EL7202, EL7212, EL7222

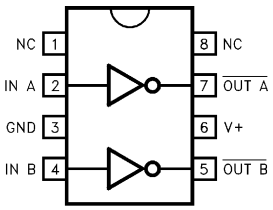
High Speed, Dual Channel Power MOSFET Drivers

FN7282
Rev.2.01
Feb 18, 2020

The EL7202, EL7212, EL7222 ICs are matched dual-drivers that improve the operation of the industry standard DS0026 clock drivers. The Elantec versions are very high speed drivers capable of delivering peak currents of 2.0 amps into highly capacitive loads. The high speed performance is achieved by means of a proprietary “Turbo-Driver” circuit that speeds up input stages by tapping the wider voltage swing at the output. Improved speed and drive capability are enhanced by matched rise and fall delay times. These matched delays maintain the integrity of input-to-output pulse-widths to reduce timing errors and clock skew problems. This improved performance is accompanied by a 10 fold reduction in supply currents over bipolar drivers, yet without the delay time problems commonly associated with CMOS devices. Dynamic switching losses are minimized with non-overlapped drive techniques.

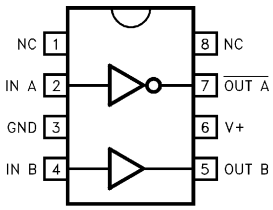
Pinouts

EL7212
(8-PIN PDIP, SO)
TOP VIEW



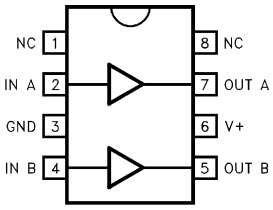
INVERTING DRIVERS

EL7222
(8-PIN PDIP, SO)
TOP VIEW



COMPLEMENTARY DRIVERS

EL7202
(8-PIN PDIP, SO)
TOP VIEW



NON-INVERTING DRIVERS

Manufactured under U.S. Patent Nos. 5,334,883, #5,341,047

Features

- Industry standard driver replacement
- Improved response times
- Matched rise and fall times
- Reduced clock skew
- Low output impedance
- Low input capacitance
- High noise immunity
- Improved clocking rate
- Low supply current
- Wide operating voltage range
- Pb-Free available (RoHS compliant)

Applications

- Clock/line drivers
- CCD Drivers
- Ultra-sound transducer drivers
- Power MOSFET drivers
- Switch mode power supplies
- Class D switching amplifiers
- Ultrasonic and RF generators
- Pulsed circuits

Ordering Information

Part Number	PART MARKING	TAPE & REEL	PACKAGE	PKG. DWG. #
EL7202CN **(No longer available, recommended replacement: EL7202CSZ)**	EL7202CN	-	8 Ld PDIP	E8.3
EL7202CSZ (See Note)	7202CSZ	-	8 Ld SOIC (Pb-free)	M8.15E
EL7202CSZ-T7 (See Note)	7202CSZ	7”	8 Ld SOIC (Pb-free)	M8.15E
EL7202CSZ-T13 (See Note)	7202CSZ	13”	8 Ld SOIC (Pb-free)	M8.15E
EL7212CNZ	EL7212CN Z	-	8 Ld PDIP* (Pb-free)	E8.3
EL7212CSZ (See Note)	7212CSZ	-	8 Ld SOIC (Pb-free)	M8.15E
EL7212CSZ-T7 (See Note)	7212CSZ	7”	8 Ld SOIC (Pb-free)	M8.15E
EL7212CSZ-T13 (See Note)	7212CSZ	13”	8 Ld SOIC (Pb-free)	M8.15E
EL7222CSZ (See Note)	7222CSZ	-	8 Ld SOIC (Pb-free)	M8.15E
EL7222CSZ-T7 (See Note)	7222CSZ	7”	8 Ld SOIC (Pb-free)	M8.15E
EL7222CSZ-T13 (See Note)	7222CSZ	13”	8 Ld SOIC (Pb-free)	M8.15E

NOTE: Pb-free products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.

*Pb-free PDIPs can be used for through hole wave solder processing only. They are not intended for use in Reflow solder processing applications.

