

IR2103(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 _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		
V _{IN}	Logic input voltage (HIN & LIN)	-0.3	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	
R _{thJA}	Thermal resistance, junction to ambient	(8 Lead PDIP)	—	125	°C/W
		(8 Lead SOIC)	—	200	
T _J	Junction temperature	—	150	°C	
T _S	Storage temperature	-55	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 offset rating is 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)	0	V _{CC}	°C
T _A	Ambient temperature	-40	125	

Note 1: Logic operational for V_S of -5 to +600V. Logic state held for V_S of -5V to -V_{BS}. (Please refer to the Design Tip DT97-3 for more details).

Dynamic Electrical Characteristics

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

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
t_{on}	Turn-on propagation delay	—	680	820	ns	$V_S = 0V$
t_{off}	Turn-off propagation delay	—	150	220		$V_S = 600V$
t_r	Turn-on rise time	—	100	170		
t_f	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		

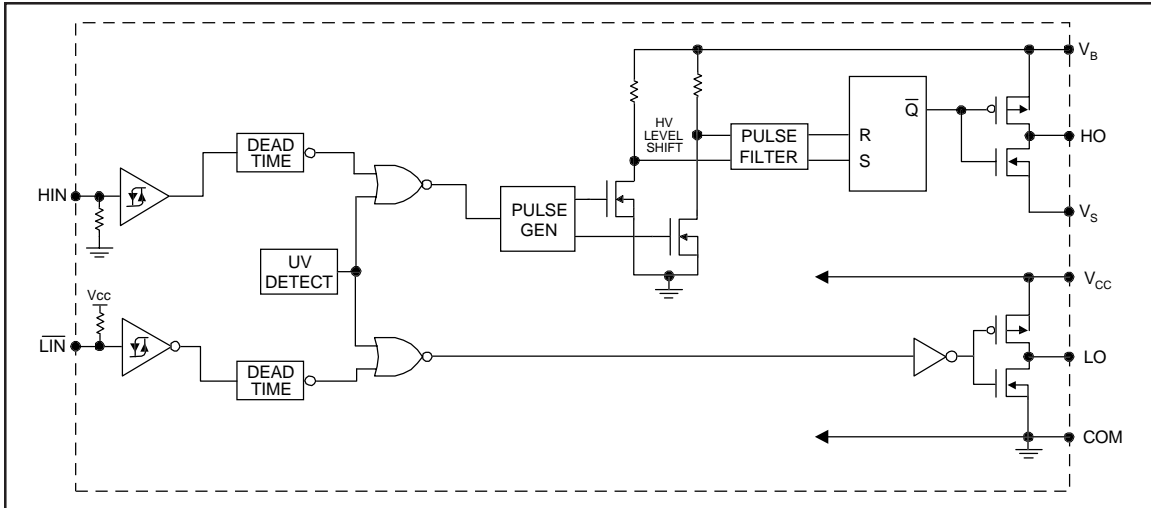
Static Electrical Characteristics

V_{BIAS} (V_{CC} , V_{BS}) = 15V and T_A = 25°C unless otherwise specified. The V_{IN} , V_{TH} and I_{IN} parameters are referenced to COM. The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO or LO.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V_{IH}	Logic "1" (HIN) & Logic "0" (\overline{LIN}) input voltage	3	—	—	V	$V_{CC} = 10V$ to 20V
V_{IL}	Logic "0" (HIN) & Logic "1" (\overline{LIN}) input voltage	—	—	0.8		$V_{CC} = 10V$ to 20V
V_{OH}	High level output voltage, $V_{BIAS} - V_O$	—	—	100	mV	$I_O = 0A$
V_{OL}	Low level output voltage, V_O	—	—	100		$I_O = 0A$
I_{LK}	Offset supply leakage current	—	—	50	μA	$V_B = V_S = 600V$
I_{QBS}	Quiescent V_{BS} supply current	—	30	55		$V_{IN} = 0V$ or 5V
I_{QCC}	Quiescent V_{CC} supply current	—	150	270		$V_{IN} = 0V$ or 5V
I_{IN+}	Logic "1" input bias current	—	3	10		HIN = 5V, $\overline{LIN} = 0V$
I_{IN-}	Logic "0" input bias current	—	—	1		HIN = 0V, $\overline{LIN} = 5V$
V_{CCUV+}	V_{CC} supply undervoltage positive going threshold	8	8.9	9.8	V	
V_{CCUV-}	V_{CC} supply undervoltage negative going threshold	7.4	8.2	9		
I_{O+}	Output high short circuit pulsed current	130	210	—	mA	$V_O = 0V, V_{IN} = V_{IH}$ $PW \leq 10 \mu s$
I_{O-}	Output low short circuit pulsed current	270	360	—		$V_O = 15V, V_{IN} = V_{IL}$ $PW \leq 10 \mu s$

