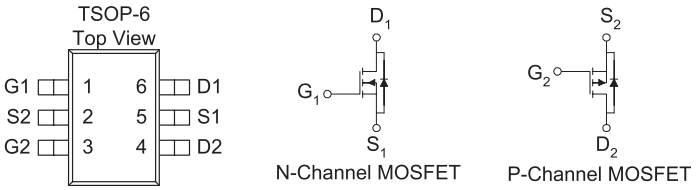
N & P-Channel 32-V (D-S) MOSFET

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.

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe TSOP-6 saves board space
- Fast switching speed
- High performance trench technology

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.063 @ V_{GS} = 10V	3.7
	0.090 @ V_{GS} = 4.5V	3.1
-30	0.112 @ V_{GS} = -10V	-2.7
	0.172 @ V_{GS} = -4.5V	-2.2



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current[a]	T_A=25°C	I_D	3.7	-2.7	A
	T_A=70°C		2.9	-2.1	
Pulsed Drain Current[b]		I_{DM}	8	-8	
Continuous Source Current (Diode Conduction)[a]		I_S	1.05	-1.05	A
Power Dissipation[a]	T_A=25°C	P_D	1.15		W
	T_A=70°C		0.7		
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	N-Channel		P-Channel		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient[a]	t <= 10 sec	R_{thJA}	93	110	93	110	°C/W
	Steady State		130	150	130	150	

Notes

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

b. Pulse width limited by maximum junction temperature

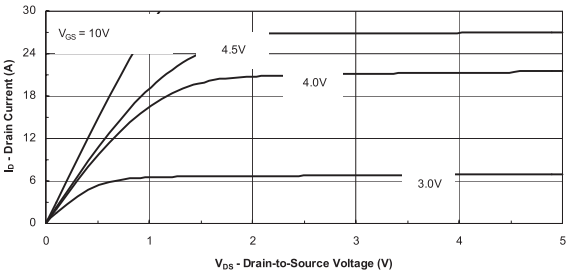
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)							
Parameter	**Symbol**	**Test Conditions**	**Limits**				**Unit**
			Ch	**Min**	**Typ**	**Max**	
Static							
Gate-Threshold Voltage	$V_{GS(th)}$	VGS = VDS, ID = 250 uA	N	1	1.6	2.5	V
		VGS = VDS, ID = -250 uA	P	-1	-1.6	-2.5	
Gate-Body Leakage Current	I_{GSS}	VDS = 0 V, VGS = 20 V	N		4.5nA	100	uA
		V_{DS} = 0 V, V_{GS} = -20 V	P		-4.5nA	-100	
Zero Gate Voltage Drain Current	I_{DSS}	VDS = 24 V, VGS = 0 V	N		12nA	1	uA
		VDS = -24 V, VGS = 0 V	P		-12nA	-1	
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 55°C	N			10	uA
		V_{DS} = -24 V, V_{GS} = 0 V, T_J = 55°C	P			-10	
On-State Drain Current[A]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	N	5			A
		V_{DS} = -5 V, V_{GS} = -10 V	P	-5			
Drain-Source On-Resistance[A]	$r_{DS(on)}$	VGS = 10 V, ID = 3.7 A	N		0.057	0.063	Ω
		VGS = -10 V, ID = 3.1 A	P		0.100	0.112	
		VGS = 4.5 V, ID = 2.7 A	N		0.075	0.090	
		VGS = -4.5 V, ID = -2.2 A	P		0.148	0.172	
Forward Tranconductance[A]	g_{fs}	V_{DS} = 5 V, I_D = 3.7 A	N		10		S
		V_{DS} = -5 V, I_D = 3.1 A	P		5		
Diode Forward Voltage[A]	V_{SD}	I_S = 1.05 A, V_{GS} = 0 V	N		0.80		S
		I_S = -1.05 A, V_{GS} = 0 V	P		-0.83		
Dynamic[b]							
Total Gate Charge	Q_g	N-Channel V_{DS}=15V, V_{GS}=4.5V, I_D=2.7A P-Channel VDS=-15V, VGS=-4.5V, ID=-3.1A	N		2.2	5	nC
			P		3.8	8	
Gate-Source Charge	Q_{gs}		N		0.5	1	
			P		0.6	2	
Gate-Drain Charge	Q_{gd}		N		0.8	2	
			P		1.5	3	
Input Capacitance	C_{iss}	N-Channel V_{DS} = 15 V, V_{GS} = 0 V, f = 1MHz P-Channel VDS=-15V, VGS=0V, f=1MHz	N		184	400	pF
			P		378	800	
Output Capacitance	C_{oss}		N		62	200	
			P		126	300	
Reverse Transfer Capacitance	C_{rss}		N		30	200	
			P		52	300	
Turn-On Delay Time	$t_{d(on)}$	N-Chaneel V_{DD}=15V, VGS=4.5V, ID=1A , R_{GEN}=15Ω, P-Channel VDD=-15V, VGS=-4.5V, ID=-1A RGEN=15Ω	N		5	10	nS
			P		5	10	
Rise Time	t_r		N		12	30	
			P		15	30	
Turn-Off Delay Time	$t_{d(off)}$		N		13	30	
			P		20	40	
Fall-Time	t_f		N		7	20	
			P		20	40	

