

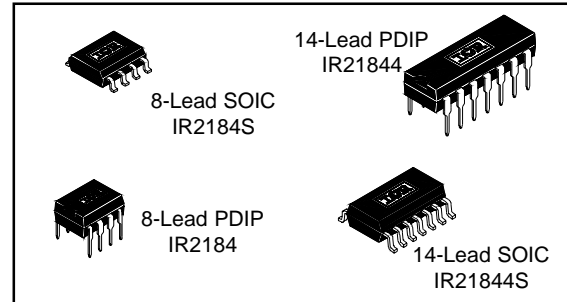
## IR2184(4)(S)

### HALF-BRIDGE 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
- 3.3V and 5V input logic compatible
- Matched propagation delay for both channels
- Logic and power ground +/- 5V offset.
- Lower di/dt gate driver for better noise immunity
- Output source/sink current capability 1.4A/1.8A

#### Packages



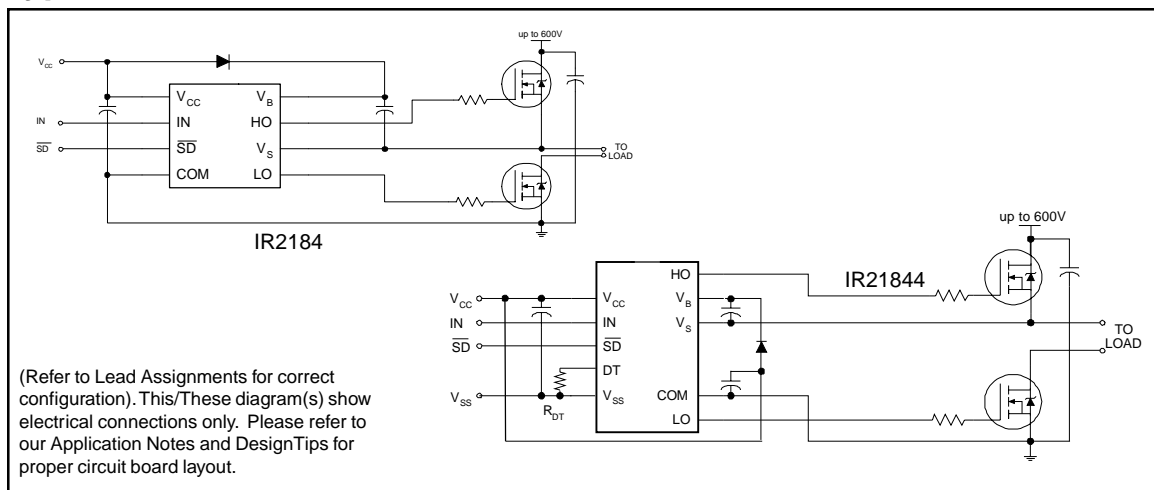
#### Description

The IR2184(4)(S) are high voltage, high speed power MOSFET and IGBT drivers 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 600 volts.

#### IR2181/IR2183/IR2184 Feature Comparison

Part	Input logic	Cross-conduction prevention logic	Dead-Time	Ground Pins	Ton/Toff
2181	HIN/LIN	no	none	COM	180/220 ns
21814				VSS/COM	
2183	HIN/LIN	yes	Internal 500ns Program 0.4 ~ 5 us	COM	180/220 ns
21834				VSS/COM	
2184	IN/SD	yes	Internal 500ns Program 0.4 ~ 5 us	COM	680/270 ns
21844				VSS/COM	