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Functional Block Diagram



Lead Definitions

Symbol	Description
HIN	Logic input for high side gate driver output (HO), in phase
$\overline{\text{LIN}}$	Logic input for low side gate driver output (LO), out of phase
VB	High side floating supply
HO	High side gate drive output
VS	High side floating supply return
VCC	Low side and logic fixed supply
LO	Low side gate drive output
COM	Low side return

Lead Assignments

<p style="text-align: center;">8 Lead PDIP</p>	<p style="text-align: center;">8 Lead SOIC</p>
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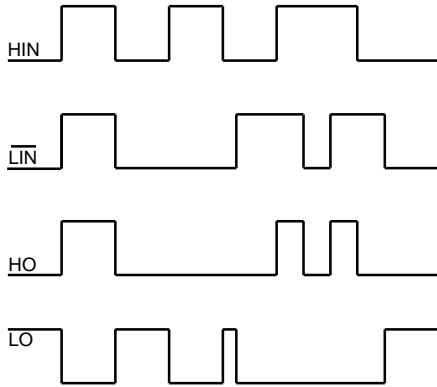


Figure 1. Input/Output Timing Diagram

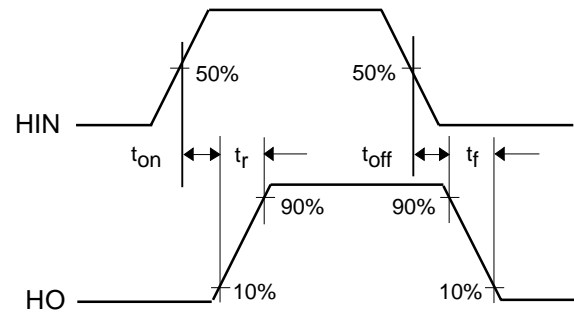
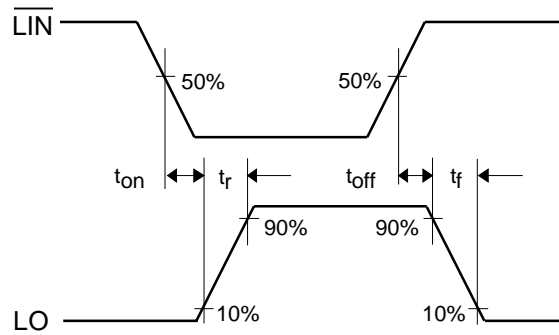


