IMP3223

HALF-BRIDGE DRIVE

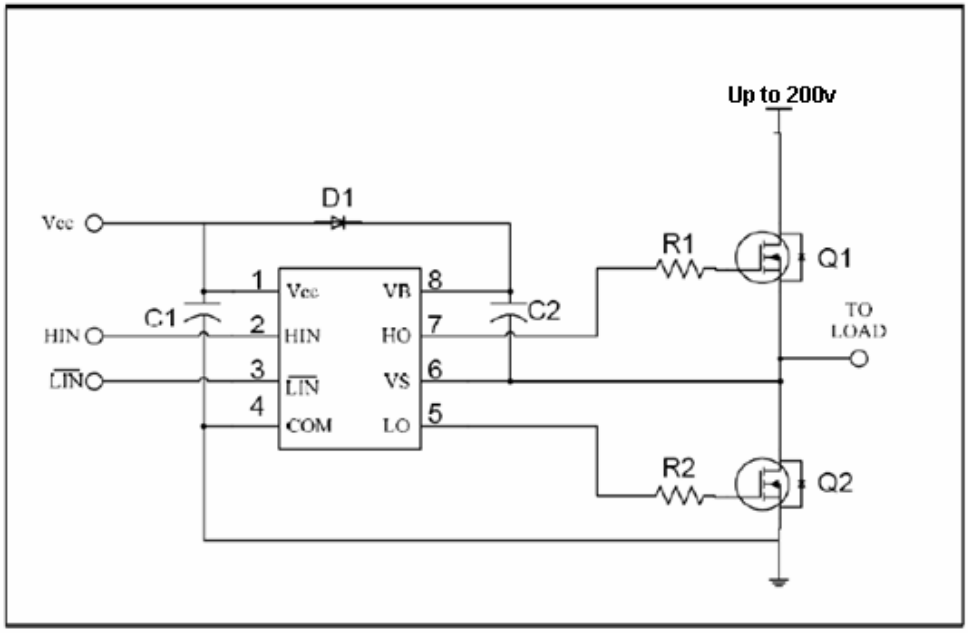
General Description

The IMP3223 is high voltage, high speed power MOSFET and IGBT driver with dependent high and low side referenced output channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS or LSTTL output, down to 3.3V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 200 volts.

Key Features

- Floating channel designed for bootstrap operation
- Fully operational to +200V
- Tolerant to negative transient voltage dV/dt immune
- Gate drive supply range from 10 to 20V
- Undervoltage lockout
- 3.3V, 5V and 15V input logic compatible
- Cross-conduction prevention logic
- Matched propagation delay for both channels
- Internally set deadtime
- High side output in phase with HIN input
- Low side output in phase with LIN input

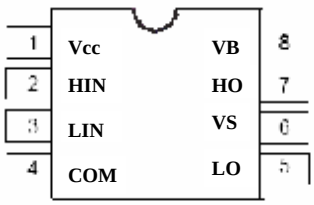
Typical Application



Part	Typical value
D1	BYV26B
C1	10uF/25V
C2	0.1uF/63V
R1	20
R2	20
Q1	IRF830
Q2	IRF830

Note 1: Please choose device refer to Design

Pin Assignments



Pin Function

Number	Symbol	Description
1	VCC	Low side and logic fixed supply
2	HIN	Logic input for high side gate driver outputs (HO), in phase
3	LIN	Logic input for low side gate driver outputs (LO), out of phase
4	COM	Low side return
5	LO	Low side gate drive output
6	VS	High side floating supply return
7	HO	High side gate drive output
8	VB	High side floating supply

Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

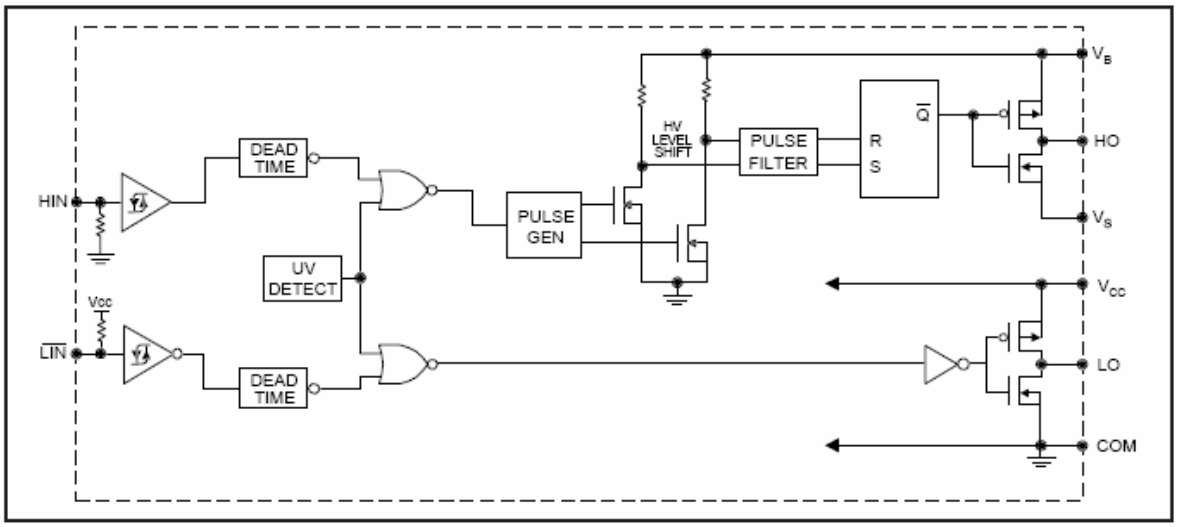
Symbol	Definition	Min.	Max.	Units
VB	High side floating absolute voltage	-0.3	225	V
VS	High side floating supply offset voltage	VB-25	VB+0.3	
VHO	High side floating output voltage	VS-0.3	VB+0.3	
VLO	Low side output voltage	-0.3	VCC+0.3	
Vcc	Low side and logic fixed supply voltage	-0.3	25	V
VIN	Logic input voltage (HIN & LIN)	-0.3	Vcc+0.3	V
dVS/dt	Allowable offset supply voltage transient	—	50	V/ns
P_D	Package power dissipation @ TA ≤ +25°C , DIP-8		0.8	W
	Package power dissipation @ TA ≤ +25°C , SOP-8		0.5	
	Package power dissipation @ TA ≤ +25°C , MSOP-8		0.45	
Rth_{JA}	Thermal resistance, junction to ambient , DIP-8		125	°C/W
	Thermal resistance, junction to ambient , SOP-8		200	
	Thermal resistance, junction to ambient , MSOP-8		220	
T_A	Operating temperature range	-40	125	°C
TS	Storage temperature	-55	150	
TL	Lead temperature (soldering, 10 seconds)		300	

Recommended Operating Conditions

The Input/Output logic timing diagram is shown in Figure 1. For proper operation the device should be used within the recommended conditions. The VS offset rating is tested with all supplies biased at 15V differential.

Symbol	Definition	Min.	Max.	Units
VB	High side floating supply absolute voltage	VS + 10	VS + 20	V
VS	High side floating supply offset voltage	-0.3	200	
VHO	High side floating output voltage	VS	VB	
VCC	Low side and logic fixed supply voltage	10	20	V
VLO	Low side output voltage	0	VCC	V
VIN	Logic input voltage (HIN&LIN)	0	VCC	V
T_A	Operating temperature range	-25	125	℃

Block Diagram



Electrical Characteristic

V_{CC} = V_{BS} = V_{BIAS} = 15V, CL＝1000pF， TA = 25°C， unless otherwise specified.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
ton	Turn-on propagation delay	—	680	820	ns	VS = 0V
toff	Turn-off propagation delay	—	150	220		VS = 200V
tr	Turn-on rise time	—	100	170		
tf	Turn-off fall time	—	50	90		
DT	Deadtime, LS turn-off to HS turn-on & HS turn-on to LS turn-off	400	520	650		
MT	Delay matching, HS & LS turn-on/off	—	—	60		

