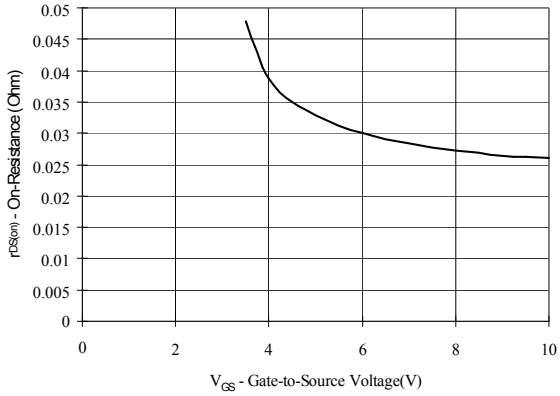


On-Resistance vs. Junction Temperature

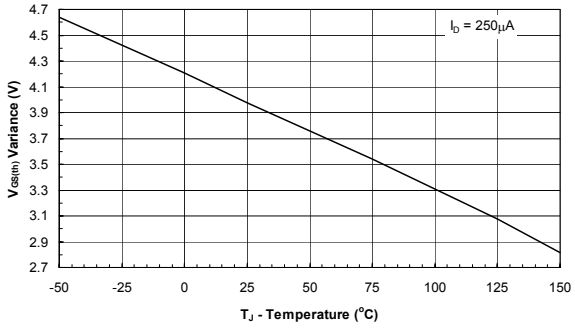
Typical Electrical Characteristics (N-Channel)



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

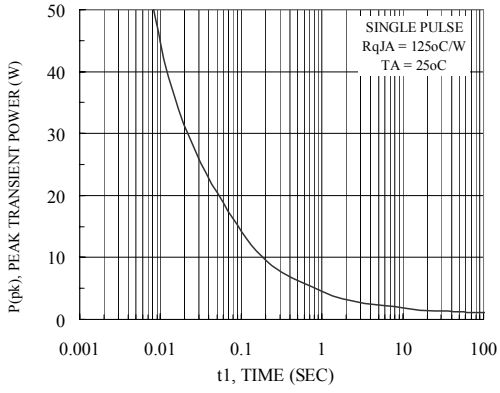


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

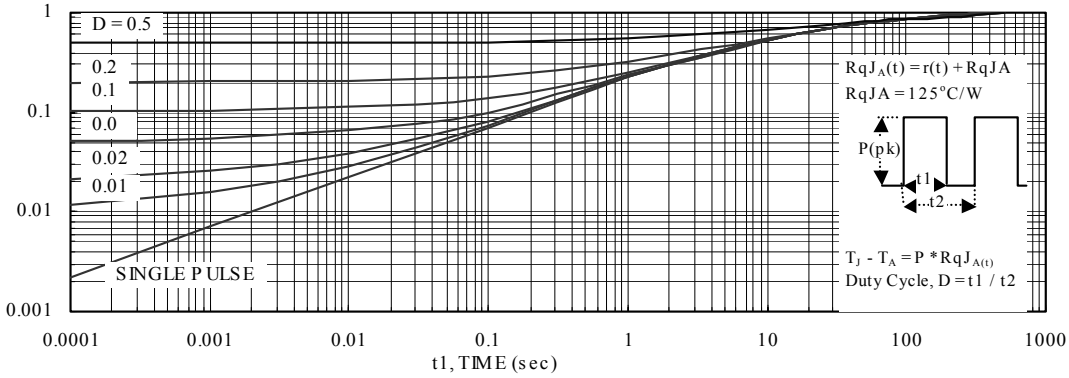
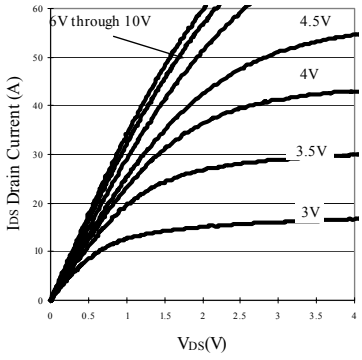
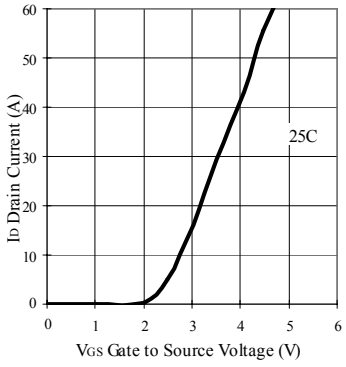


Figure 11. Transient Thermal Response Curve

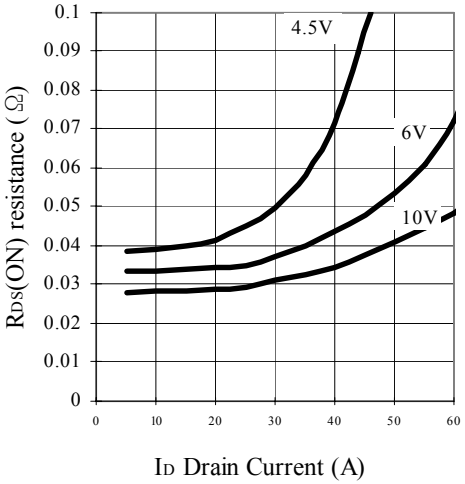
Typical Electrical Characteristics (P-Channel)