Figure 2. Switching Time Waveform Definitions

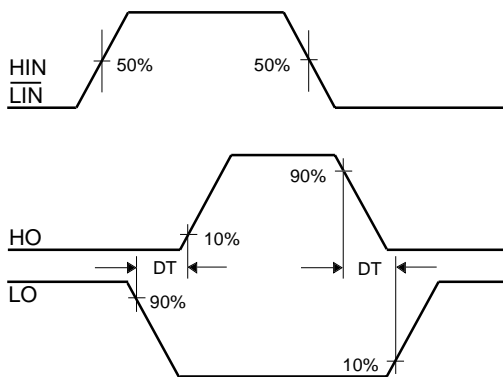


Figure 4. Deadtime Waveform Definitions

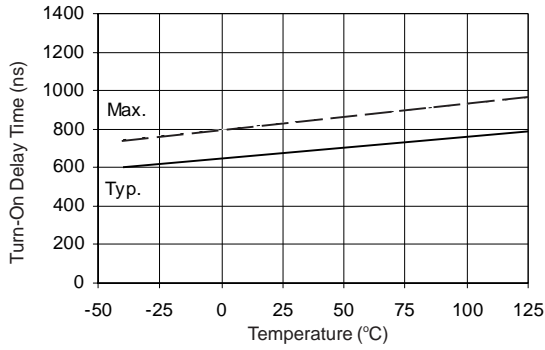


Figure 6A. Turn-On Time vs Temperature

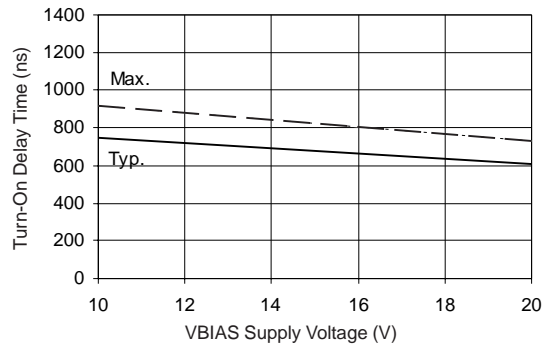


Figure 6B. Turn-On Time vs Supply Voltage

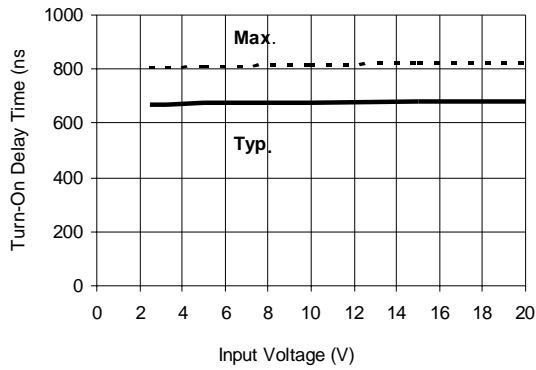


Figure 6C. Turn-On Time vs Input Voltage

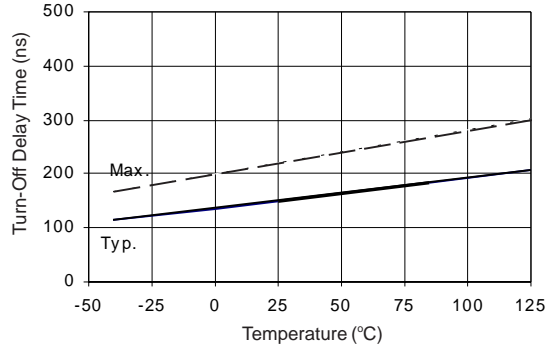


Figure 7A. Turn-Off Time vs Temperature

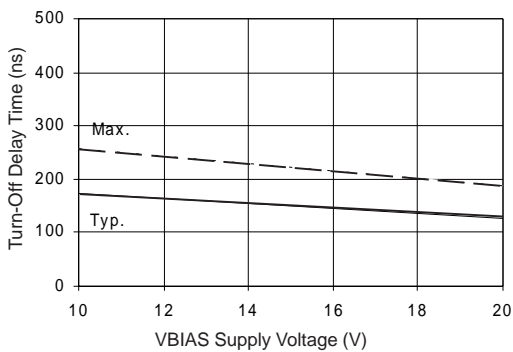


Figure 7B. Turn-Off Time vs Supply Voltage

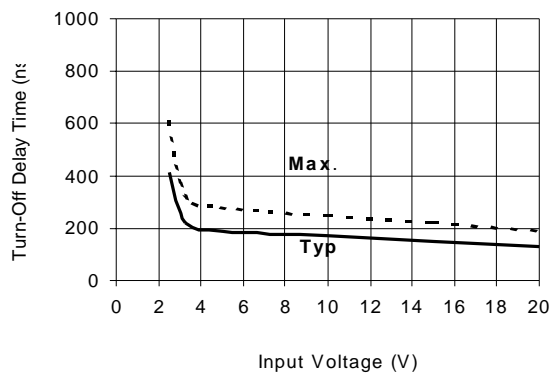


Figure 7C. Turn-Off Time vs Input Voltage

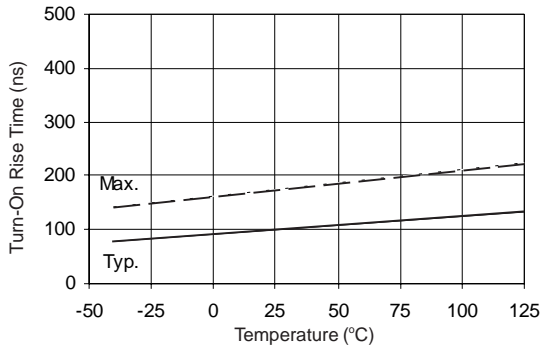


Figure 9A. Turn-On Rise Time vs Temperature

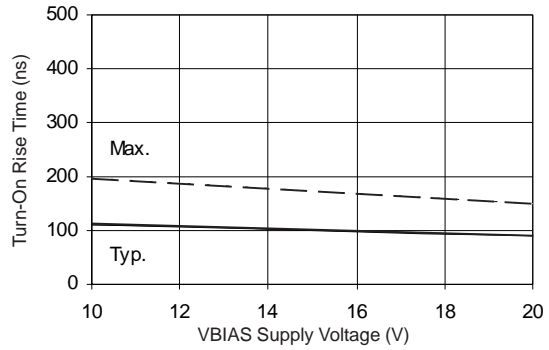


Figure 9B. Turn-On Rise Time vs Voltage

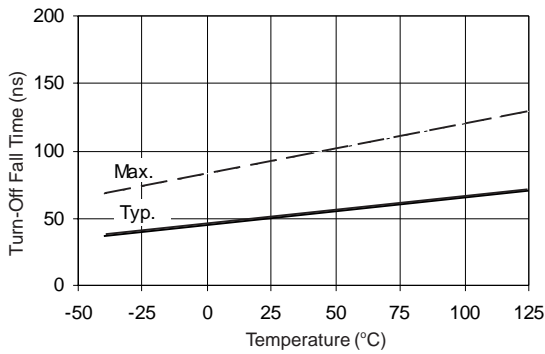


