

TLTS7428TE/TK

N-Channel Enhancement Mode Power MOSFET

● Features

$V_{DS} = 40V$,

$I_D = 147A$

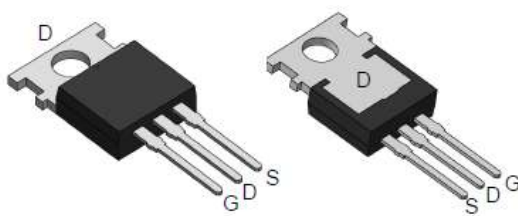
$R_{DS(ON)} @ V_{GS} = 10V$, TYP 1.9 mΩ(TO220)

$R_{DS(ON)} @ V_{GS} = 4.5V$, TYP 2.4 mΩ(TO220)

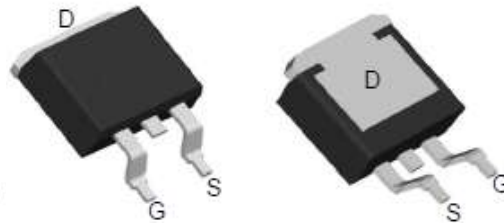
$R_{DS(ON)} @ V_{GS} = 10V$, TYP 1.7 mΩ(TO263)

$R_{DS(ON)} @ V_{GS} = 4.5V$, TYP 2.2 mΩ(TO263)

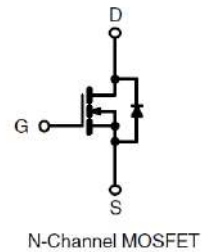
● Pin Configurations



TLTS7428TE
TO220



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TO263



● Absolute Maximum Ratings @ $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DSS}	40	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current (Continuous) *C	I_D	$T_C=25^\circ C$	147
		$T_C=70^\circ C$	117
Drain Current (Pulse) *B	I_{DM}	560	A
Power Dissipation	P_D	83.3	W
Operating Temperature/ Storage Temperature	T_J/T_{STG}	-55~150	$^\circ C$

● Thermal Resistance Ratings

Parameter	Symbol	Maximum	Unit
Maximum Junction-to-Ambient *A	R_{thJA}	50	$^\circ C/W$
Maximum Junction-to-Case (Drain) *A	R_{thJC}	1.5	

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● **Electrical Characteristics** @ $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static* D						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_{DS} = 250\mu A$	1	--	3	V
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	--	--	± 100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$ (TO220)	--	1.9	2.5	m Ω
	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 20A$ (TO220)	--	2.4	3.5	m Ω
	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$ (TO263)	--	1.7	2.5	m Ω
	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 20A$ (TO263)	--	2.2	3.5	m Ω
Diode Forward Voltage	V_{SD}	$I_{SD} = 10A, V_{GS} = 0V$	--	--	1.2	V
Diode Forward Current *AC	I_S	$T_C = 25^\circ\text{C}$	--	--	69	A
Switching						
Total Gate Charge	Q_g	$V_{DS} = 20V, I_D = 20A,$ $V_{GS} = 10V$	--	83	--	nC
Gate-Source Charge	Q_{gs}		--	19	--	nC
Gate-Drain Charge	Q_{gd}		--	17	--	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 20A,$ $V_{GS} = 10V, R_{GEN} = 4.5\Omega,$ $R_L = 1\Omega$	--	13	--	ns
Turn-on Rise Time	t_r		--	45	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	70	--	ns
Turn-Off Fall Time	t_f		--	36	--	ns
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 20V, f = 1\text{MHz}$	--	4875	--	pF
Output Capacitance	C_{oss}		--	1530	--	pF
Reverse Transfer Capacitance	C_{rss}		--	30	--	pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the $t \leq 10s$ junction to ambient thermal resistance rating.

