

IR2183/IR21834

HIGH AND LOW SIDE DRIVER

Features

- Floating channel designed for bootstrap operation
Fully operational to +600V
Tolerant to negative transient voltage
dV/dt immune
- Gate drive supply range from 10 to 20V
- Undervoltage lockout for both channels
- 5V Schmitt triggered input logic
- Cross-conduction prevention logic
- Matched propagation delay for both channels
- High side output in phase with HIN input
- Low side output out of phase with LIN input
- Logic and power ground +/- 5V offset.
- Internal 500ns dead-time, and programmable
up to 5us with one external R_{DT} resistor (IR21834)
- Lower di/dt gate driver for better noise immunity

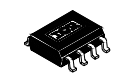
Description

The IR2183/IR21834 are high voltage, high speed power MOSFET and IGBT drivers with independent 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. 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 600 volts.

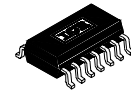
Product Summary

V_{OFFSET}	600V max.
$I_{O+/-}$	1.7A
V_{OUT}	10 - 20V
$t_{on/off}$ (typ.)	180 ns
Deadtime (typ.)	500 ns
(programmable up to 5us for IR21834)	

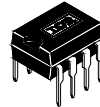
Packages



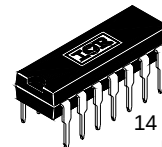
8 Lead SOIC
IR2183S



14 Lead SOIC
IR21834S

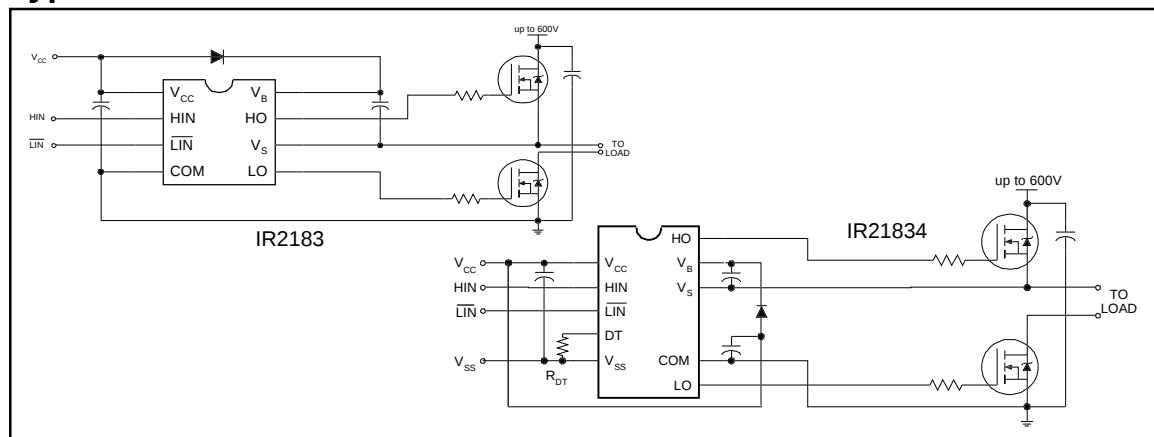


8 Lead PDIP
IR2183



14 Lead PDIP
IR21834

Typical Connection



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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	
V _B	High side floating absolute voltage	-0.3	625	V	
V _S	High side floating supply offset voltage	V _B - 25	V _B + 0.3		
V _{HO}	High side floating output voltage	V _S - 0.3	V _B + 0.3		
V _{CC}	Low side and logic fixed supply voltage	-0.3	25		
V _{LO}	Low side output voltage	-0.3	V _{CC} + 0.3		
DT	Programmable dead-time pin voltage (IR21384 only)	V _{SS} - 0.3	V _{CC} + 0.3		
V _{IN}	Logic input voltage (H _{IN} & L _{IN})	V _{SS} - 0.3	V _{CC} + 0.3		
V _{SS}	Logic ground (IR21834 only)	V _{CC} - 25	V _{CC} + 0.3		
dV _S /dt	Allowable offset supply voltage transient	—	50	V/ns	
P _D	Package power dissipation @ T _A ≤ +25°C	(8 lead PDIP)	—	1.0	W
		(8 lead SOIC)	—	0.625	
		(14 lead PDIP)	—	1.6	
		(14 lead SOIC)	—	1.0	
R _{thJA}	Thermal resistance, junction to ambient	(8 lead PDIP)	—	125	°C/W
		(8 lead SOIC)	—	200	
		(14 lead PDIP)	—	75	
		(14 lead SOIC)	—	120	
T _J	Junction temperature	—	150	°C	
T _S	Storage temperature	-50	150		
T _L	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 V_S and V_{SS} offset rating are tested with all supplies biased at 15V differential.