Figure 10A. Turn Off Fall Time vs Temperature

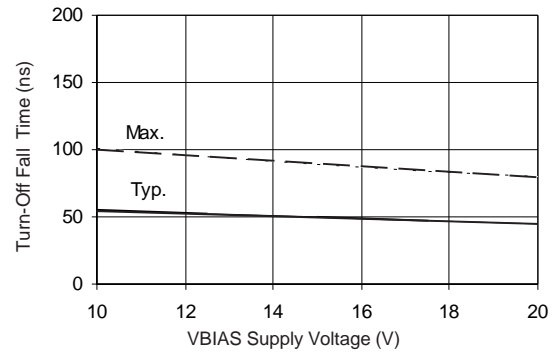


Figure 10B. Turn Off Fall Time vs Voltage

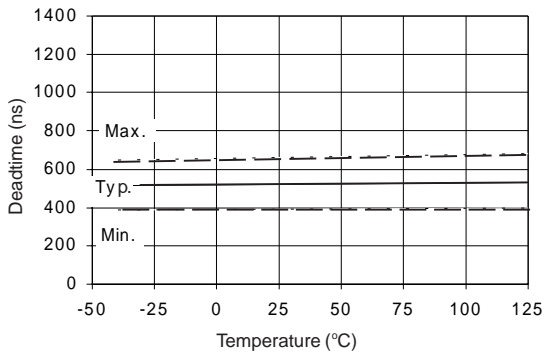


Figure 11A. Deadtime vs Temperature

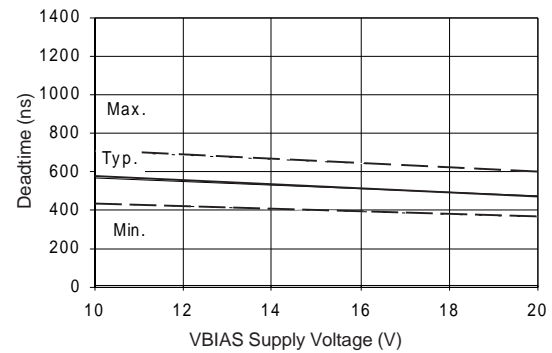


Figure 11B. Deadtime vs Voltage

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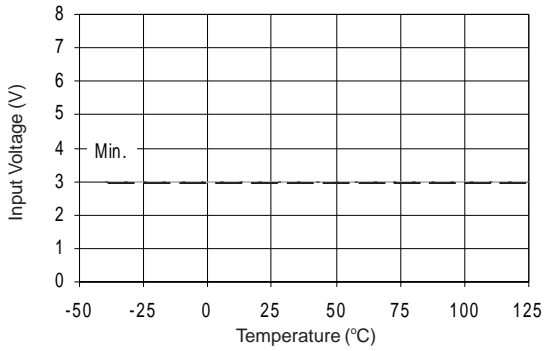


Figure 12A. Logic "1" (\overline{HIN}) & Logic "0" (\overline{LIN}) Input Voltage vs Temperature

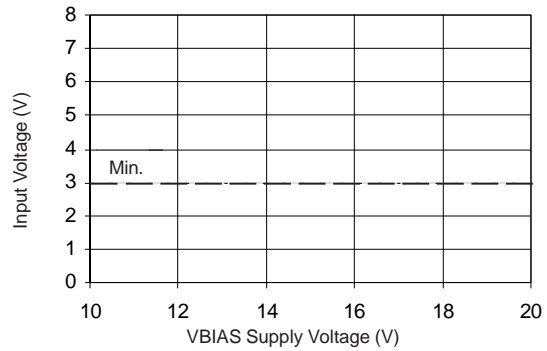


Figure 12B. Logic "1" (\overline{HIN}) & Logic "0" (\overline{LIN}) Input Voltage vs Voltage

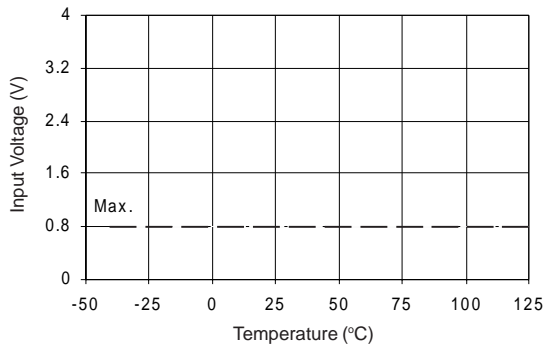


Figure 13A. Logic "0" (\overline{HIN}) & Logic "1" (\overline{LIN}) Input Voltage vs Temperature

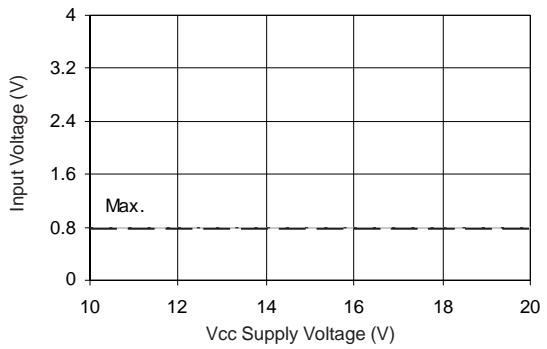


Figure 13B. Logic "0" (\overline{HIN}) & Logic "1" (\overline{LIN}) Input Voltage vs Voltage