#### Typical Connection



# IR2184(4) (S)

## 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 <sub>B</sub>	High side floating absolute voltage	-0.3	625	V	
V <sub>S</sub>	High side floating supply offset voltage	V <sub>B</sub> - 25	V <sub>B</sub> + 0.3		
V <sub>HO</sub>	High side floating output voltage	V <sub>S</sub> - 0.3	V <sub>B</sub> + 0.3		
V <sub>CC</sub>	Low side and logic fixed supply voltage	-0.3	25		
V <sub>LO</sub>	Low side output voltage	-0.3	V <sub>CC</sub> + 0.3		
DT	Programmable dead-time pin voltage (IR21844 only)	V <sub>SS</sub> - 0.3	V <sub>CC</sub> + 0.3		
V <sub>IN</sub>	Logic input voltage (IN & $\overline{SD}$ )	V <sub>SS</sub> - 0.3	V <sub>SS</sub> + 10		
V <sub>SS</sub>	Logic ground (IR21844 only)	V <sub>CC</sub> - 25	V <sub>CC</sub> + 0.3		
dV <sub>S</sub> /dt	Allowable offset supply voltage transient	—	50	V/ns	
P <sub>D</sub>	Package power dissipation @ T <sub>A</sub> ≤ +25°C	(8-lead PDIP)	—	1.0	W
		(8-lead SOIC)	—	0.625	
		(14-lead PDIP)	—	1.6	
		(14-lead SOIC)	—	1.0	
R <sub>thJA</sub>	Thermal resistance, junction to ambient	(8-lead PDIP)	—	125	°C/W
		(8-lead SOIC)	—	200	
		(14-lead PDIP)	—	75	
		(14-lead SOIC)	—	120	
T <sub>J</sub>	Junction temperature	—	150	°C	
T <sub>S</sub>	Storage temperature	-50	150		
T <sub>L</sub>	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<sub>S</sub> and V<sub>SS</sub> offset rating are tested with all supplies biased at 15V differential.

Symbol	Definition	Min.	Max.	Units
V <sub>B</sub>	High side floating supply absolute voltage	V <sub>S</sub> + 10	V <sub>S</sub> + 20	V
V <sub>S</sub>	High side floating supply offset voltage	Note 1	600	
V <sub>HO</sub>	High side floating output voltage	V <sub>S</sub>	V <sub>B</sub>	
V <sub>CC</sub>	Low side and logic fixed supply voltage	10	20	
V <sub>LO</sub>	Low side output voltage	0	V <sub>CC</sub>	
V <sub>IN</sub>	Logic input voltage (IN & $\overline{SD}$ )	V <sub>SS</sub>	V <sub>SS</sub> + 5	
DT	Programmable dead-time pin voltage (IR21844 only)	V <sub>SS</sub>	V <sub>CC</sub>	
V <sub>SS</sub>	Logic ground (IR21844 only)	-5	5	
T <sub>A</sub>	Ambient temperature	-40	125	°C

Note 1: Logic operational for V<sub>S</sub> of -5 to +600V. Logic state held for V<sub>S</sub> of -5V to -V<sub>BS</sub>. (Please refer to the Design Tip DT97-3 for more details).

Note 2: IN and SD are internally clamped with a 5.2V zener diode.

**Dynamic Electrical Characteristics**

VBIAS (VCC, VBS) = 15V, VSS = COM, CL = 1000 pF, TA = 25°C, DT = VSS unless otherwise specified.