Symbol	Definition	Min.	Max.	Units
V _B	High side floating supply absolute voltage	V _S + 10	V _S + 20	V
V _S	High side floating supply offset voltage	Note 1	600	
V _{HO}	High side floating output voltage	V _S	V _B	
V _{CC}	Low side and logic fixed supply voltage	10	20	
V _{LO}	Low side output voltage	0	V _{CC}	
V _{IN}	Logic input voltage (HIN & LIN)	V _{SS}	V _{CC}	
DT	Programmable dead-time pin voltage (IR21834 only)	V _{SS}	V _{CC}	
V _{SS}	Logic ground (IR21834 only)	-5	5	
T _A	Ambient temperature	-40	125	°C

Note 1: Logic operational for V_S of -5 to +600V. Logic state held for V_S of -5V to -V_{BS}.

Dynamic Electrical Characteristics

V_{BIAS} (V_{CC} , V_{BS}) = 15V, V_{SS} = COM, C_L = 1000 pF, T_A = 25°C, DT = V_{SS} unless otherwise specified.

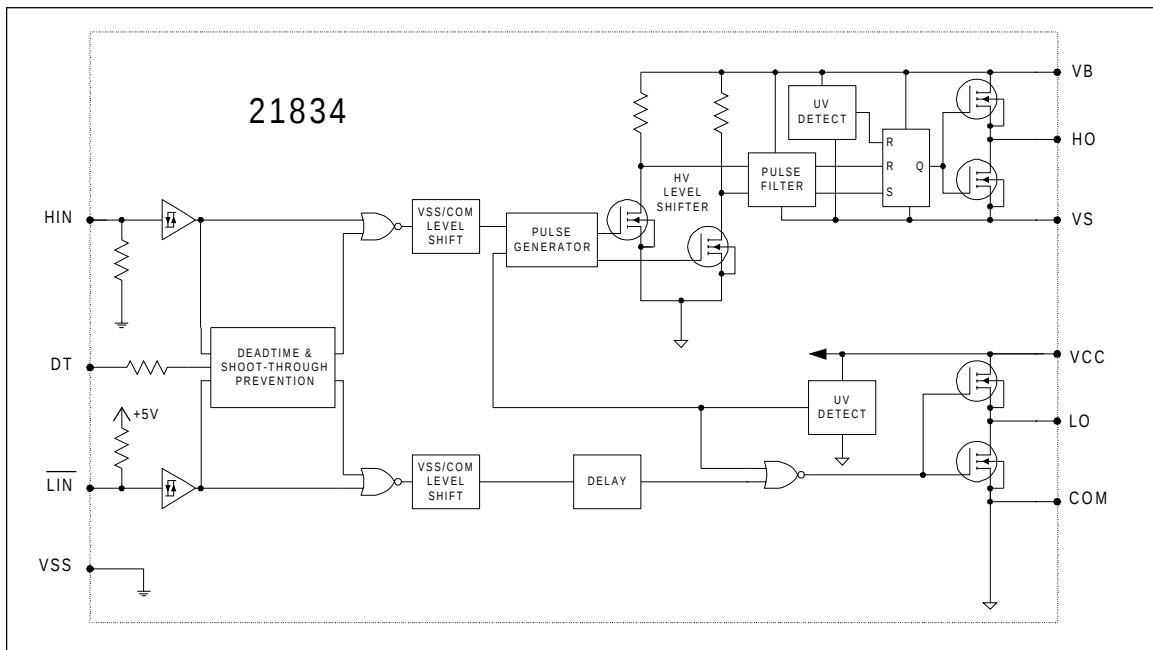
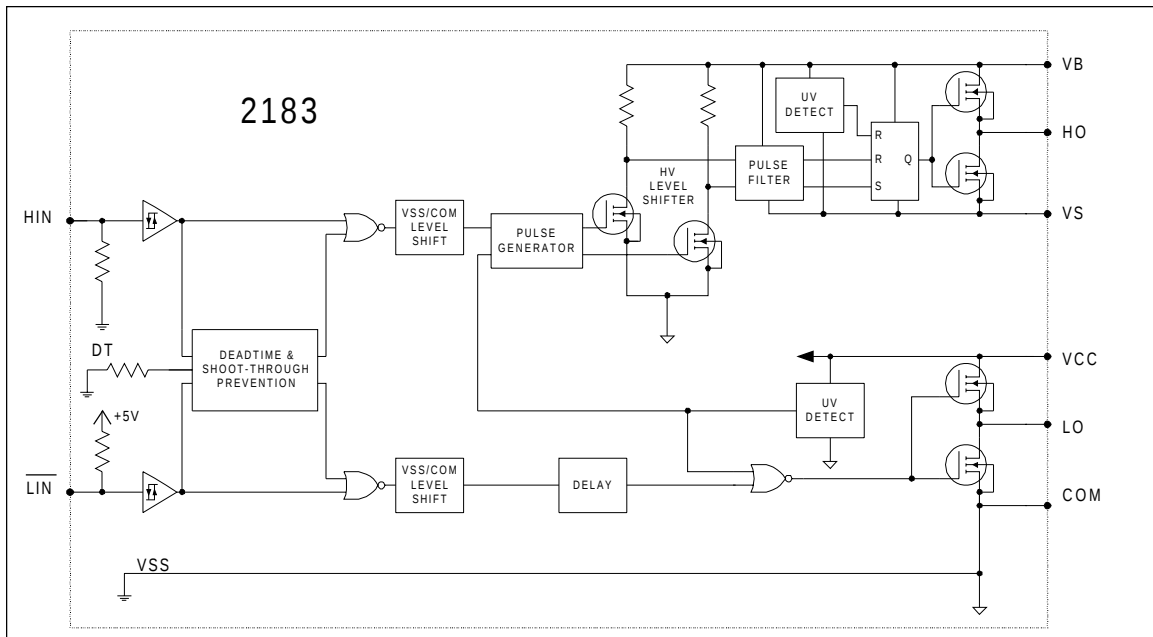
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
t_{on}	Turn-on propagation delay	—	180	270	nsec	$V_S = 0V$
t_{off}	Turn-off propagation delay	—	170	250		$V_S = 0V$ or 600V
MT	Delay matching, HS & LS turn-on/off	—	0	50		
t_r	Turn-on rise time	—	40	60		$V_S = 0V$
t_f	Turn-off fall time	—	20	30		$V_S = 0V$
DT	Deadtime: LO turn-off to HO turn-on (DT _{LO-HO})	380	500	620	usec	RDT = 0
	HO turn-off to LO turn-on (DT _{HO-LO})	4	5	6		RDT = 200k (IR21834)
MDT	Deadtime matching = DT _{LO-HO} - DT _{HO-LO}	—	0	60	nsec	RDT = 0
		—	0	600		RDT = 200k (IR21834)

