élantec
HIGH PERFORMANCE ANALOG INTEGRATED CIRCUITS

EL7144C

Dual Input, High Speed, High Current Power MOSFET Driver

Features

- Logic and input
- 3V and 5V Input compatible
- Clocking speeds up to 10 MHz
- 20 ns Switching/delay time
- 4A Peak drive
- Isolated drains
- Low output impedance—2.5Ω
- Low quiescent current—5 mA
- Wide operating voltage—4.5V–16V

Applications

- Short circuit protected switching
- Under-voltage shut-down circuits
- Switch-mode power supplies
- Motor controls
- Power MOSFET switching
- Switching capacitive loads
- Asymmetrical switching
- Resonant charging
- Cascoded switching

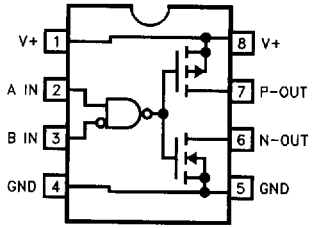
Ordering Information

Part No.	Temp. Range	Pkg.	Outline #
EL7144CN	−40°C to +85°C	8-Pin P-DIP	MDP0031
EL7144CS	−40°C to +85°C	8-Pin SOIC	MDP0027

General Description

The EL7144C dual input, driver achieves excellent switching while providing added flexibility. The 2-input logic and configuration coupled with the "isolated drains" makes this part well suited for various driver applications requiring an asymmetrical drive, resonant charging, and gated control. Providing twice as much drive as the EL7242 family, the EL7144C is excellent for driving large power MOSFET's and other capacitive loads.

Connection Diagram



Top View

EL7144C
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Absolute Maximum Ratings

Supply (V+ to Gnd)	16.5V	Operating Junction Temperature	125°C
Input Pins	−0.3V to +0.3V above V+	Power Dissipation	
Peak Output Current	4A	SOIC	570 mW
Storage Temperature Range	−65°C to +150°C	PDIP	1050 mW
Ambient Operating Temperature	−40°C to +85°C		

Important Note:
All parameters having Min/Max specifications are guaranteed. The Test Level column indicates the specific device testing actually performed during production and Quality inspection. Elantec performs most electrical tests using modern high-speed automatic test equipment, specifically the LTX77 Series system. Unless otherwise noted, all tests are pulsed tests, therefore $T_J = T_C = T_A$.

Test Level	Test Procedure
I	100% production tested and QA sample tested per QA test plan QCX0002.
II	100% production tested at T_A = 25°C and QA sample tested at T_A = 25°C, T_{MAX} and T_{MIN} per QA test plan QCX0002.
III	QA sample tested per QA test plan QCX0002.
IV	Parameter is guaranteed (but not tested) by Design and Characterization Data.
V	Parameter is typical value at T_A = 25°C for information purposes only.

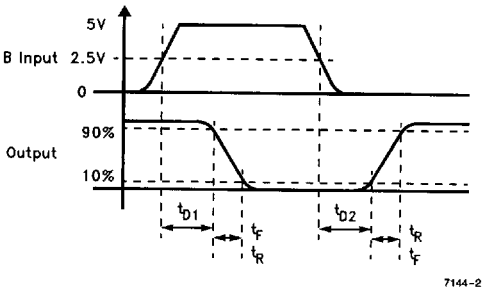
DC Electrical Characteristics T_A = 25°C, V+ = 15V unless otherwise specified

Parameter	Description	Test Conditions	Min	Typ	Max	Test Level	Units
Input							
V_{IH}	Logic "1" Input Voltage		2.4			I	V
I_{IH}	Logic "1" Input Current	V_{IH} = V+		0.1	10	I	µA
V_{IL}	Logic "0" Input Voltage				0.8	I	V
I_{IL}	Logic "0" Input Current	V_{IL} = GND		0.1	10	I	µA
V_{HYS}	Input Hysteresis			0.3		V	V
Output							
R_{OH}	Pull-Up Resistance	I_{OUT} = −100 mA		1.5	4	I	Ω
R_{OL}	Pull-Down Resistance	I_{OUT} = +100 mA		2	4	I	Ω
I_{OUT}	Output Leakage Current	V+/GND		0.2	10	I	µA
I_{PK}	Peak Output Current	Source Sink		4 4		V	A
I_{DC}	Continuous Output Current	Source/Sink	200			I	mA
Power Supply							
I_S	Power Supply Current	Inputs V+		1	2.5	I	mA
V_S	Operating Voltage		4.5		16	I	V