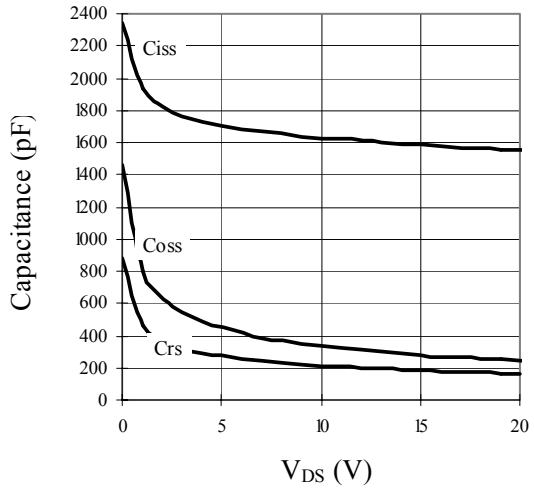
Output Characteristics



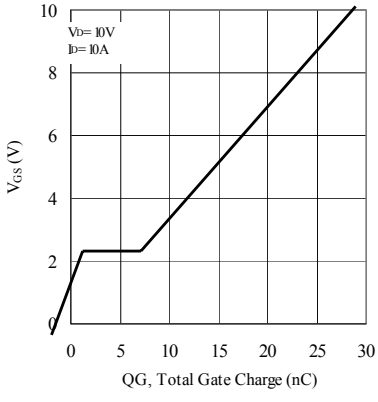
Transfer Characteristics



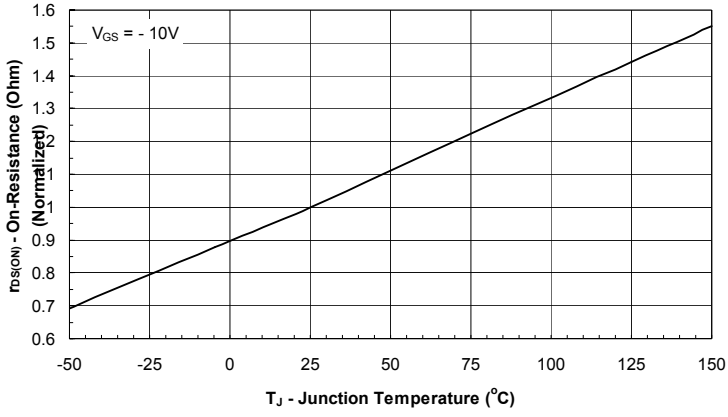
On Resistance Vs Vgs Voltage



Capacitance

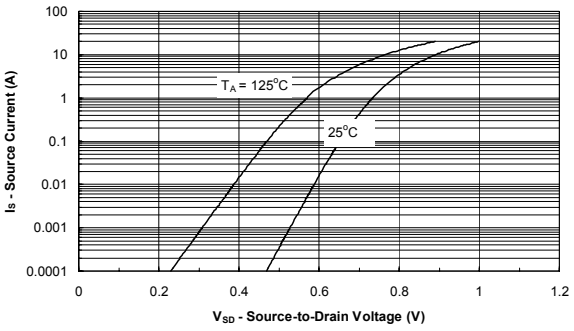


Gate Charge

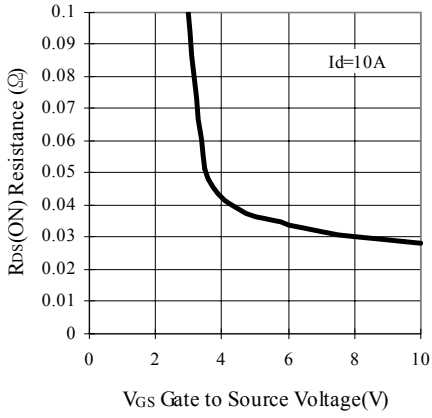


On-Resistance vs. Junction Temperature

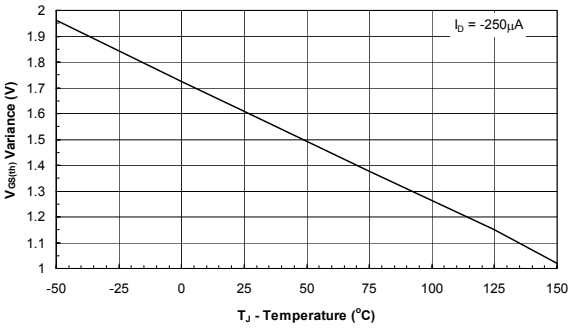
Typical Electrical Characteristics (P-Channel)