D: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

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- Typical Performance Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

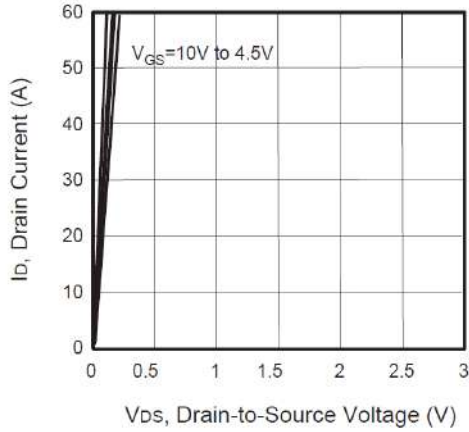


Figure 1. Output Characteristics

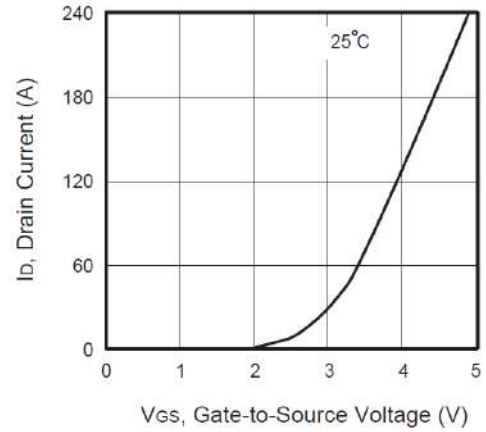


Figure 2. Transfer Characteristics

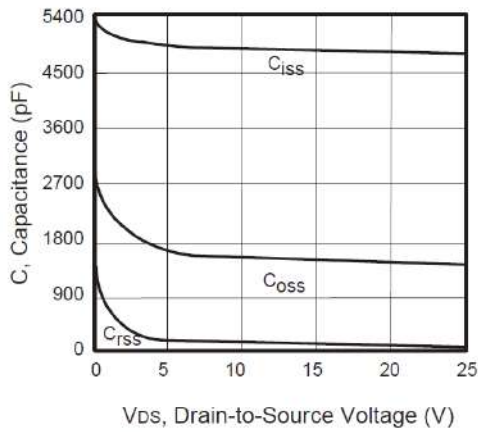


Figure 3. Capacitance

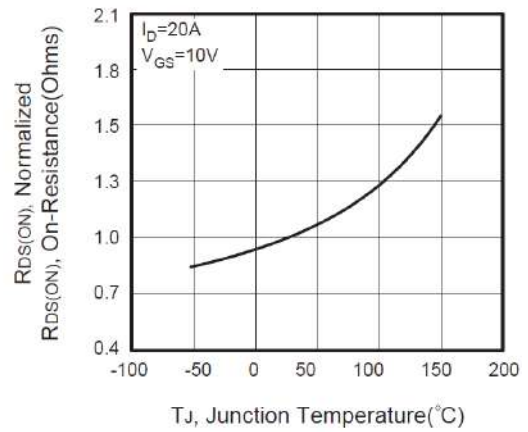


Figure 4. On-Resistance Variation with Temperature

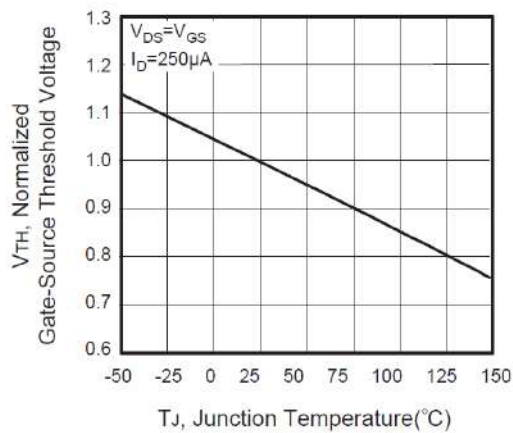


Figure 5. Gate Threshold Variation with Temperature

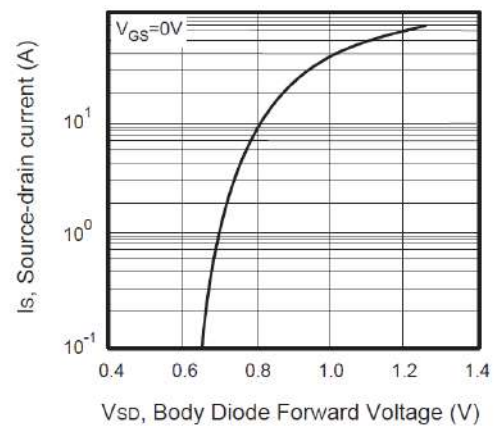


Figure 6. Body Diode Forward Voltage Variation with Source Current

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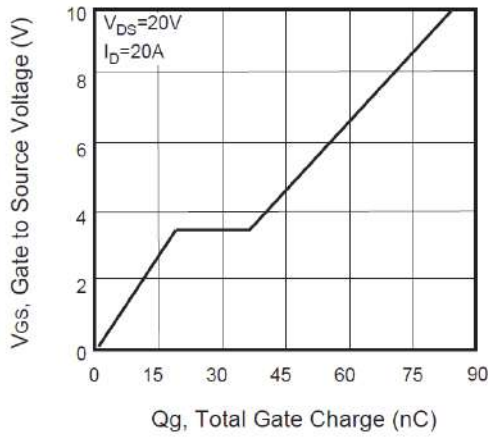