Notes

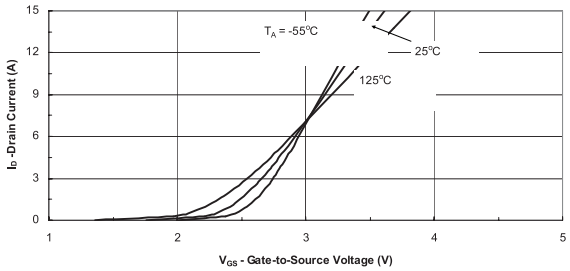
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

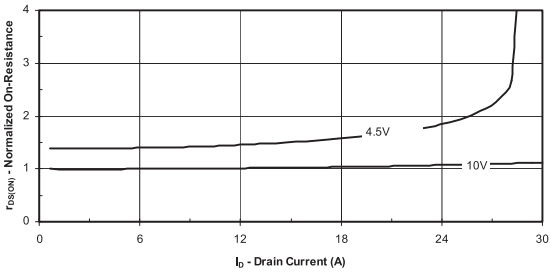
Typical Electrical Characteristics (N-Channel)



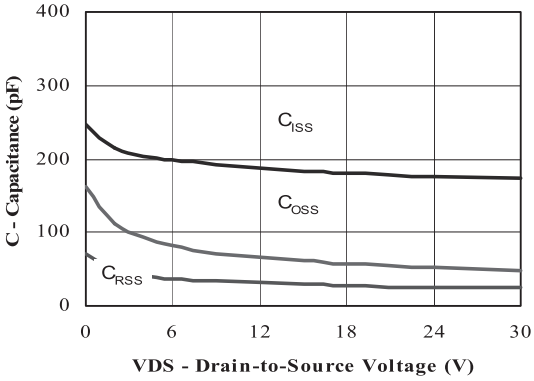
Output Characteristics



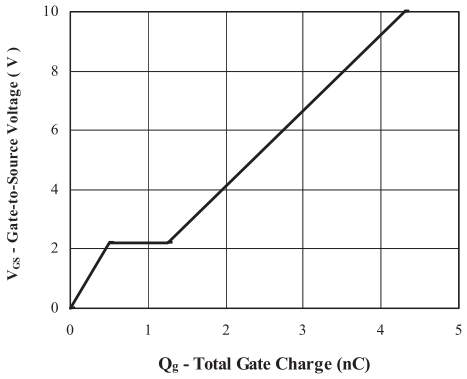
Transfer Characteristics