Absolute Maximum Ratings (T_A = 25°C)

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

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typical values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore: $T_J = T_C = T_A$

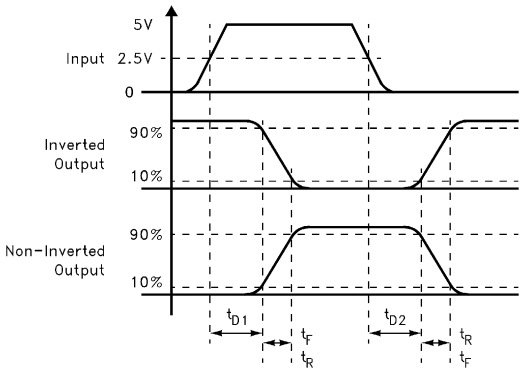
DC Electrical Specifications T_A = 25°C, V = 15V unless otherwise specified

parameter	Description	Test Conditions	Min	Typ	Max	Units
INPUT						
V_{IH}	Logic "1" Input Voltage		2.4			V
I_{IH}	Logic "1" Input Current	@V+		0.1	10	µA
V_{IL}	Logic "0" Input Voltage				0.8	V
I_{IL}	Logic "0" Input Current	@0V		0.1	10	µA
V_{HVS}	Input Hysteresis			0.3		V
OUTPUT						
R_{OH}	Pull-Up Resistance	I_{OUT} = -100mA		3	6	Ω
R_{OL}	Pull-Down Resistance	I_{OUT} = +100mA		4	6	Ω
I_{PK}	Peak Output Current	Source Sink		2 2		A
I_{DC}	Continuous Output Current	Source/Sink	100			mA
POWER SUPPLY						
I_S	Power Supply Current	Inputs High/EL7202 Inputs High/EL7212 Inputs High/EL7222		4.5 1 2.5	7.5 2.5 5.0	mA
V_S	Operating Voltage		4.5		15	V

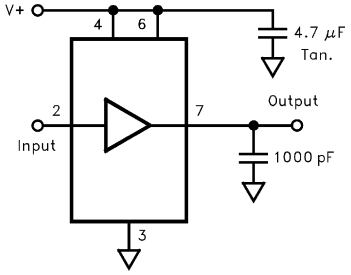
AC Electrical Specifications T_A = 25°C, V = 15V unless otherwise specified

parameter	Description	Test Conditions	Min	Typ	Max	Units
SWITCHING CHARACTERISTICS						
t_R	Rise Time	C_L = 500pF C_L = 1000pF		7.5 10	 20	ns
t_F	Fall Time	C_L = 500pF C_L = 1000pF		10 13	 20	ns
t_{D1}	Turn-On Delay Time	See Timing Table		18	25	ns
t_{D2}	Turn-Off Delay Time	See Timing Table		20	25	ns