Static Electrical Characteristics

V_{BIAS} (V_{CC} , V_{BS}) = 15V, V_{SS} = COM, DT = V_{SS} and T_A = 25°C unless otherwise specified. The V_{IL} , V_{IH} and I_{IN} parameters are referenced to V_{SS}/COM and are applicable to the respective input leads: HIN and LIN. The V_O , I_O and Ron parameters are referenced to COM and are applicable to the respective output leads: HO and LO.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V_{IH}	Logic "1" input voltage for HIN & logic "0" for LIN	2.7	—	—	V	$V_{CC} = 10V$ to 20V
V_{IL}	Logic "0" input voltage for HIN & logic "1" for LIN	—	—	0.8		$V_{CC} = 10V$ to 20V
V_{OH}	High level output voltage, $V_{BIAS} - V_O$	—	—	1.2		$I_O = 0A$
V_{OL}	Low level output voltage, V_O	—	—	0.1		$I_O = 0A$
I_{LK}	Offset supply leakage current	—	—	50	μA	$V_B = V_S = 600V$
I_{QBS}	Quiescent V_{BS} supply current	20	60	150		$V_{IN} = 0V$ or 5V
I_{QCC}	Quiescent V_{CC} supply current	0.4	1.0	1.6	mA	$V_{IN} = 0V$ or 5V
I_{IN+}	Logic "1" input bias current	—	5	20	μA	HIN = 5V, LIN = 0V
I_{IN-}	Logic "0" input bias current	—	1	2		HIN = 0V, LIN = 5V
V_{CCUV+} V_{BSUV+}	V_{CC} and V_{BS} supply undervoltage positive going threshold	8.0	8.9	9.8	V	
V_{CCUV-} V_{BSUV-}	V_{CC} and V_{BS} supply undervoltage negative going threshold	7.4	8.2	9.0		
V_{CCUVH} V_{BSUVH}	Hysteresis	0.3	0.7	—		
I_{O+}	Output high short circuit pulsed current	1.7	2	—	A	$V_O = 0V$, $PW \leq 10 \mu s$
I_{O-}	Output low short circuit pulsed current	1.7	2	—		$V_O = 15V$, $PW \leq 10 \mu s$