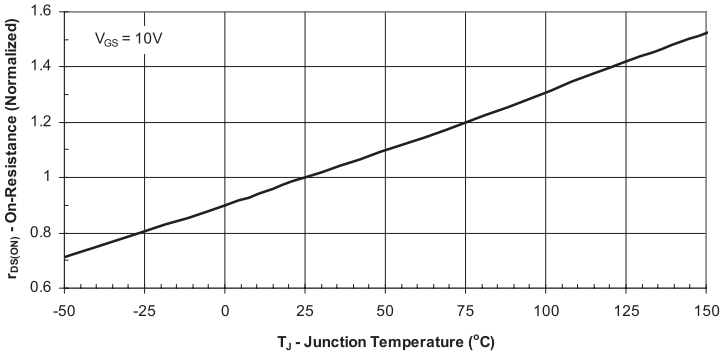
On-Resistance vs. Drain Current



Capacitance

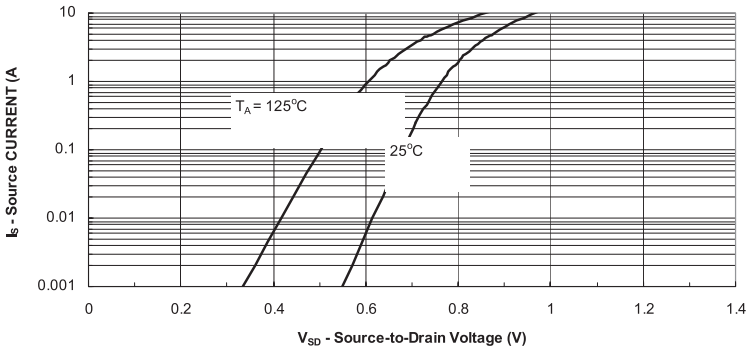


Gate Charge

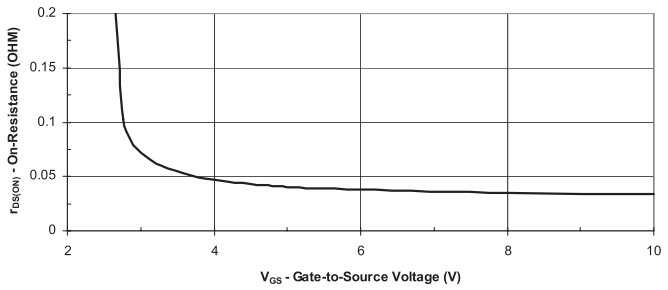


On-Resistance vs. Junction Temperature

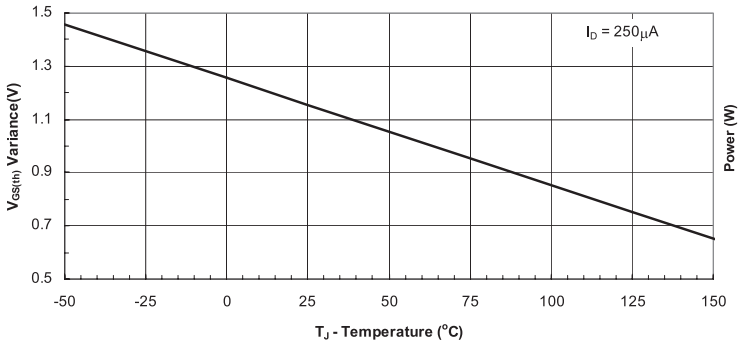
Typical Electrical Characteristics (N-Channel)