Electrical Characteristic

V_{CC} = V_{BS} = V_{BIAS} = 15V， TA = 25°C， unless otherwise specified.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
VIH	Logic “1” (HO) & Logic “0” (LO) input voltage	3	—	—	V	VCC＝10V—20V
VIL	Logic “0” (HO) & Logic “1” (LO) input voltage	—	—	0.8		VCC＝10V—20V
VOH	High level output voltage, VBIAS - VO	—	—	100	mV	Io＝0A
VOL	Low level output voltage, VO	—	—	100		Io＝0A
ILK	Offset supply leakage current	—	—	50	uA	VB＝VS＝200V
IQBS	Quiescent VBS supply current	—	30	50		Vin＝0V或5V
IQCC	Quiescent VCC supply current	—	150	270		Vin＝0V或5V
IIN+	Logic “1” input bias current	—	3	10		HIN＝5V，LIN＝0V
IIN-	Logic “0” input bias current	—	—	1		HIN＝0V，LIN＝5V
VCCUV+	VCC supply undervoltage positive going threshold	8	8.9	9.8	V	
VCCUV-	VCC supply undervoltage negative going threshold	7.4	8.2	9		
IO+	Output high short circuit pulsed current	130	210	—	mA	Vo＝0V，VIN＝VIL PW≦10us
IO-	Output low short circuit pulsed current	270	360	—		Vo＝0V，VIN＝VIL PW≦10us

Time waveform

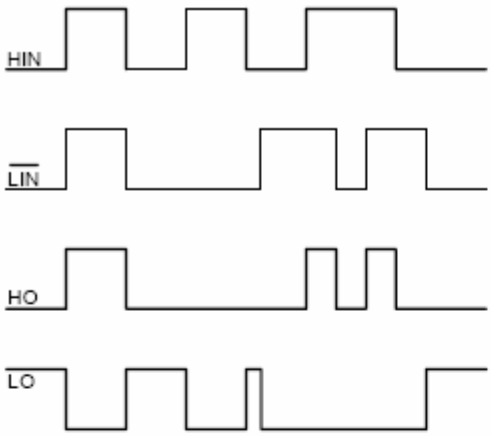
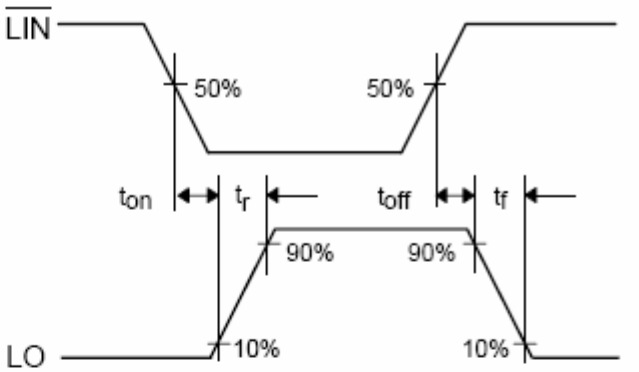