Figure 7. Gate Charge

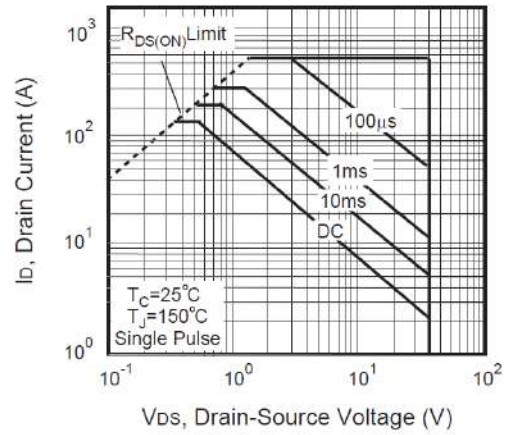


Figure 8. Maximum Safe Operating Area

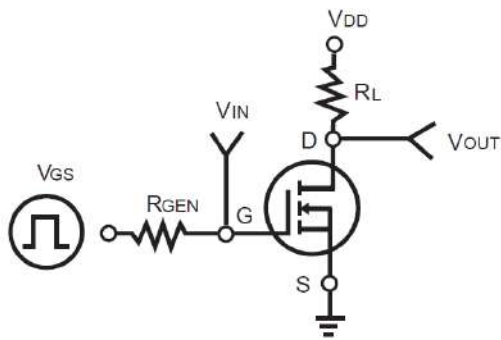


Figure 9. Switching Test Circuit