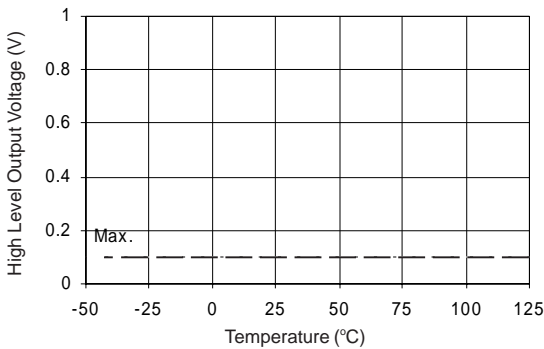


Figure 14A. High Level Output vs Temperature

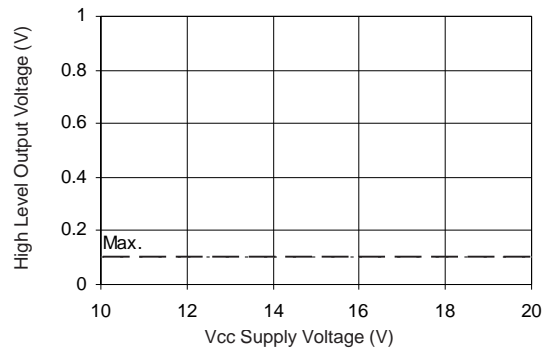


Figure 14B. High Level Output vs Voltage

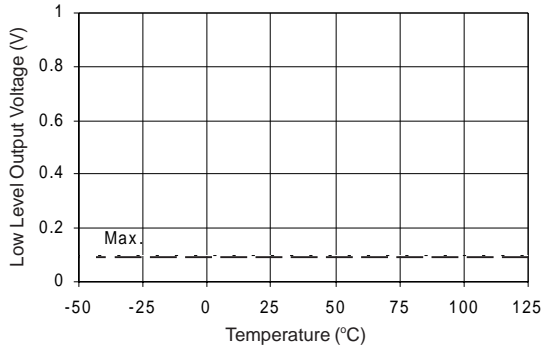


Figure 15A. Low Level Output vs Temperature

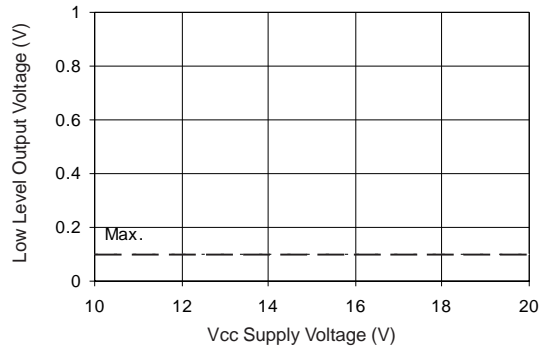


Figure 15B. Low Level Output vs Voltage

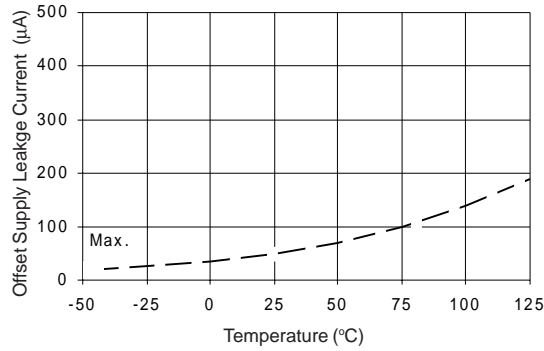


Figure 16A. Offset Supply Current vs Temperature

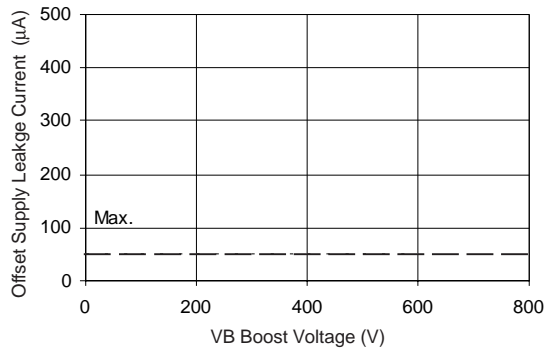


Figure 16B. Offset Supply Current vs Voltage

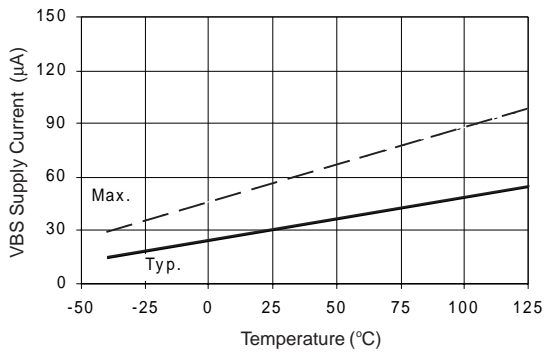


Figure 17A. VBS Supply Current vs Temperature

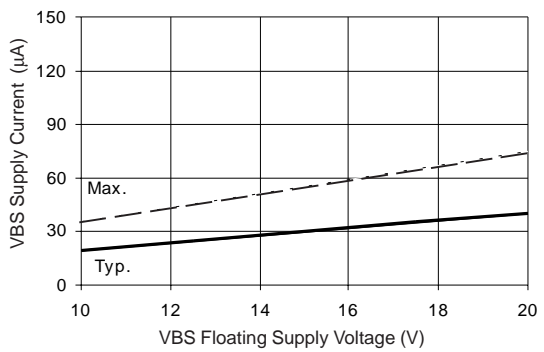


Figure 17B. VBS Supply Current vs Voltage

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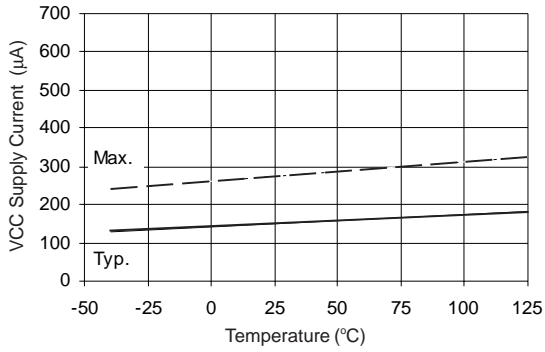