AC Electrical Characteristics T_A = 25°C, V = 15V unless otherwise specified

Parameter	Description	Test Conditions	Min	Typ	Max	Test Level	Units
Switching Characteristics							
t_R	Rise Time	C_L = 1000 pF C_L = 2000 pF		7.5 10	 20	IV	ns
t_F	Fall Time	C_L = 1000 pF C_L = 2000 pF		10 13	 20	IV	ns
t_{D-ON}	Turn-On Delay Time	See Timing Table		18	25	IV	ns
t_{D-OFF}	Turn-Off Delay Time	See Timing Table		20	25	IV	ns

Timing Table



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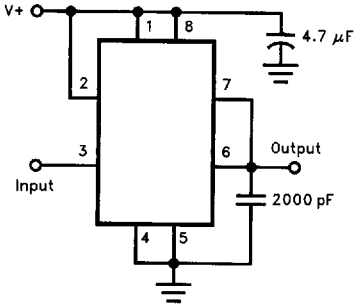
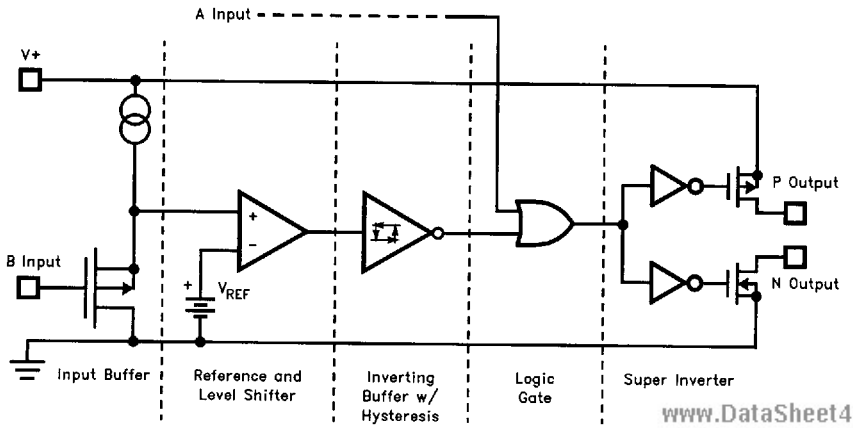
Standard Test Configuration



7144-3

Simplified Schematic



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EL7144C
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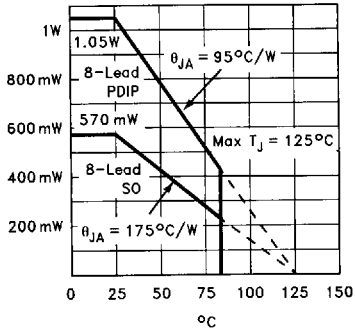
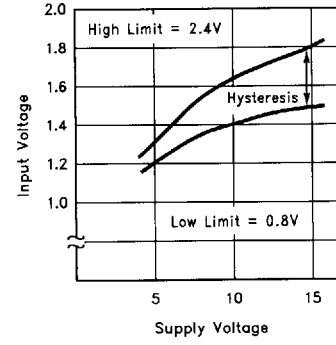
Typical Performance Curve