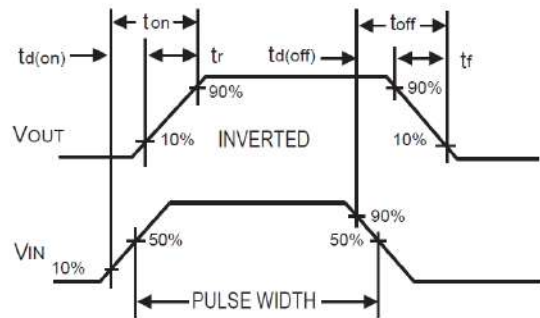


Figure 10. Switching Waveforms

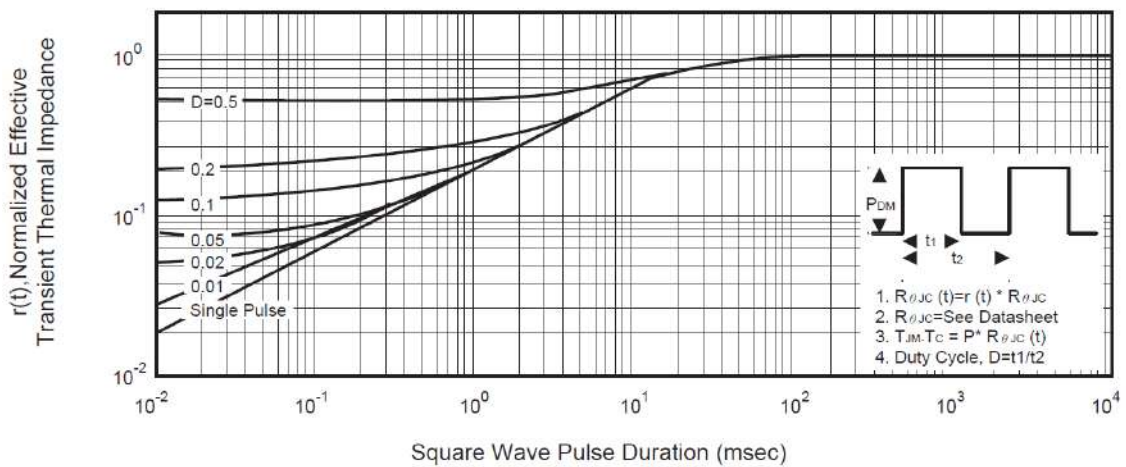
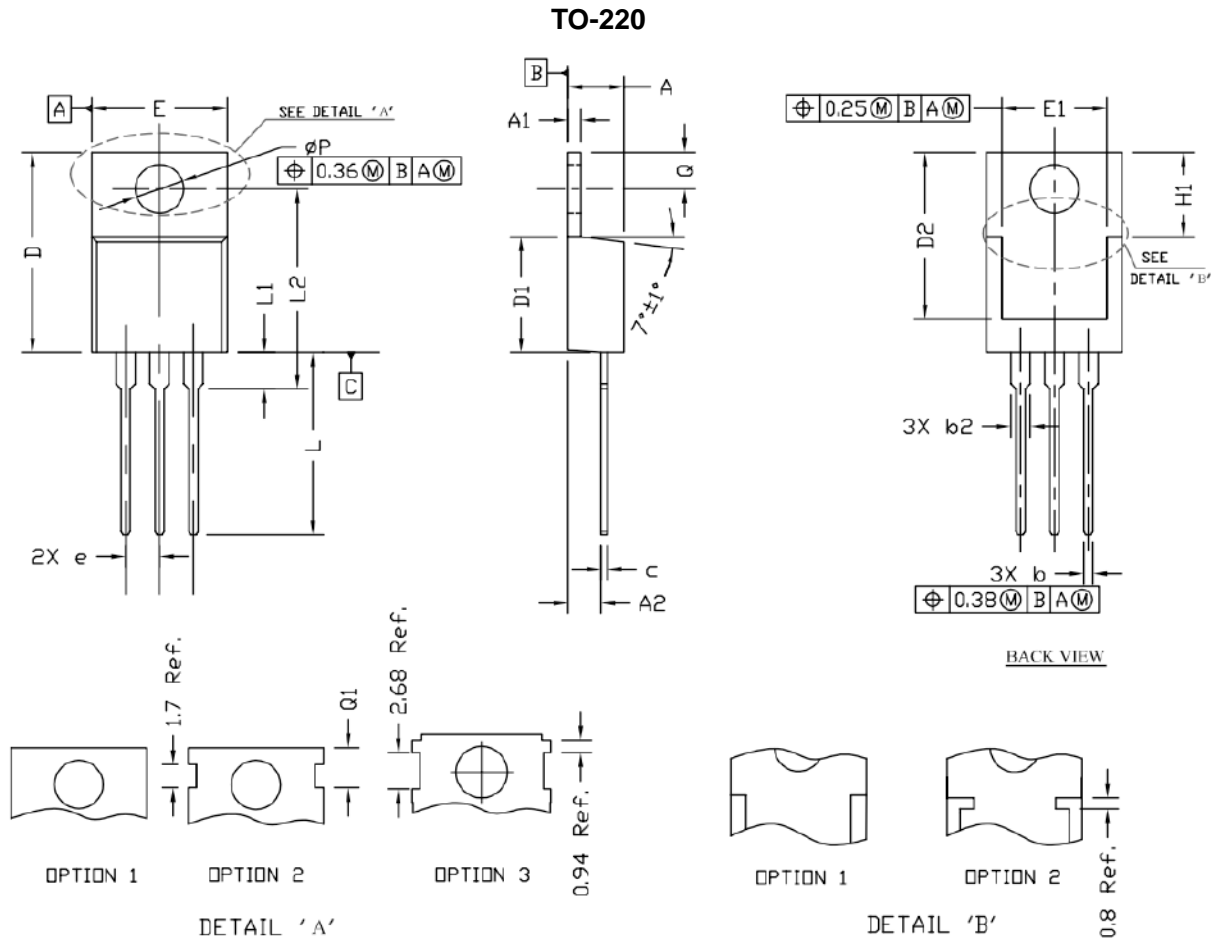