Figure 18A. Vcc Supply Current vs Temperature

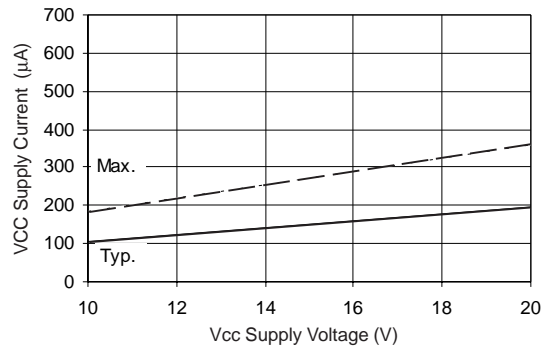


Figure 18B. Vcc Supply Current vs Voltage

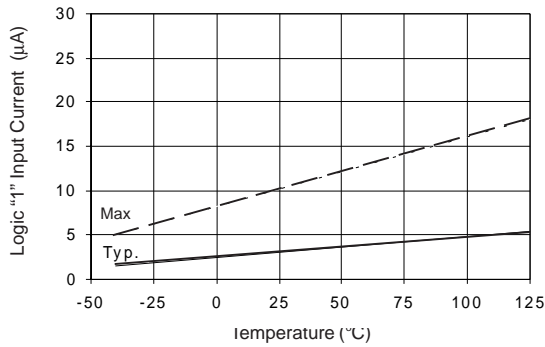


Figure 19A. Logic "1" Input Current vs Temperature

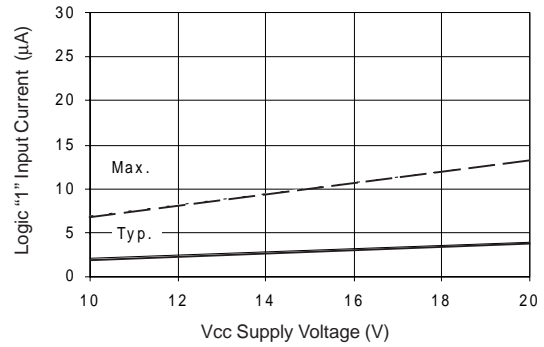


Figure 19B. Logic "1" Input Current vs Voltage

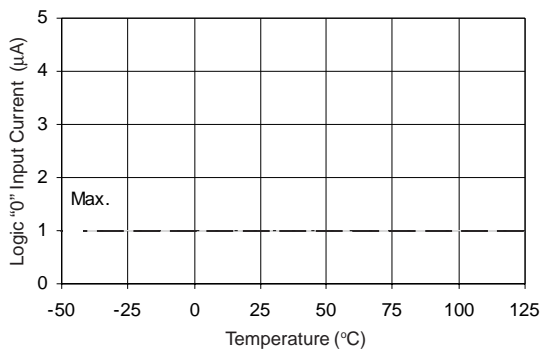


Figure 20A. Logic "0" Input Current vs Temperature

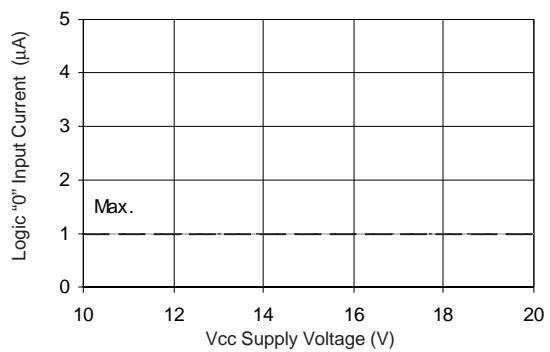