Functional Block Diagram



Lead Definitions

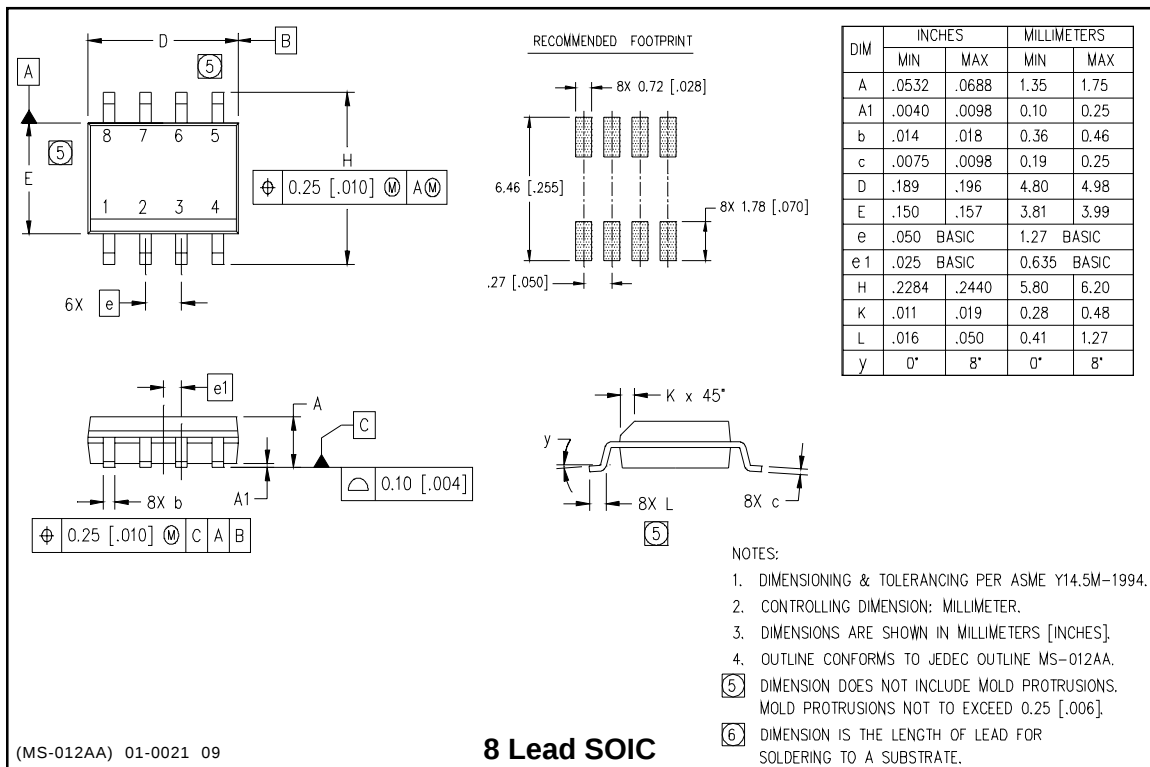
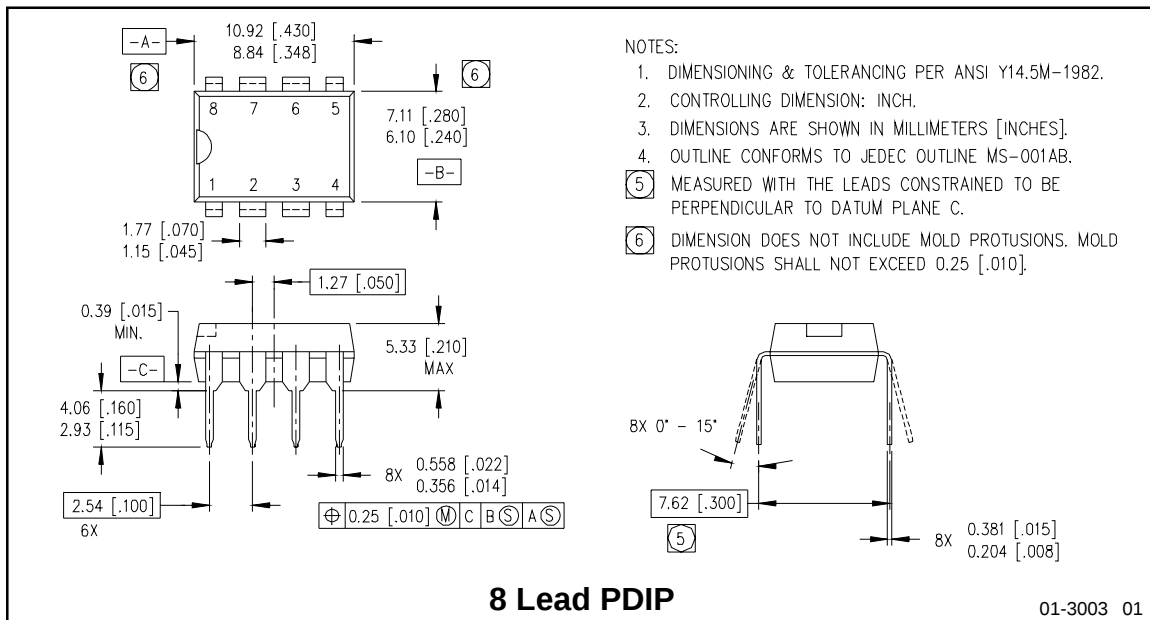
Symbol	Description
HIN	Logic input for high side gate driver output (HO), in phase (referenced to COM for IR2183 and VSS for IR21834)
$\overline{\text{LIN}}$	Logic input for low side gate driver output (LO), out of phase (referenced to COM for IR2183 and VSS for IR21834)
DT	Programmable dead-time lead, referenced to VSS. (IR21834 only)
VSS	Logic Ground (21834 only)
V _B	High side floating supply
HO	High side gate driver output
V _S	High side floating supply return
V _{CC}	Low side and logic fixed supply
LO	Low side gate driver output
COM	Low side return