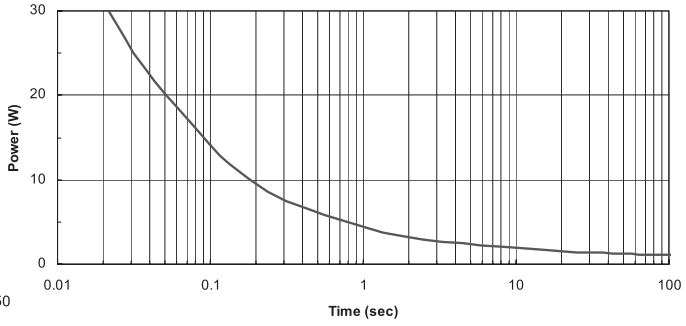


Source-Drain Diode Forward Voltage



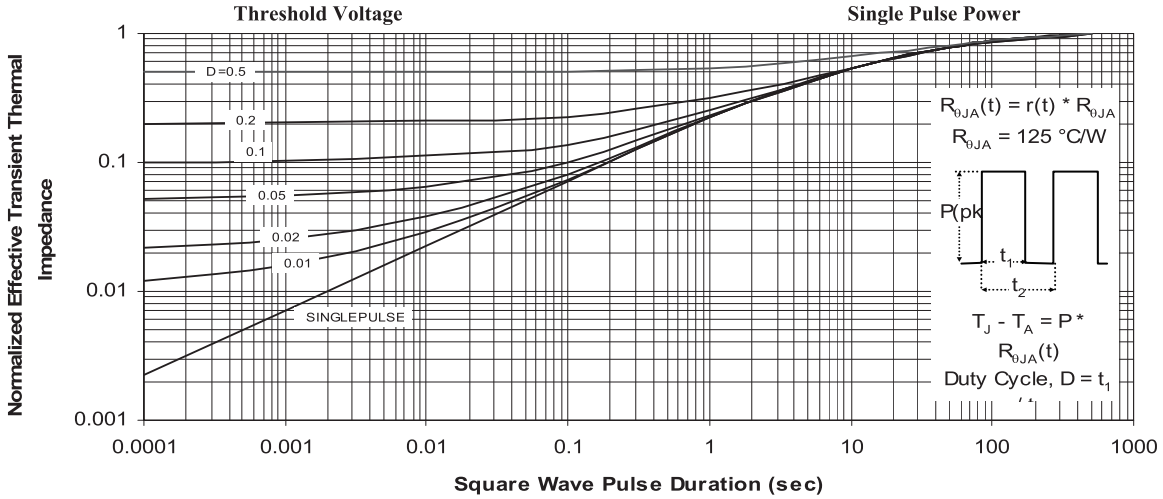
On-Resistance vs.Gate-to Source Voltage





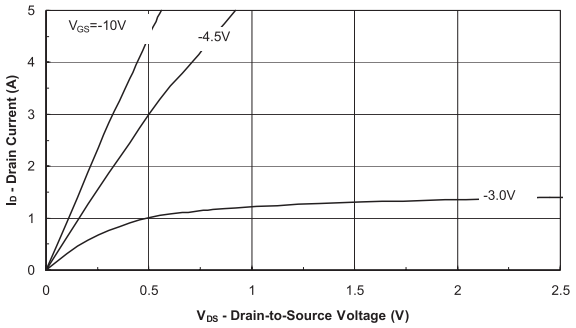
Threshold Voltage

Single Pulse Power

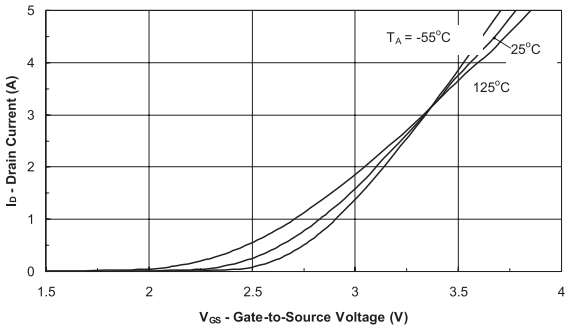


Normalized Thermal Transient Impedance, Junction-to-Ambient

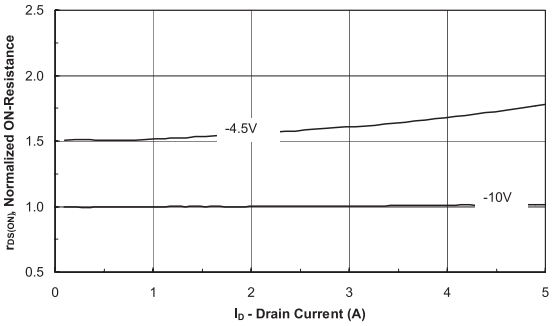
Typical Electrical Characteristics (P-Channel)