Max Power/Derating Curves



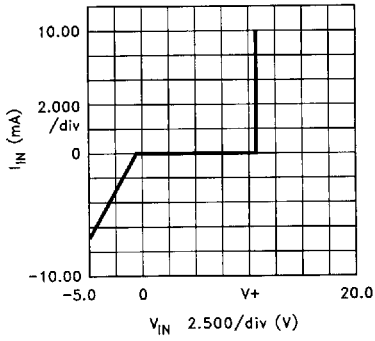
7144-5

Switch Threshold vs Supply Voltage



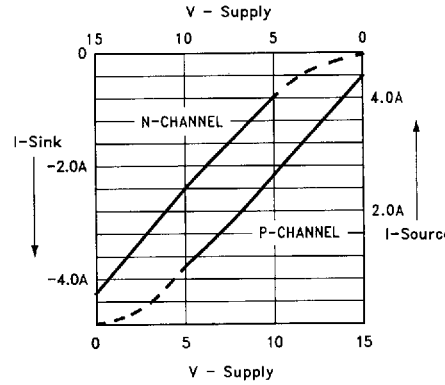
7144-6

Input Current vs Voltage



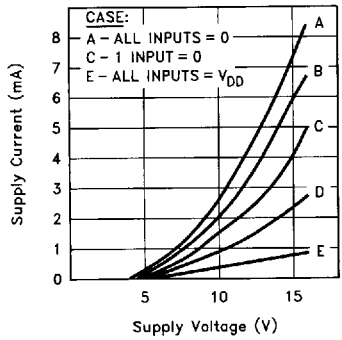
7144-7

Peak Drive vs Supply Voltage



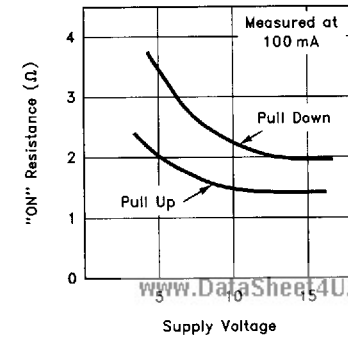
7144-8

Quiescent Supply Current



7144-9

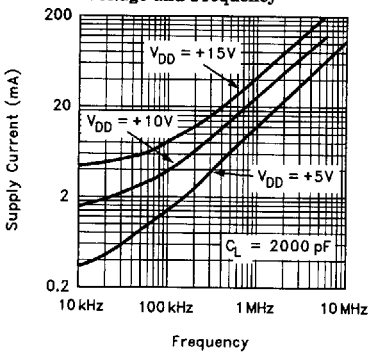
"ON" Resistance vs Supply Voltage



7144-10

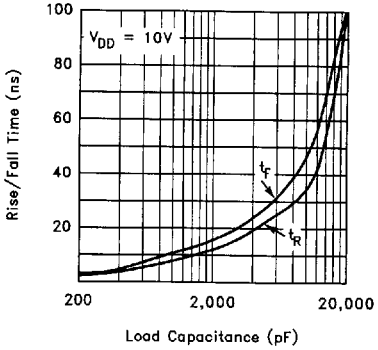
Typical Performance Curve — Contd.

Average Supply Current vs Voltage and Frequency



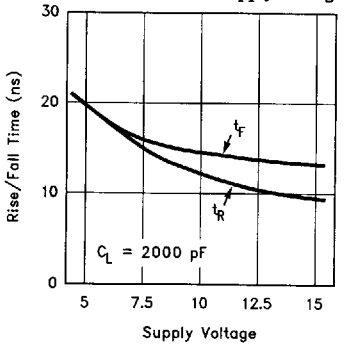
7144-11

Rise/Fall Time vs Load



7144-13

Rise/Fall Time vs Supply Voltage



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EL7144C
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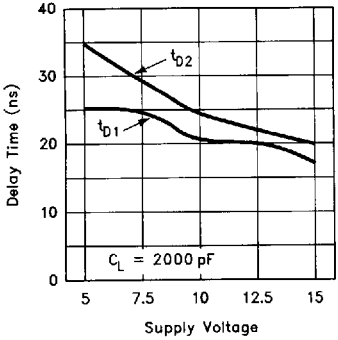
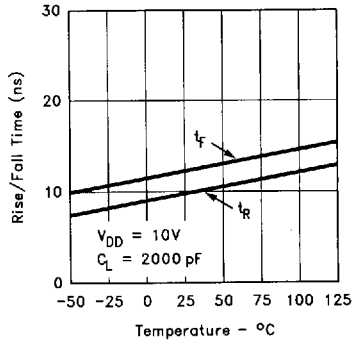
Typical Performance Curve — Contd.

Propagation Delay vs Supply Voltage



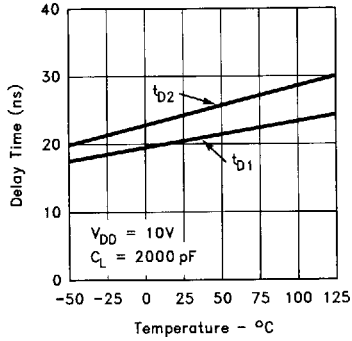
7144-15

Rise/Fall Time vs Temperature



7144-16

Delay vs Temperature



7144-17

Soldering Packages to PC Boards

DIP Packages

Wave soldering is recommended for DIP packages. Solder plated boards are recommended. Rosin mildly activated (RMA) flux is needed. Wave soldering using a dual wave system at 250°C ±10°C for two seconds per wave is preferable. Thorough cleaning of boards after soldering is required.