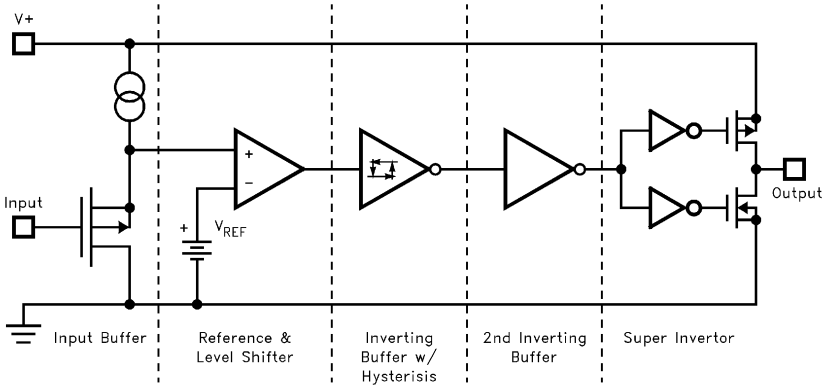
Timing Table



Standard Test Configuration

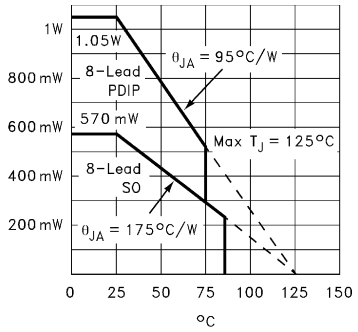


Simplified Schematic

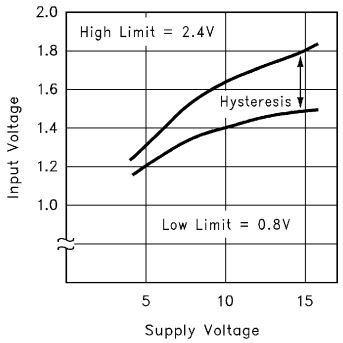


Typical Performance Curves

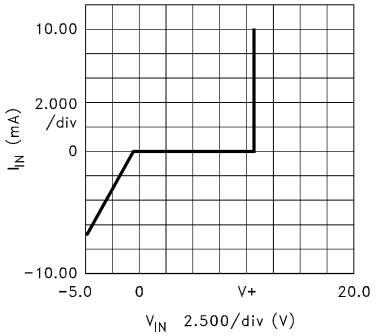
MAX POWER/DERATING CURVES



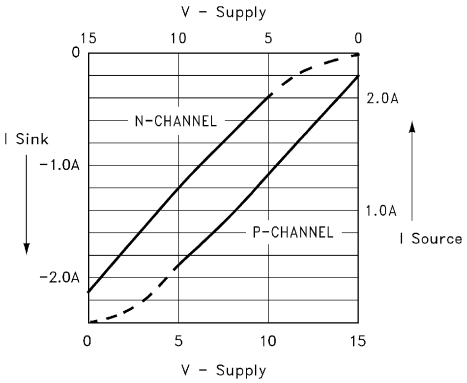
SWITCH THRESHOLD vs SUPPLY VOLTAGE



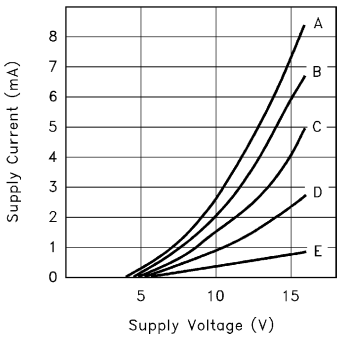
INPUT CURRENT vs VOLTAGE



PEAK DRIVE vs SUPPLY VOLTAGE



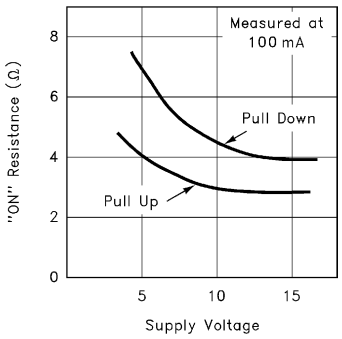
QUIESCENT SUPPLY CURRENT



CASE:

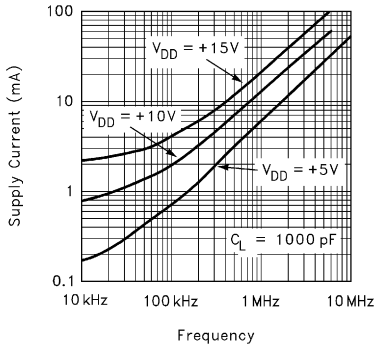
Device	Input Level	Curve
EL7202	GND	A
EL7202	GND, V+	B
EL7202	V+	C
EL7212	GND	C
EL7212	GND, V+	D
EL7212	V+	E
EL7222	GND	B
EL7222	GND, V+	C
EL7222	V+	D

"ON" RESISTANCE vs SUPPLY VOLTAGE

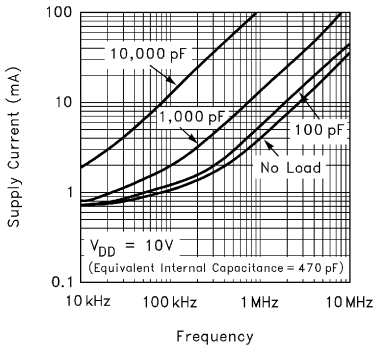


Typical Performance Curves (Continued)

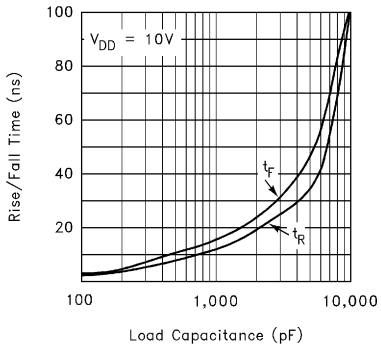
AVERAGE SUPPLY CURRENT vs VOLTAGE AND FREQUENCY