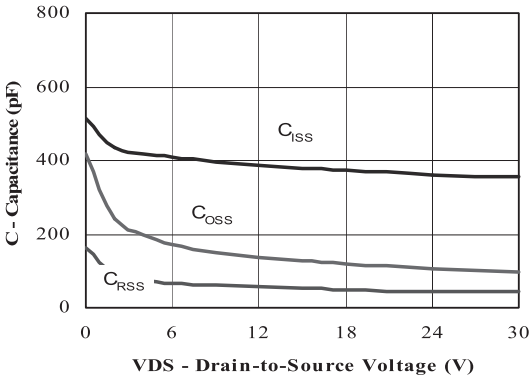
Output Characteristics



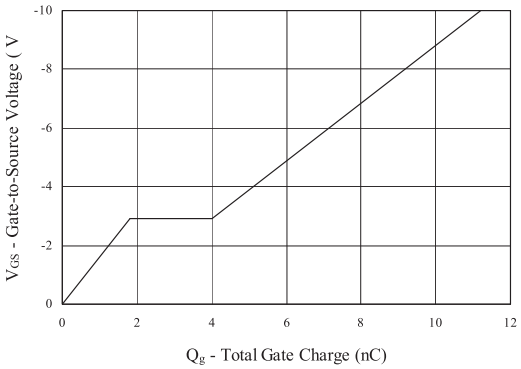
Transfer Characteristics



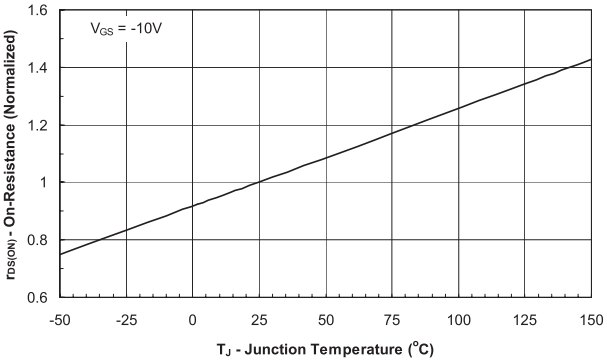
On-Resistance vs. Drain Current



Capacitance

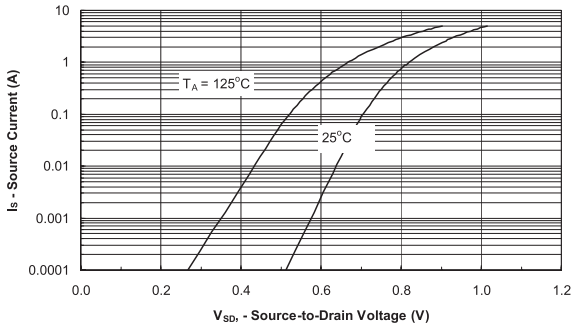


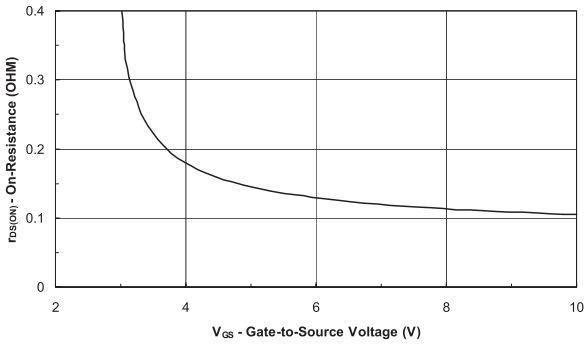
Gate Charge



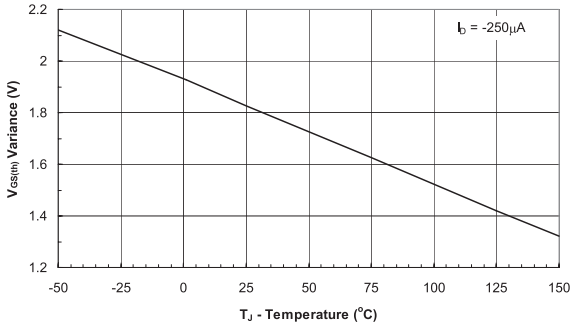
On-Resistance vs. Junction Temperature

Typical Electrical Characteristics (P-Channel)