Hand soldering, Elantec's DIP packages will survive a peak temperature of 300°C (at leads) for a maximum period of 10 seconds.

Surface Mount Packages

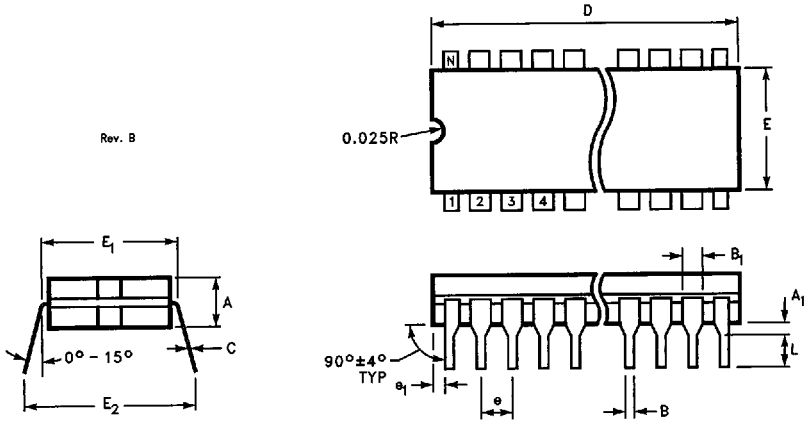
Wave soldering and vapor phase or infrared (IR) reflow can be used for soldering surface mount packages to PC boards. Solder plated boards are recommended for wave soldering and vapor phase or IR reflow methods.

Wave Soldering: Adhesive is used to hold components on the boards during wave soldering. Place components on the board and cure adhesive before wave soldering. Rosin mildly activated (RMA) flux or organic flux is needed. Wave soldering using a dual wave system at 250°C ±10°C for a maximum of two seconds per wave is preferable. Thorough cleaning of boards after soldering is required.

Reflow Soldering: Screen solder paste on board and attach components to board. Solder paste with RMA flux is recommended. Bake boards at 65°C–90°C for 15 minutes. Preheat boards to within 60°C–70°C of the solder temperature. To reflow solder paste with vapor phase method, the solder paste temperature must be maintained at or above 200°C for at least 30 seconds. The components temperature can not exceed 215°C. For the IR reflow method, the solder paste temperature must be maintained at or above 200°C for at least 30 seconds. The components temperature can not exceed 220°C. The temperature/time ramp-up during vapor phase or IR reflow shall be no greater than 2°C/sec.

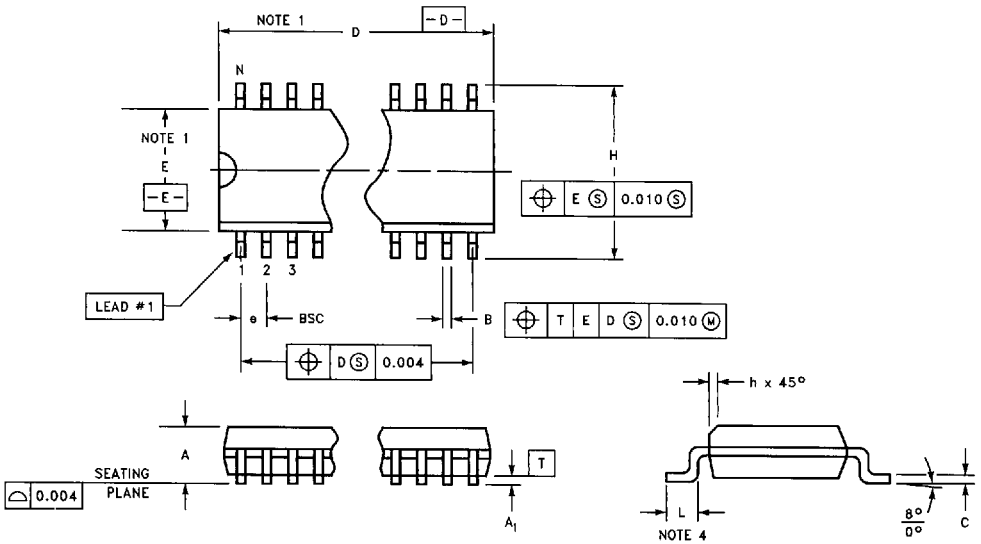
Hand soldering, Elantec's surface mount packages will survive a peak temperature of 260°C (at leads) for a maximum period of 10 seconds.