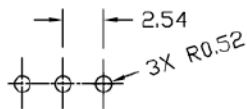
Figure 11. Normalized Thermal Transient Impedance Curve

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● Package Information



RECOMMENDATION OF HOLE PATTERN



UNIT: mm

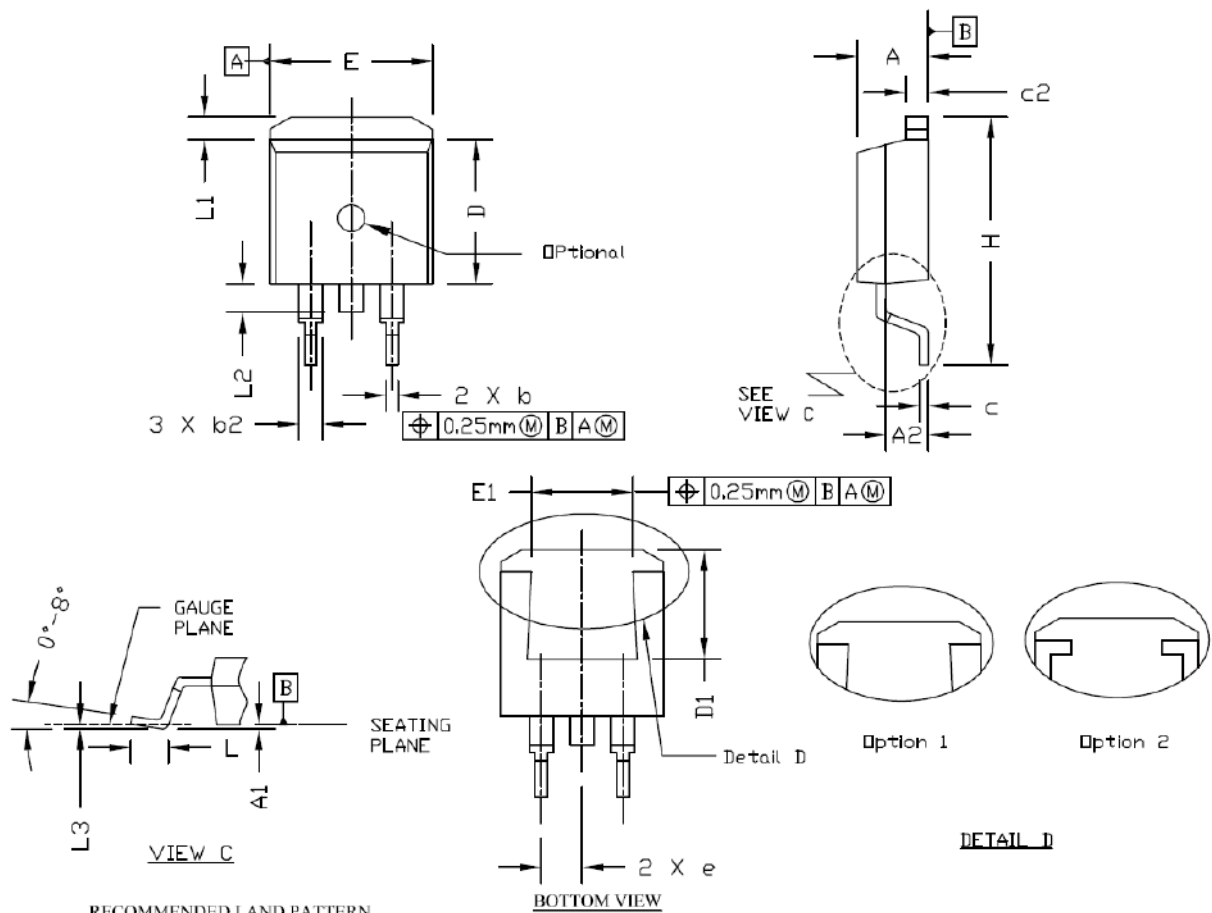
NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MIL.
2. TOLERANCE 0.100 MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