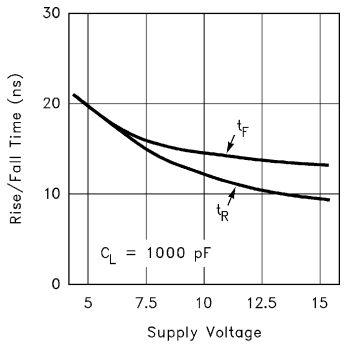
AVERAGE SUPPLY CURRENT vs CAPACITIVE LOAD



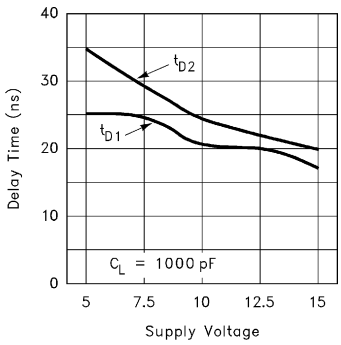
RISE/FALL TIME vs LOAD



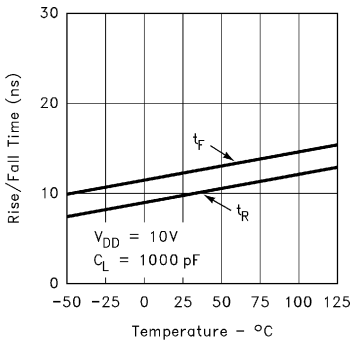
RISE/FALL TIME vs SUPPLY VOLTAGE



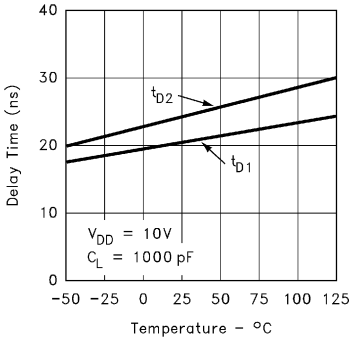
PROPAGATION DELAY vs SUPPLY VOLTAGE



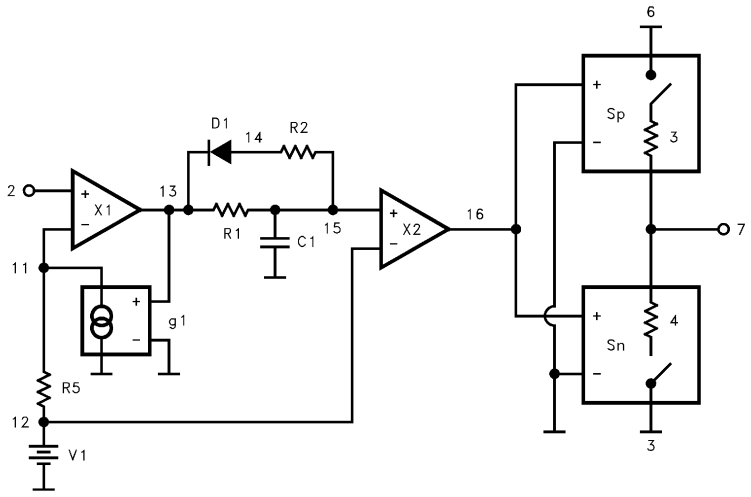
RISE/FALL TIME vs TEMPERATURE



DELAY vs TEMPERATURE



EL7212 Macro Model



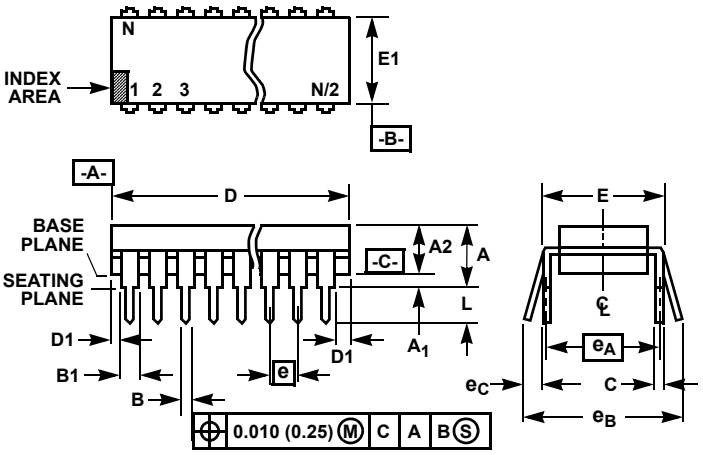

```
**** EL7212 model ****
*                    input
*                    |     gnd
*                    |     |     Vsupply
*                    |     |     |     Vout
.subckt M7212    2     3     6     7
V1 12 3 1.6
R1 13 15 1k
R2 14 15 5k
R5 11 12 100
C1 15 3 43.3 pF
D1 14 13 dmod
X1 13 11 2 3 comp1
X2 16 12 15 3 comp1
sp 6 7 16 3 spmod
sn 7 3 16 3 snmod
g1 11 0 13 0 938µ
.model dmod d
.model spmod vswitch ron3 roff2meg von1 voff1.5
.model snmod vswitch ron4 roff2meg von3 voff2
.ends M7212
.subckt comp1 out inp inm vss
e1 out vss table { (v(inp) v(inm))* 5000}   (0,0) (3.2,3.2)
Rout out vss 10meg
Rinp inp vss 10meg
Rinm inm vss 10meg
.ends comp1
```

Revision History

The revision history provided is for informational purposes only and is believed to be accurate, but not warranted. Please visit our website to make sure you have the latest revision.