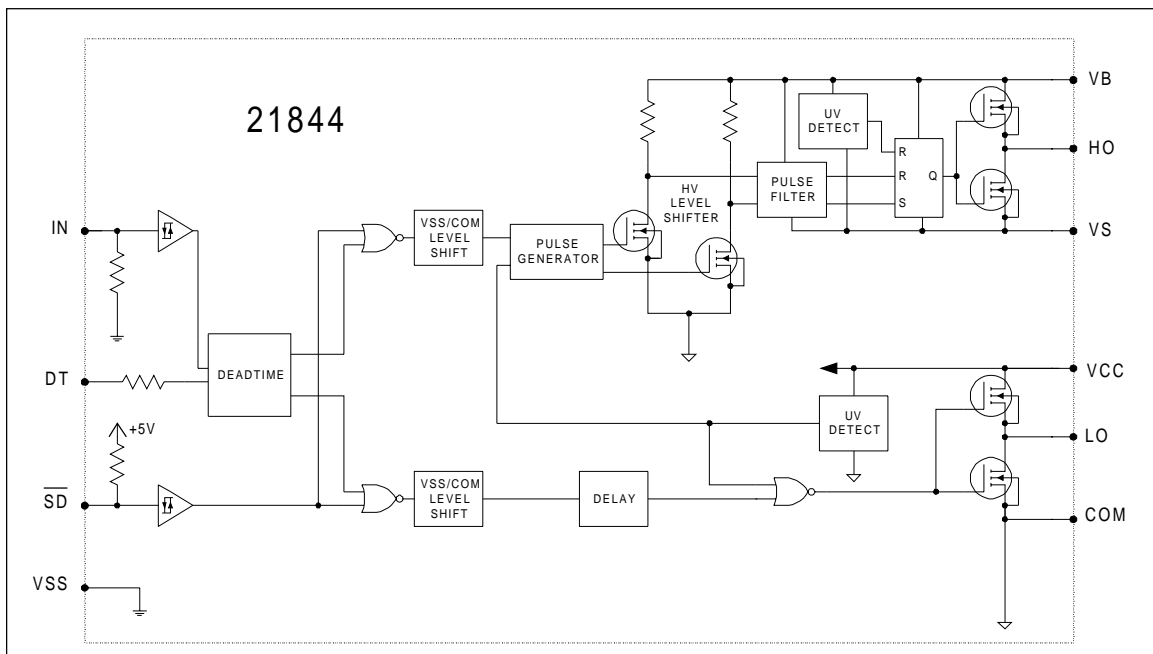
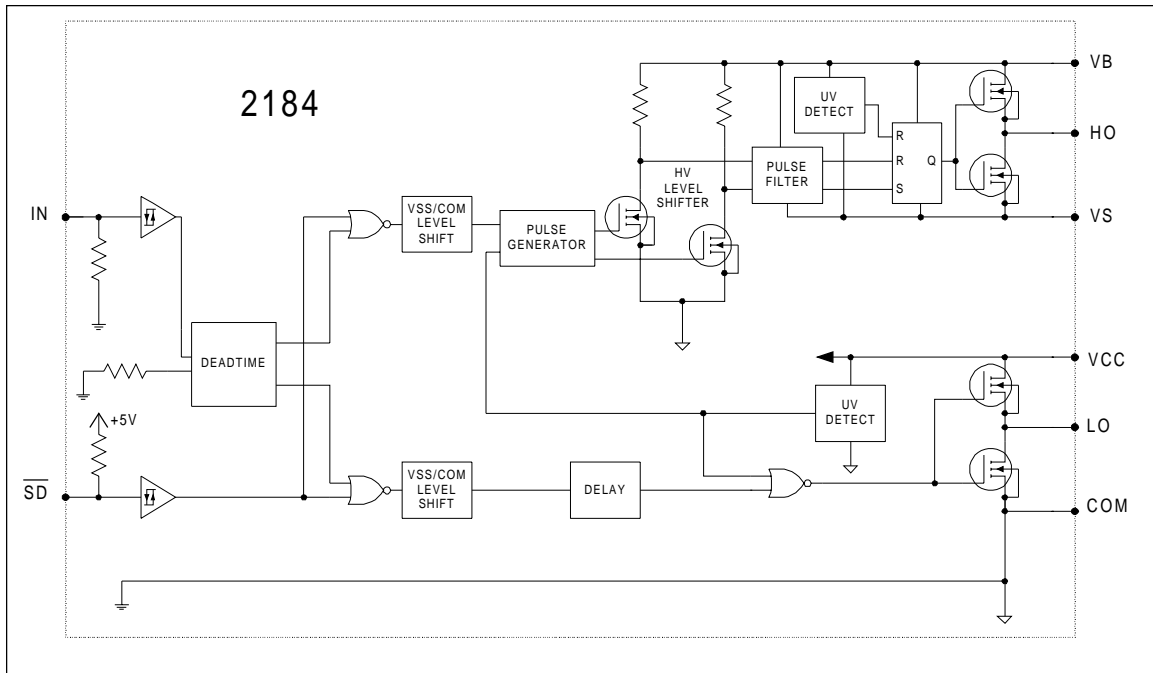
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
ton	Turn-on propagation delay	—	680	900	nsec	VS = 0V
toff	Turn-off propagation delay	—	270	400		VS = 0V or 600V
tsd	Shut-down propagation delay	—	180	270		
MTon	Delay matching, HS & LS turn-on	—	0	90		
MToff	Delay matching, HS & LS turn-off	—	0	40		
tr	Turn-on rise time	—	40	60		VS = 0V
tf	Turn-off fall time	—	20	35		VS = 0V
DT	Deadtime: LO turn-off to HO turn-on(DTLO-HO) & HO turn-off to LO turn-on (DTHO-LO)	280	400	520	µsec	RDT= 0
		4	5	6		RDT = 200k
MDT	Deadtime matching = DTLO - HO - DTHO-LO	—	0	50	nsec	RDT=0
		—	0	600		RDT = 200k