Figure 1. Input/Output Timing



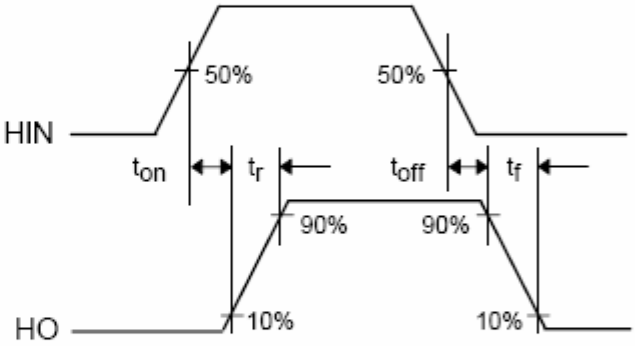


Figure 2. Switching Time Waveform Definitions

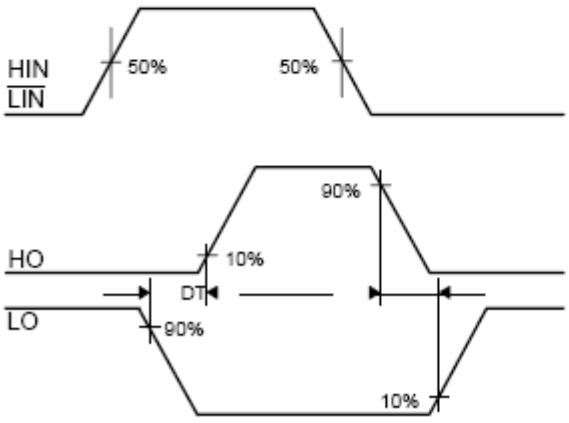
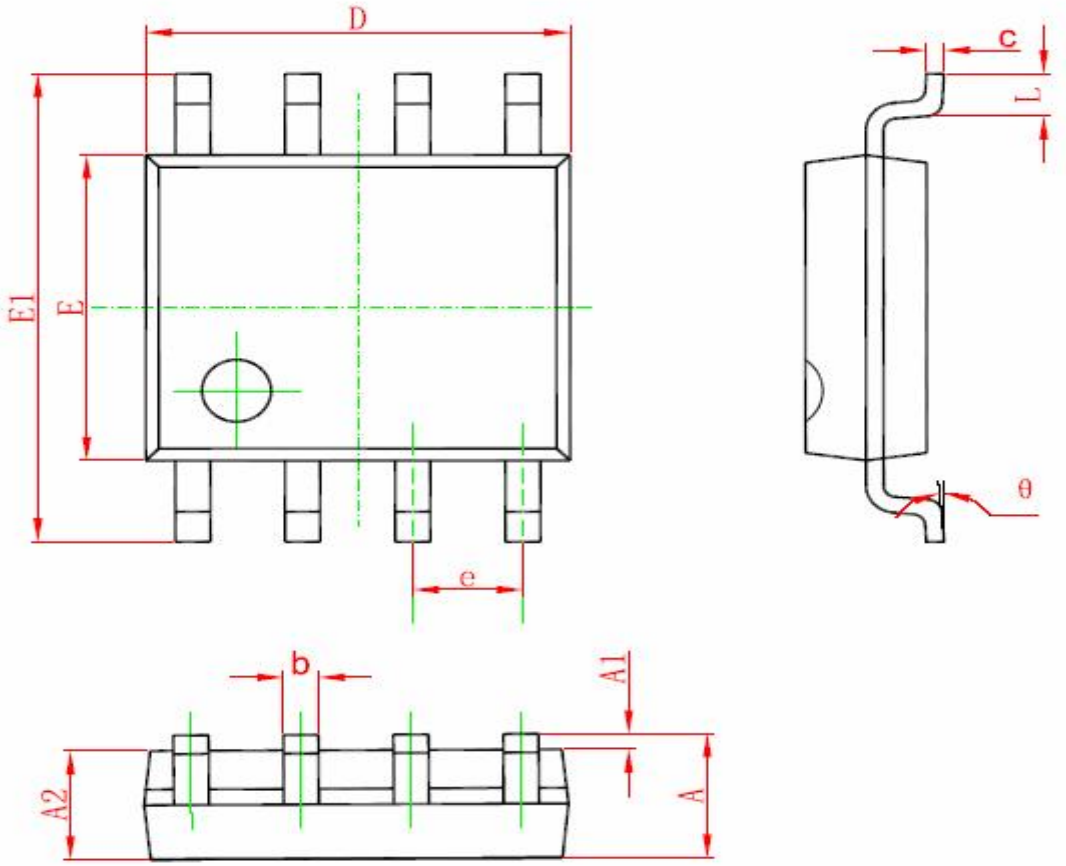