DATE	REVISION	CHANGE
Feb 18, 2020	2.01	Updated ordering information table. Added Revision History Replaced POD MDP0031 with E8.3 POD. Replaced POD MDP0027 with M8.15E POD. Updated disclaimer

Package Outline Drawings



NOTES:

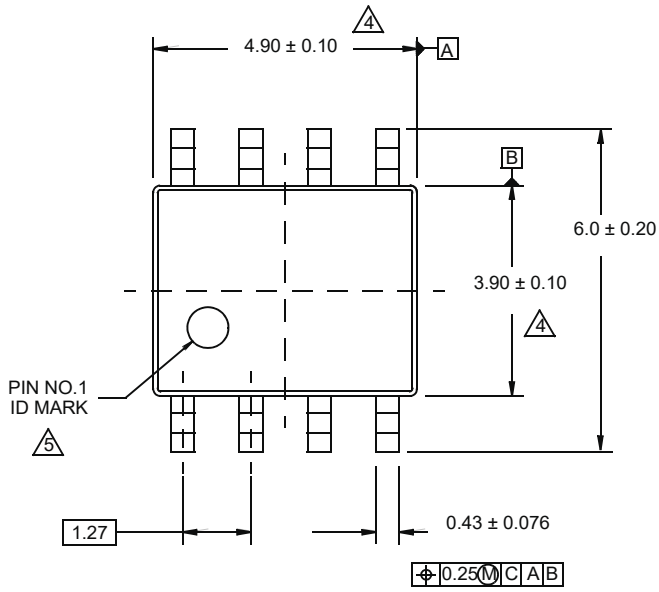
1. Controlling Dimensions: INCH. In case of conflict between English and Metric dimensions, the inch dimensions control.
2. Dimensioning and tolerancing per ANSI Y14.5M-1982.
3. Symbols are defined in the “MO Series Symbol List” in Section 2.2 of Publication No. 95.
4. Dimensions A, A1 and L are measured with the package seated in JEDEC seating plane gauge GS-3.
5. D, D1, and E1 dimensions do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.010 inch (0.25mm).
6. E and e_A are measured with the leads constrained to be perpendicular to datum -C-.
7. e_B and e_C are measured at the lead tips with the leads unconstrained. e_C must be zero or greater.
8. B1 maximum dimensions do not include dambar protrusions. Dambar protrusions shall not exceed 0.010 inch (0.25mm).
9. N is the maximum number of terminal positions.
10. Corner leads (1, N, N/2 and N/2 + 1) for E8.3, E16.3, E18.3, E28.3, E42.6 will have a B1 dimension of 0.030 - 0.045 inch (0.76 - 1.14mm).