**Static Electrical Characteristics**

VBIAS (VCC, VBS) = 15V, VSS = COM, DT= VSS and TA = 25°C unless otherwise specified. The VIL, VIH and IIN parameters are referenced to VSS /COM and are applicable to the respective input leads: IN and SD. The VO, IO 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
VIH	Logic “1” input voltage for HO & logic “0” for LO	2.7	—	—	V	VCC = 10V to 20V
VIL	Logic “0” input voltage for HO & logic “1” for LO	—	—	0.8		VCC = 10V to 20V
VSD,TH+	SD input positive going threshold	2.7	—	—		VCC = 10V to 20V
VSD,TH-	SD input negative going threshold	—	—	0.8		VCC = 10V to 20V
VOH	High level output voltage, VBIAS - VO	—	—	1.2		IO = 0A
VOL	Low level output voltage, VO	—	—	0.1		IO = 0A
ILK	Offset supply leakage current	—	—	50	µA	VB = VS = 600V
IQBS	Quiescent VBS supply current	20	60	150		VIN = 0V or 5V
IQCC	Quiescent VCC supply current	0.4	1.0	1.6	mA	VIN = 0V or 5V
IIN+	Logic “1” input bias current	—	5	20		IN = 5V, SD = 0V
IIN-	Logic “0” input bias current	—	1	2	µA	IN = 0V, SD = 5V
VCCUV+ VBSUV+	VCC and VBS supply undervoltage positive going threshold	8.0	8.9	9.8	V	
VCCUV- VBSUV-	VCC and VBS supply undervoltage negative going threshold	7.4	8.2	9.0		
VCCUVH VBSUVH	Hysteresis	0.3	0.7	—		
IO+	Output high short circuit pulsed current	1.4	1.9	—	A	VO = 0V, PW ≤ 10 µs
IO-	Output low short circuit pulsed current	1.8	2.3	—		VO = 15V, PW ≤ 10 µs

## Functional Block Diagrams



## Lead Definitions

Symbol	Description
IN	Logic input for high and low side gate driver outputs (HO and LO), in phase with HO (referenced to COM for IR2184 and VSS for IR21844)
$\overline{SD}$	Logic input for shutdown (referenced to COM for IR2184 and VSS for IR21844)
DT	Programmable dead-time lead, referenced to VSS. (IR21844 only)
VSS	Logic Ground (21844 only)
$V_B$	High side floating supply
HO	High side gate drive output
$V_S$	High side floating supply return
$V_{CC}$	Low side and logic fixed supply
LO	Low side gate drive output
COM	Low side return