Figure 3. Deadtime Waveform Definitions

Packaging information

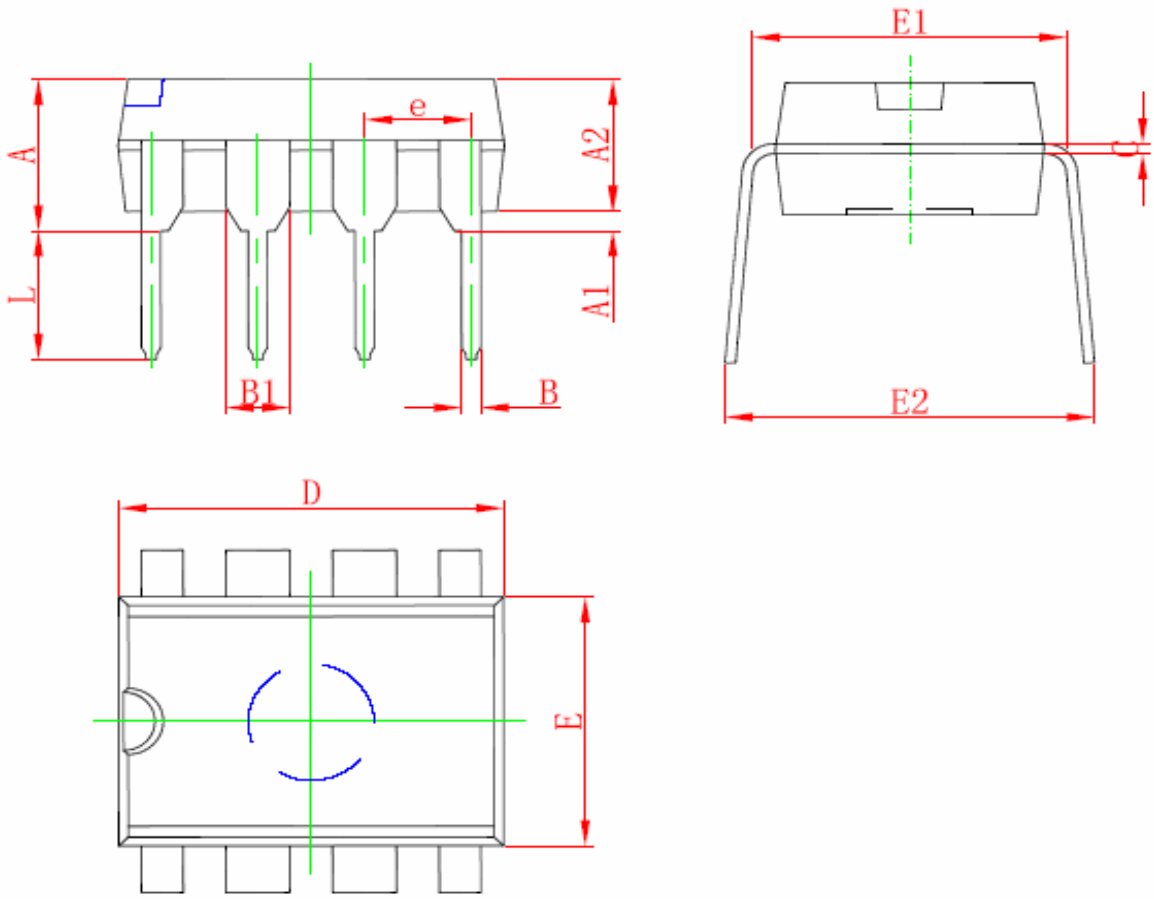
SOP－8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	0.127(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Packaging information