Figure 20B. Logic "0" Input Current vs Voltage

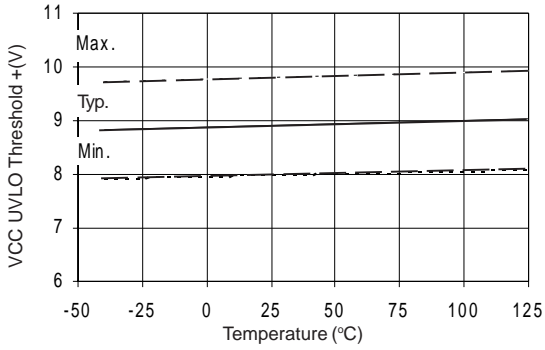


Figure 21A. Vcc Undervoltage Threshold(+) vs Temperature

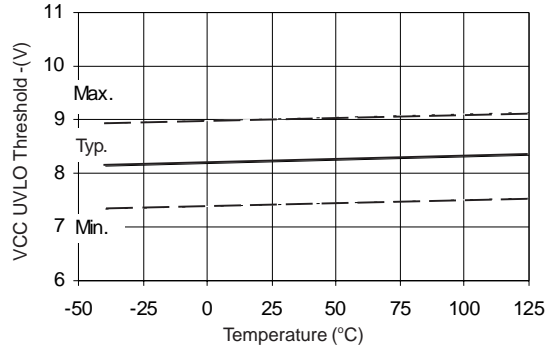


Figure 21B. Vcc Undervoltage Threshold (-) vs Temperature

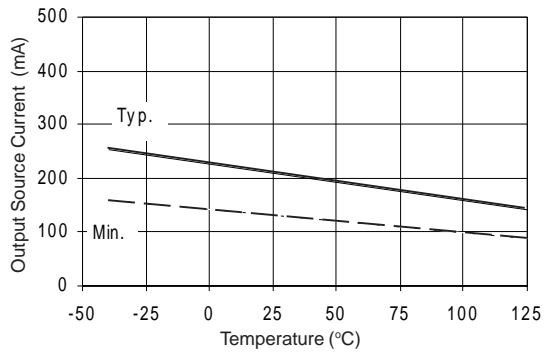


Figure 22A. Output Source Current vs Temperature

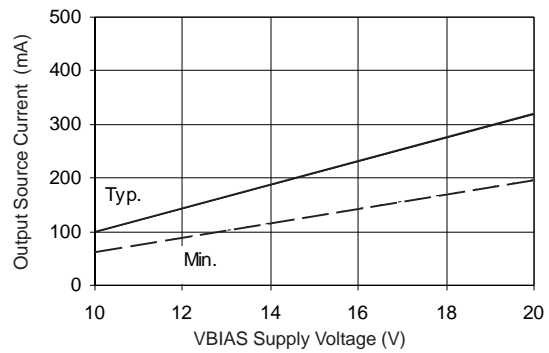


Figure 22B. Output Source Current vs Voltage