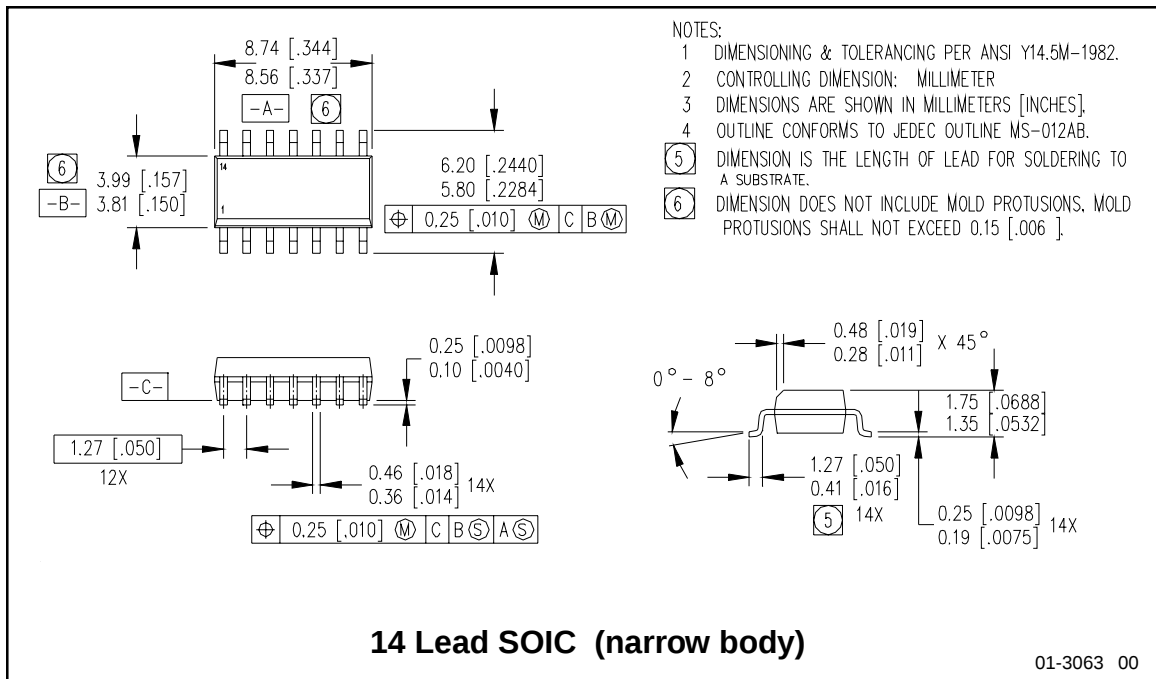
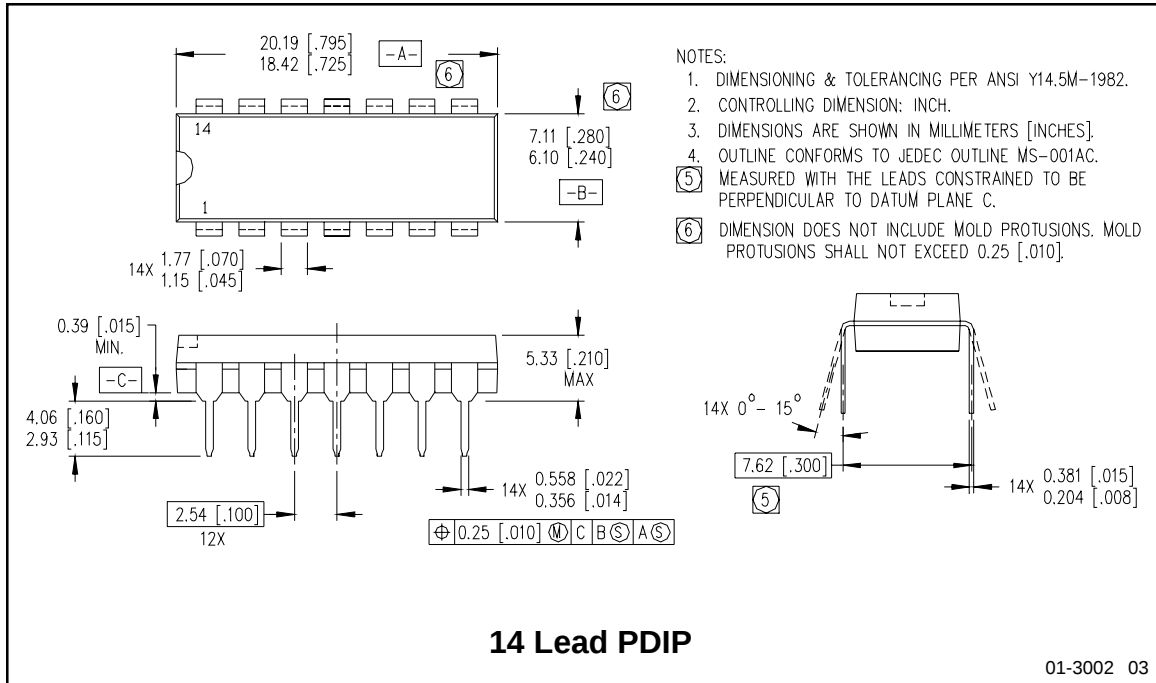
Lead Assignments