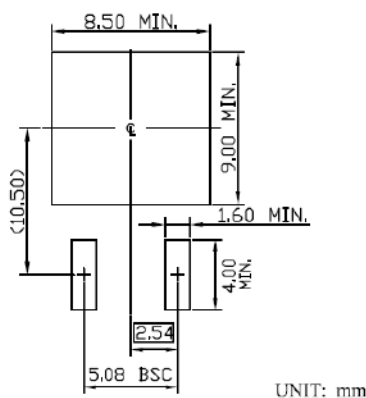
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.45	4.72	0.169	0.175	0.186
A1	1.15	1.27	1.40	0.045	0.050	0.055
A2	2.20	2.67	2.90	0.087	0.105	0.114
b	0.69	0.81	0.95	0.027	0.032	0.037
b2	1.17	1.37	1.45	0.046	0.050	0.068
c	0.36	0.38	0.60	0.014	0.015	0.024
D	14.50	15.44	15.80	0.571	0.608	0.622
D1	8.59	9.14	9.65	0.338	0.360	0.380
D2	11.43	11.73	12.48	0.450	0.462	0.491
e	2.54 BSC			0.100 BSC.		
F	9.66	10.03	10.54	0.380	0.395	0.415
E1	6.22	---	---	0.245	---	---
H1	6.10	6.30	6.50	0.240	0.248	0.256
L	12.27	12.82	14.27	0.483	0.505	0.562
L1	2.47	---	3.90	0.097	---	0.154
L2	---	---	16.70	---	---	0.657
Q	2.59	2.74	2.89	0.102	0.108	0.114
∅P	3.50	3.84	3.89	0.138	0.151	0.153
Q1	2.70	---	2.90	0.106	---	0.114

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TO-263



RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.064	4.45	4.826	0.160	0.175	0.190
A1	0.00	---	0.254	0.000	---	0.010
A2	2.20	2.67	2.90	0.087	0.105	0.114
b	0.508	0.81	0.991	0.020	0.032	0.039
b2	1.143	1.27	1.778	0.045	0.050	0.070
c	0.381	0.50	0.737	0.015	0.020	0.029
c2	1.143	1.27	1.651	0.045	0.050	0.065
D	8.382	9.14	9.652	0.330	0.360	0.380
D1	6.858	8.00	8.37	0.270	0.315	0.330
e	2.54 BSC			0.100 BSC.		
E	9.652	10.03	10.668	0.380	0.395	0.420
E1	6.223	8.00	8.37	0.245	0.315	0.330
H	14.605	15.24	15.875	0.575	0.600	0.625
L	1.778	2.54	2.794	0.070	0.100	0.110
L1	1.02	1.27	1.676	0.040	0.050	0.066
L2	1.27	1.52	1.778	0.50	0.60	0.070
L3	0.25 BSC			0.010 BSC.		

NOTE:

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2. TOLERANCE 0.10 MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. DIMENSION L IS MEASURED IN GAUGE LINE.
4. CONTROLLING DIMENSION IS MILLIMETER.
5. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
6. REFER TO JEDEC TO-263 AB.