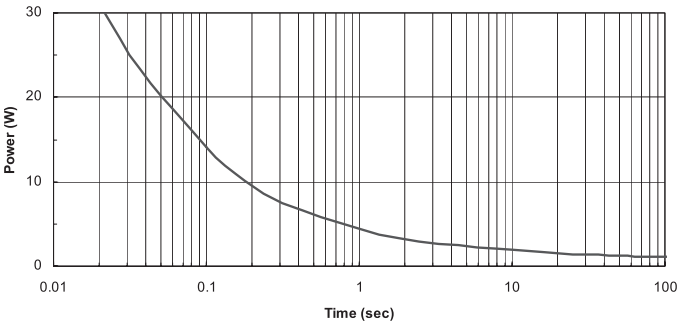




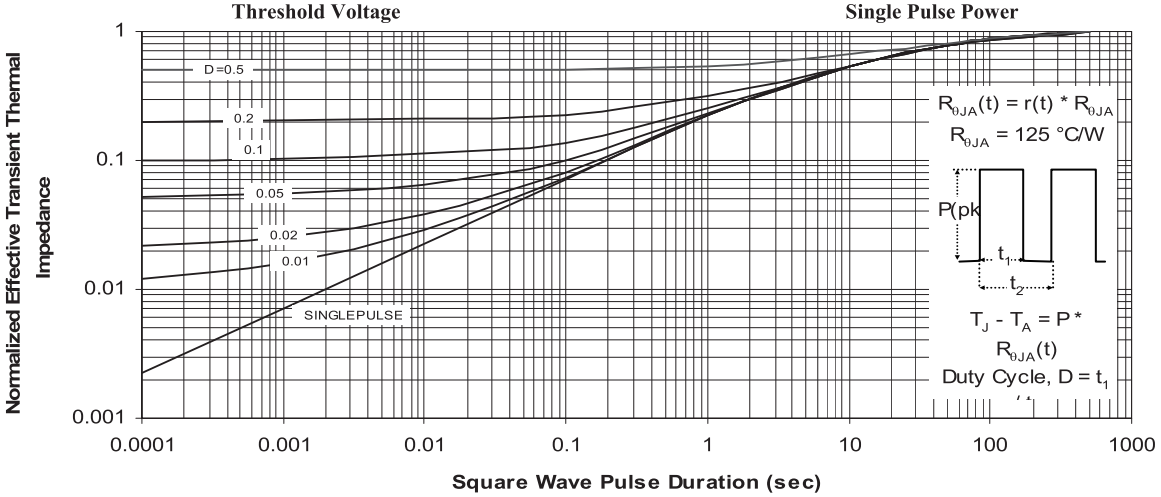
Source-Drain Diode Forward Voltage



On-Resistance vs.Gate-to Source Voltage



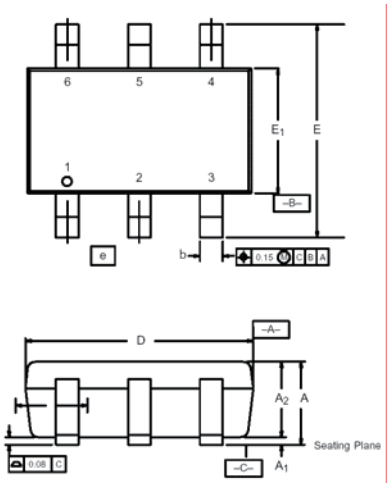
Threshold Voltage **Single Pulse Power**

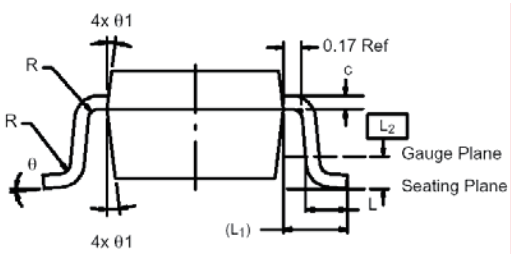


Normalized Thermal Transient Impedance, Junction-to-Ambient

Package Information

TSOP-6: 6LEAD





Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	–	1.10	0.036	–	0.043
A_1	0.01	–	0.10	0.0004	–	0.004
A_2	0.84	–	1.00	0.033	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E_1	1.55	1.65	1.70	0.061	0.065	0.067
e	1.00 BSC			0.0394 BSC		
L	0.35	–	0.50	0.014	–	0.020
L_1	0.60 Ref			0.024 Ref		
L_2	0.25 BSC			0.010 BSC		
R	0.10	–	–	0.004	–	–
θ	0°	4°	8°	0°	4°	8°
θ_1	7° Nom			7° Nom		