E8.3 (JEDEC MS-001-BA ISSUE D)
8 LEAD DUAL-IN-LINE PLASTIC PACKAGE (PDIP)

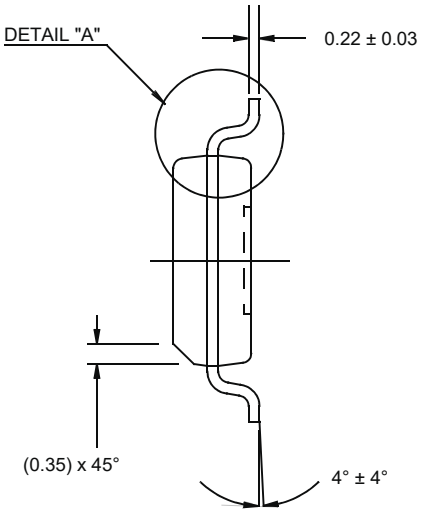
SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	-	0.210	-	5.33	4
A1	0.015	-	0.39	-	4
A2	0.115	0.195	2.93	4.95	-
B	0.014	0.022	0.356	0.558	-
B1	0.045	0.070	1.15	1.77	8, 10
C	0.008	0.014	0.204	0.355	-
D	0.355	0.400	9.01	10.16	5
D1	0.005	-	0.13	-	5
E	0.300	0.325	7.62	8.25	6
E1	0.240	0.280	6.10	7.11	5
e	0.100 BSC		2.54 BSC		-
e_A	0.300 BSC		7.62 BSC		6
e_B	-	0.430	-	10.92	7
L	0.115	0.150	2.93	3.81	4
N	8		8		9

Rev. 0 12/93

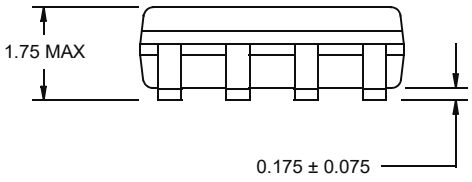
M8.15E
8 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
Rev 0, 08/09



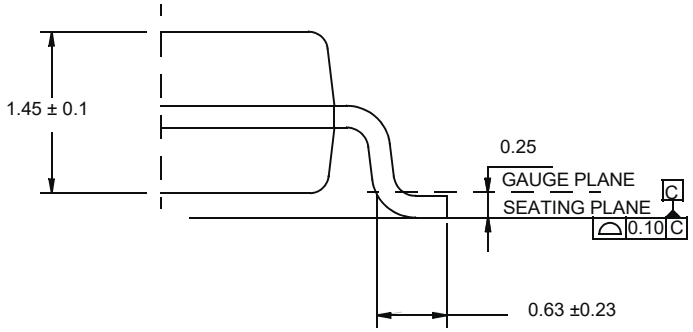
TOP VIEW



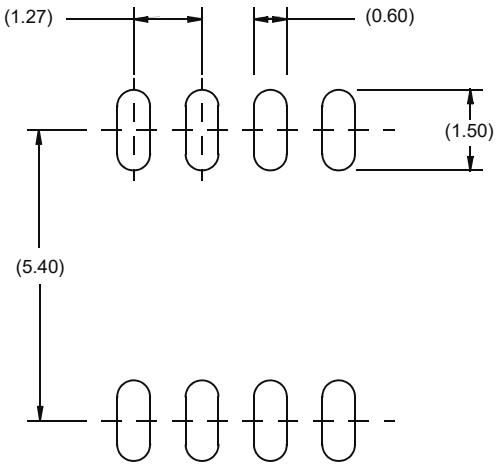
SIDE VIEW "B"



SIDE VIEW "A"



DETAIL "A"



TYPICAL RECOMMENDED LAND PATTERN

NOTES:

1. Dimensions are in millimeters.
   Dimensions in ( ) for Reference Only.
2. Dimensioning and tolerancing conform to AMSE Y14.5m-1994.
3. Unless otherwise specified, tolerance : Decimal ± 0.05
4. Dimension does not include interlead flash or protrusions.
   Interlead flash or protrusions shall not exceed 0.25mm per side.
5. The pin #1 identifier may be either a mold or mark feature.
6. Reference to JEDEC MS-012.

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(Rev.4.0-1 November 2017)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Contact Information

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