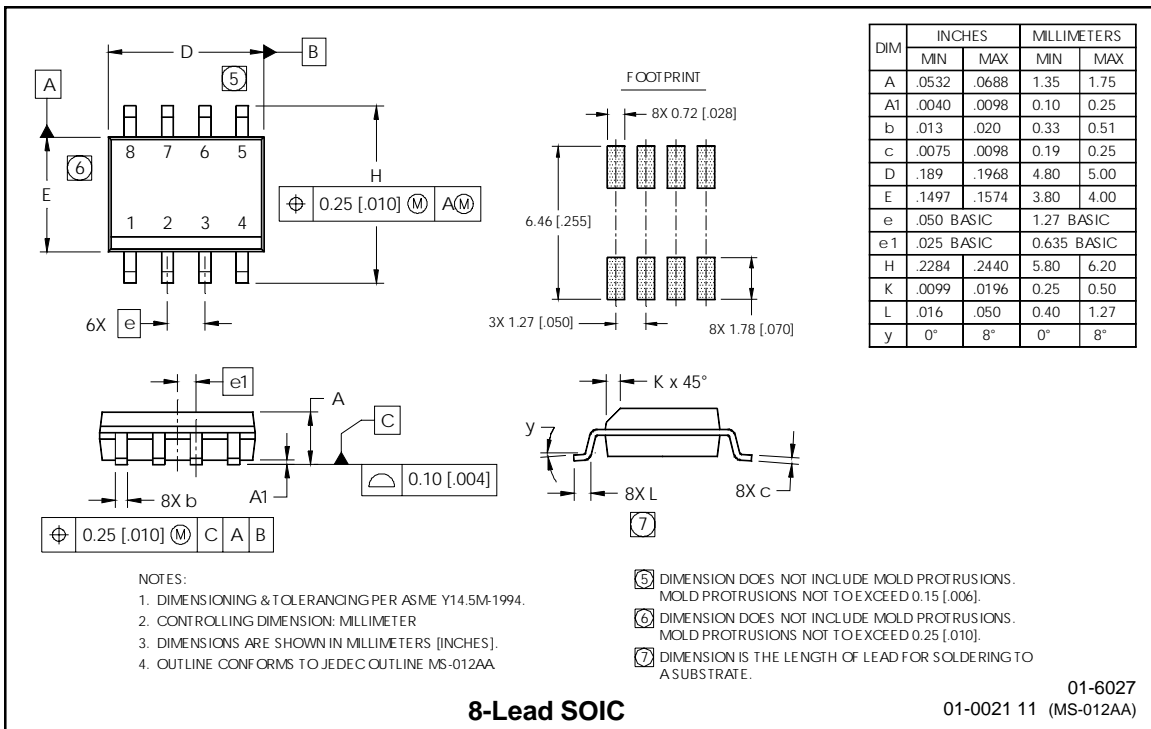
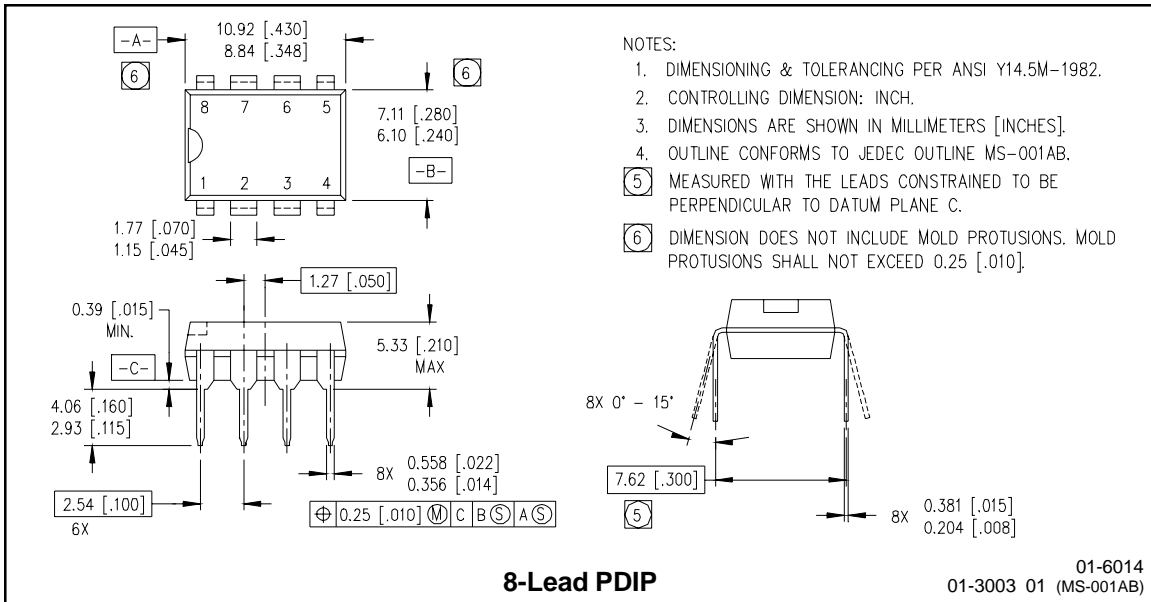
## Lead Assignments