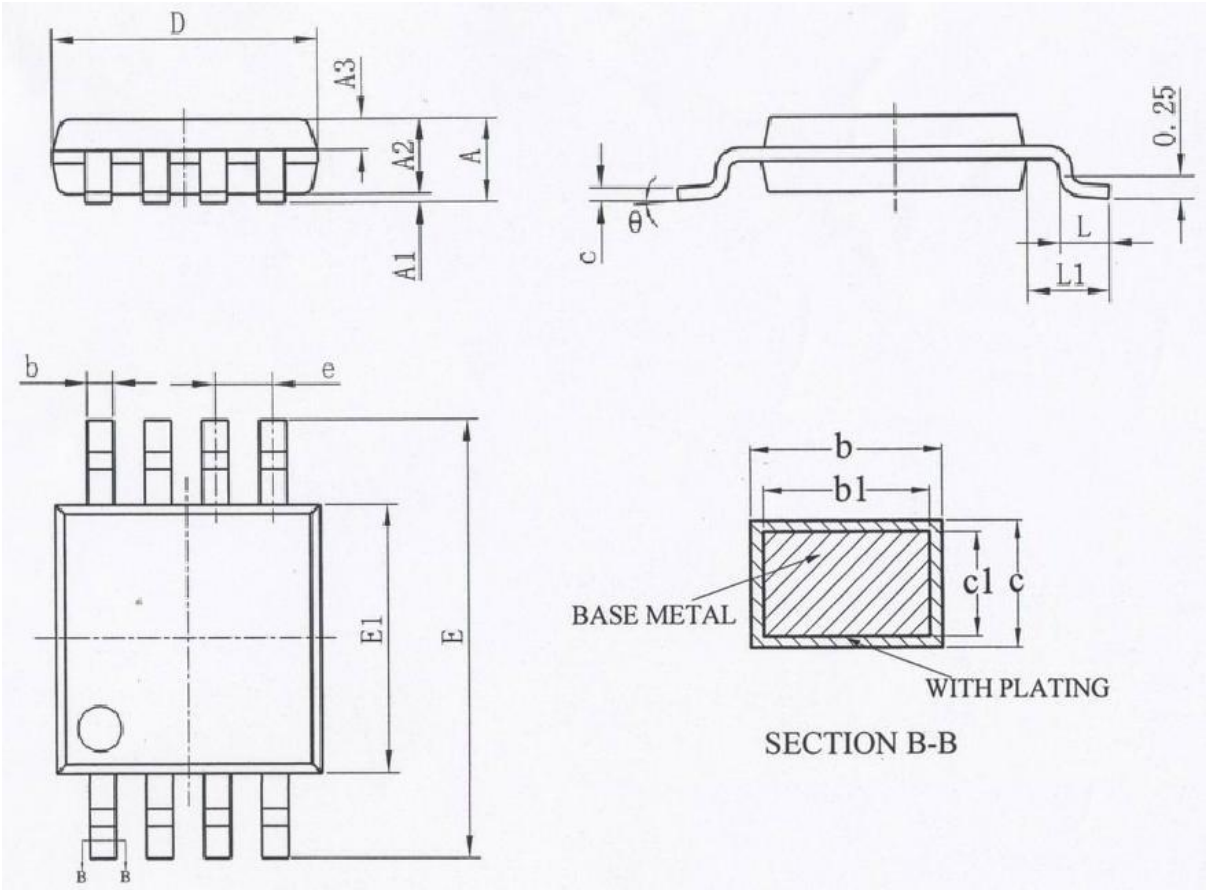
DIP－8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524(BSC)		0.060(BSC)	
C	0.204	0.360	0.008	0.014
D	9.000	9.400	0.354	0.370
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540(BSC)		0.100(BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354

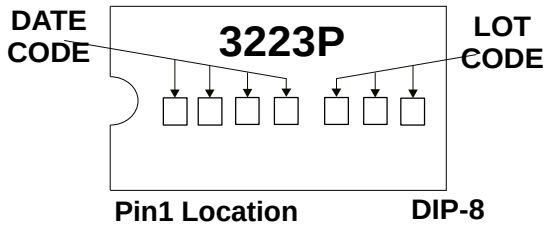
Packaging information

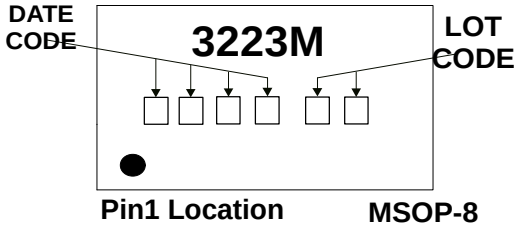
MSOP－8

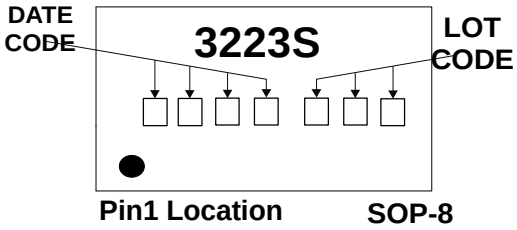


SYM-BOL	MILLIMETER			SYM-BOL	MILLIMETER		
	MIN	NOM	MAX		MIN	NOM	MAX
A	-	-	1.10	D	2.90	3.00	3.10
A1	0.05	-	0.15	E	4.70	4.90	5.10
A2	0.75	0.85	0.95	E1	2.90	3.00	3.10
A3	0.30	0.35	0.40	e	0.65BSC		
b	0.29	-	0.38	L	0.40	-	0.70
b1	0.28	0.30	0.33	L1	0.95BSC		
c	0.15	-	0.20	θ	0	-	8°
c1	0.14	0.152	0.16				

Marking information







Ordering information

Ordering Part Number	Package
IMP3223EPA	DIP8
IMP3223ESA	SOP8
IMP3223EMA	MSOP8

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