Source-Drain Diode Forward Voltage



On-Resistance with Gate to Source Voltage



Threshold Voltage

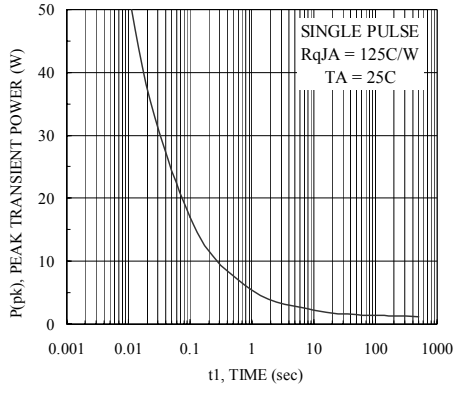


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

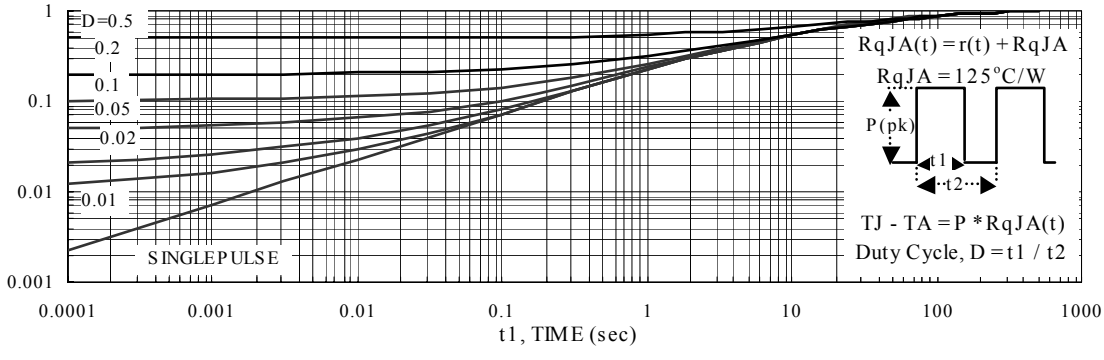
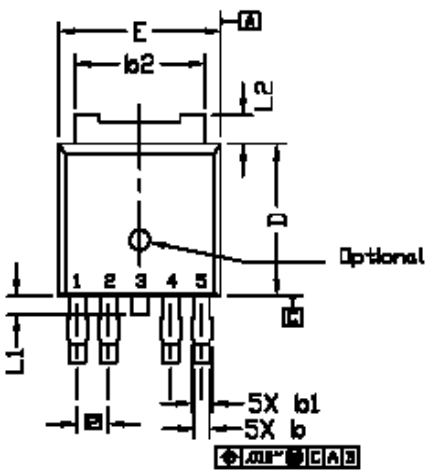
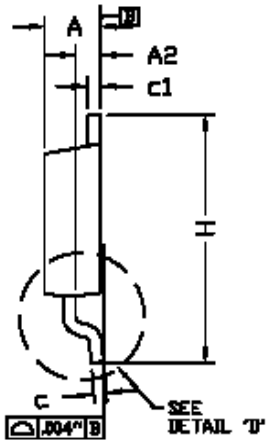
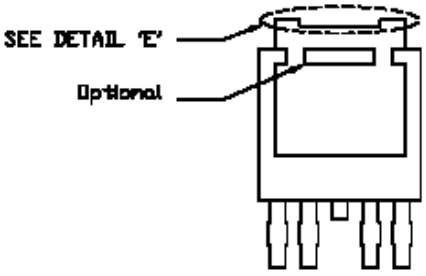


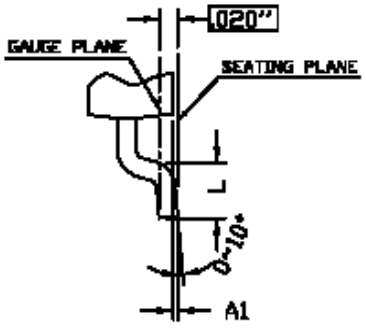
Figure 11. Transient Thermal Response Curve

TO252_4L PACKAGE OUTLINE









DETAIL 'D'

DETAIL 'E'

SYMBOL	DIMENSION IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	2.184	2.286	2.388	0.086	0.090	0.094
A1	0.000	—	0.127	0.000	—	0.005
A2	0.889	—	1.143	0.035	—	0.045
b	0.508	—	0.711	0.020	—	0.028
b1	0.584	—	0.787	0.023	—	0.031
b2	4.953	—	5.461	0.195	—	0.215
c	0.457	0.508	0.610	0.018	0.020	0.024
c1	0.457	—	0.610	0.018	—	0.024
D	5.969	6.096	6.223	0.235	0.240	0.245
E	6.350	6.604	6.731	0.250	0.260	0.265
e	1.270 BSC.			0.050 BSC.		
H	9.398	—	10.414	0.370	—	0.410
L	1.270	—	2.032	0.050	—	0.080
L1	—	—	1.016	—	—	0.040
L2	0.889	—	1.270	0.035	—	0.050

NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MIL.
2. DIMENSION L IS MEASURED IN GAUGE PLANE.
3. TOLERANCE 0.10 mm UNLESS OTHERWISE SPECIFIED.
4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
5. REFER TO JEDEC TO-252 (AD).