8 Lead PDIP IR2183	8 Lead SOIC IR2183S
14 Lead PDIP IR21834	14 Lead SOIC IR21834S

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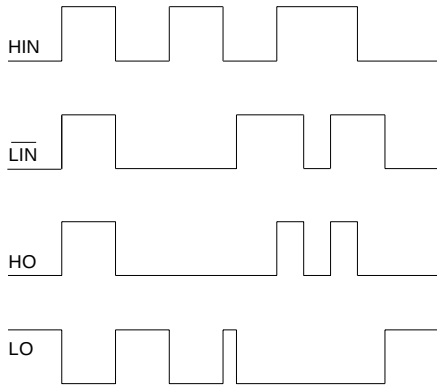


Figure 1. Input/Output Timing Diagram

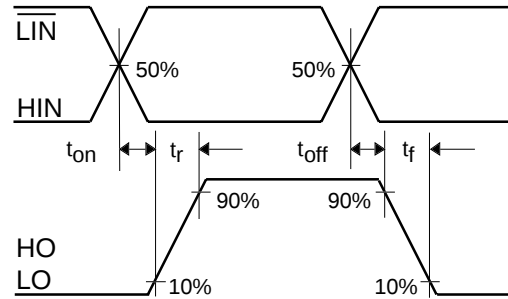


Figure 2. Switching Time Waveform Definitions

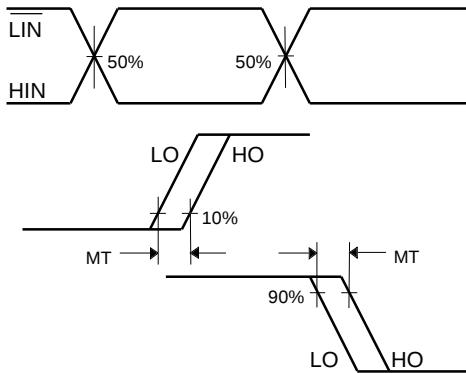


Figure 3. Delay Matching Waveform Definitions

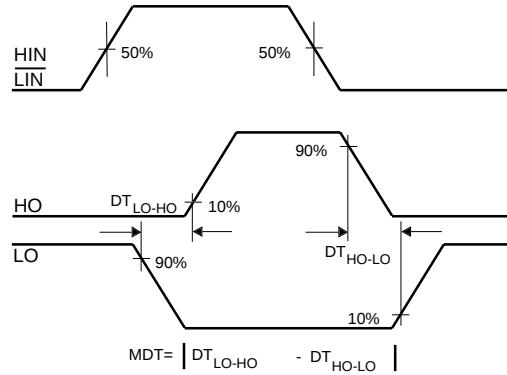


Figure 4. Deadtime Waveform Definitions

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IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 Tel: (310) 252-7105
IR EUROPEAN REGIONAL CENTRE: 439/445 Godstone Rd., Whyteleafe, Surrey CR3 0BL, United Kingdom
 Tel: ++ 44 (0) 20 8645 8000
IR JAPAN: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171-0021 Tel: 8133 983 0086
IR HONG KONG: Unit 308, #F, New East Ocean Centre, No. 9 Science Museum Road, Tsimshatsui East, Kowloon
 Hong Kong Tel: (852) 2803-7380
Data and specifications subject to change without notice. 4/11/2000

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