<p>8-Lead PDIP</p>	<p>8-Lead SOIC</p>
<b>IR2184</b>	<b>IR2184S</b>

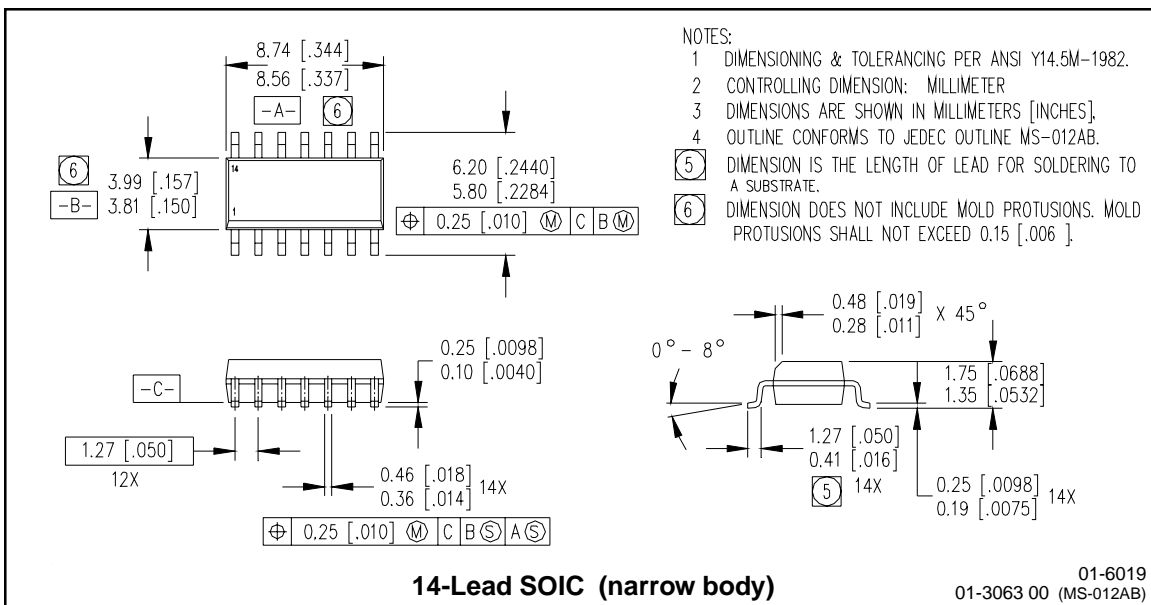
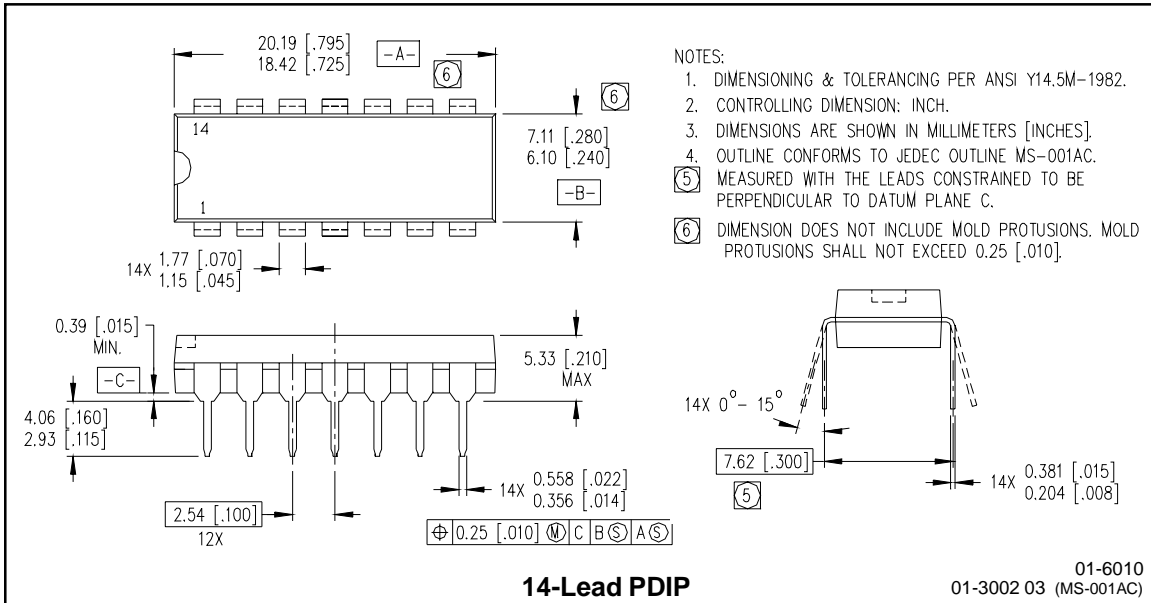
<p>14-Lead PDIP</p>	<p>14-Lead SOIC</p>
<b>IR21844</b>	<b>IR21844S</b>