Package Outlines



MDP0016 Rev. B
CerDIP Package
Lead Finish (Coml)—Tin Plate or Hot Solder DIP
Lead Finish (Mil)—Hot Solder DIP

Common Dimensions	Min	Max	Min	Max	Min	Max	Min	Max
A	0.140	0.160	0.140	0.160	0.140	0.160	0.140	0.160
A_1	0.115	0.055	0.020	0.050	0.015	0.060	0.020	0.050
B	0.016	0.023	0.016	0.021	0.014	0.026	0.016	0.021
B_1	0.050	0.065	0.050	0.060	0.038	0.068	0.050	0.060
C	0.008	0.012	0.008	0.012	0.008	0.018	0.008	0.012
D	0.375	0.395	0.760	0.785	0.940	0.960	1040.925	1.060
E	0.245	0.265	0.220	0.291	0.220	0.310	0.2780	0.298
E_1	0.300	0.320	0.300	0.320	0.290	0.320	0.300	0.320
E_2	0.340	0.390	0.340	0.390	0.360	0.410	0.340	0.390
e	0.090	0.110	0.090	0.110	0.090	0.110	0.090	0.110
e_1	0.020	0.055	0.078	0.098	0.068	0.098	0.078	0.098
L	0.125	0.150	0.125	0.150	0.125	0.150	0.150	0.150
N	8-Lead		14-Lead		18-Lead		20-Lead	



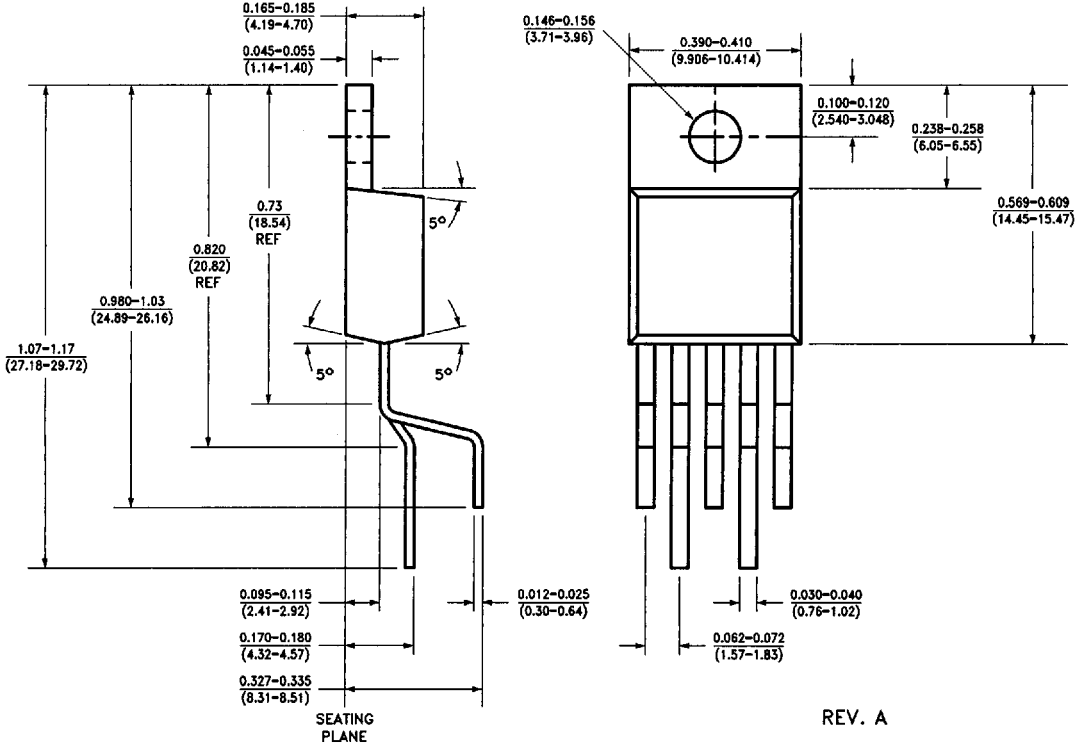
REV. C

Note 1: These dimensions do not include mold flash or protrusions. Mold flash protrusion shall not exceed .006" on any side.
Note 2: SO-8, SO-14, S0-16 packages are narrow body (0.150").
Note 3: Dimensions and tolerancing per ANSI Y14.5M-1982.
Note 4: Flat area of lead foot.
Note 5: SOL-24T2 (thermal package) has 2 fused leads on each side of package.
Note 6: SOL-20T (thermal package) has 4 fused leads on each side of package.
Note 7: SOL-28T contains a thermal metal slug.