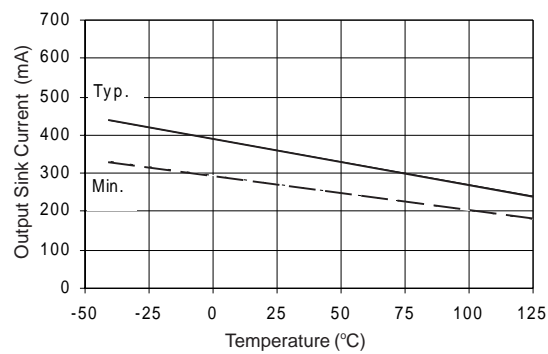


Figure 23A. Output Sink Current vs Temperature

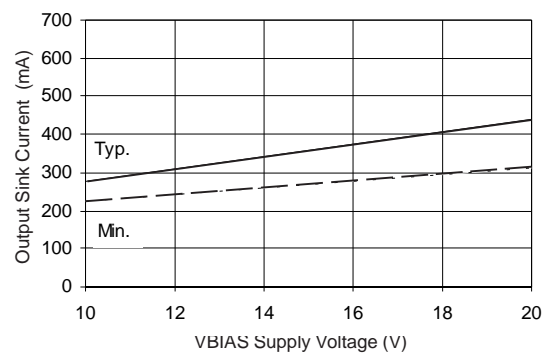
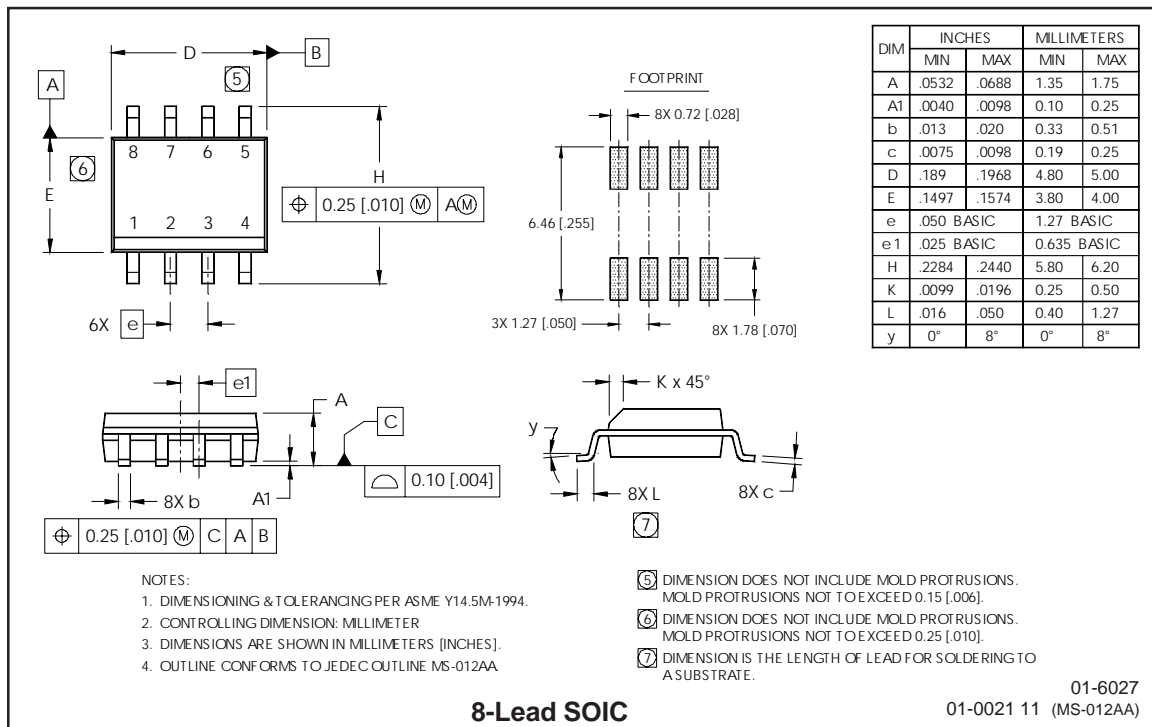
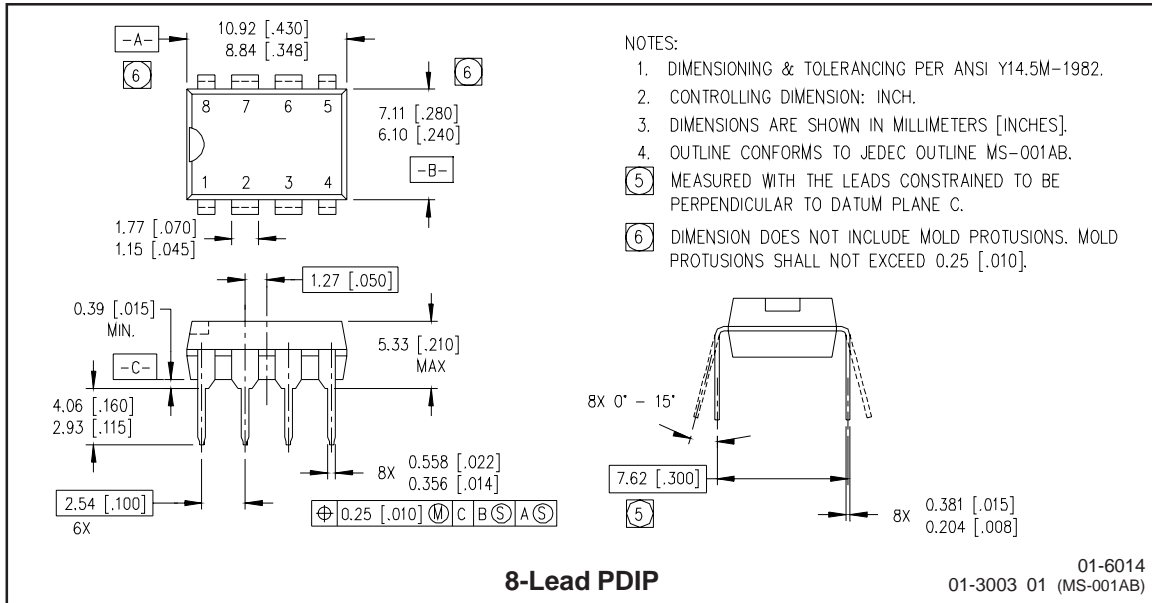


Figure 23B. Output Sink Current vs Voltage

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IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 Tel: (310) 252-7105
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