# IR2184(4) (S)

International  
**IR** Rectifier



# IR2184(4) (S)



# IR2184(4) (S)

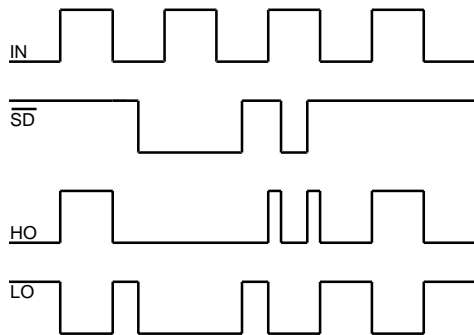


Figure 1. Input/Output Timing Diagram

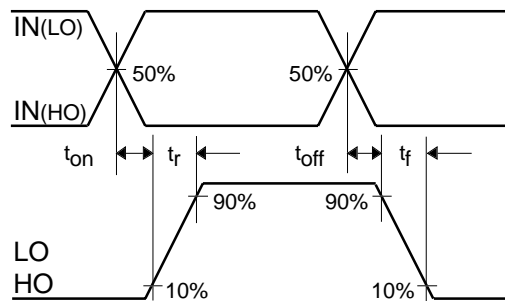


Figure 2. Switching Time Waveform Definitions

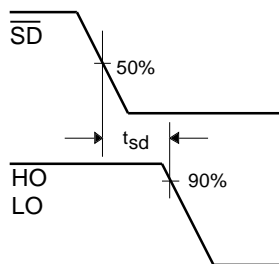


Figure 3. Shutdown Waveform Definitions

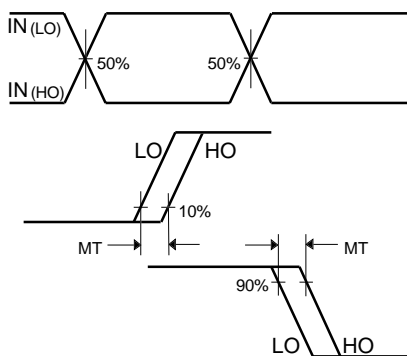


Figure 4. Deadtime Waveform Definitions

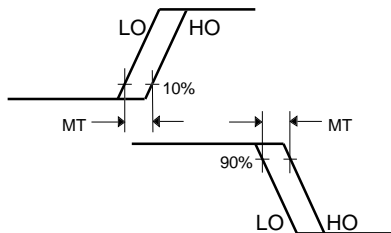


Figure 5. Delay Matching Waveform Definitions