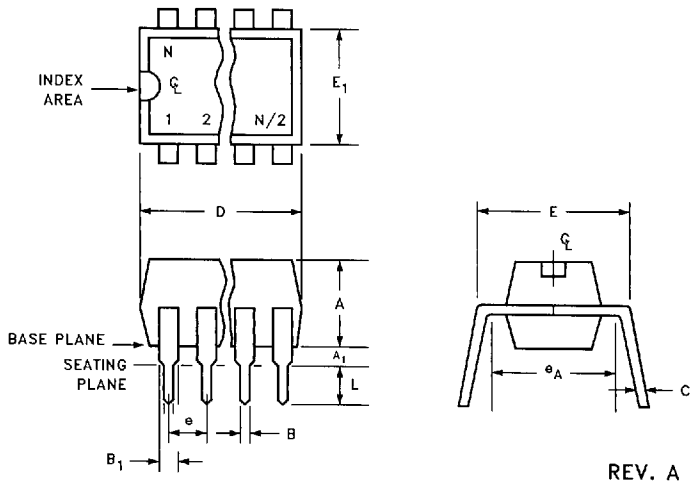
MDP0027 Rev. C
Package Outline—SOIC
Lead Finish—Solder Plate

Symbol	Lead Count													
	SOL-28		SOL-20		SOL-16		SO-16		SO-14		SO-8		SOL-24	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
A	0.096	0.104	0.096	0.104	0.096	0.104	0.061	0.068	0.061	0.068	0.061	0.068	0.096	0.104
A_1	0.004	0.011	0.004	0.011	0.004	0.011	0.004	0.010	0.004	0.010	0.004	0.010	0.004	0.011
B	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019
C	0.009	0.012	0.009	0.012	0.009	0.012	0.008	0.010	0.008	0.010	0.008	0.010	0.009	0.012
D	0.696	0.712	0.498	0.510	0.397	0.430	0.386	0.394	0.337	0.344	0.189	0.196	0.598	0.614
E	0.291	0.299	0.291	0.299	0.291	0.299	0.150	0.157	0.150	0.157	0.150	0.157	0.291	0.299
e	0.050 BSC		0.050 BSC		0.050 BSC		0.050 BSC		0.050 BSC		0.050 BSC		0.050 BSC	
H	0.398	0.414	0.398	0.414	0.398	0.414	0.230	0.244	0.230	0.244	0.230	0.244	0.398	0.414
h	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016
L	0.016	0.024	0.016	0.024	0.016	0.024	0.016	0.024	0.016	0.024	0.016	0.024	0.016	0.024

Package Outlines



MDP0028 Rev. A
5-Lead TO-220
Lead Finish—Solder Plate



MDP0031 Rev. A
Plastic Package
Lead Finish—Hot Solder DIP

Common Dimensions	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
A_1	0.020	0.040	0.020	0.040	0.020	0.040	0.020	0.040	0.020	0.040
A	0.125	0.145	0.125	0.145	0.125	0.145	0.125	0.145	0.125	0.145
B	0.016	0.020	0.016	0.020	0.016	0.020	0.016	0.020	0.015	0.021
B_1	0.050	0.070	0.050	0.070	0.050	0.070	0.050	0.070	0.050	0.070
C	0.008	0.012	0.008	0.012	0.008	0.012	0.008	0.012	0.008	0.012
D	0.350	0.385	0.745	0.755	0.745	0.755	0.875	0.905	0.925	1.045
E	0.295	0.320	0.295	0.320	0.295	0.320	0.295	0.320	0.295	0.320
E_1	0.245	0.255	0.245	0.255	0.245	0.255	0.245	0.255	0.245	0.255
e	0.100 Typ		0.100 Typ		0.100 Typ		0.100 Typ		0.100 Typ	
e_A	0.300 Ref		0.300 Ref		0.300 Ref		0.300 Ref		0.300 Ref	
L	0.115	0.135	0.115	0.135	0.115	0.135	0.115	0.135	0.115	0.135
N	8		14		16		18		20	

Note: Package outline exclusive of any mold flashes. Mold flash protrusion shall not exceed 0.006" on any side.