Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

International
IOR Rectifier

Data Sheet No. PD60043K

IR2101/IR21014
IR2102/IR21024

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
- 5V Schmitt-triggered input logic
- Matched propagation delay for both channels
- Outputs in phase with inputs (IR2101/IR21014) or out of phase with inputs (IR2102/IR21024)

Product Summary

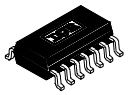
V_{OFFSET}	600V max.
I_{O}+/-	130 mA / 270 mA
V_{OUT}	10 - 20V
$t_{on/off}$ (typ.)	160 & 150 ns
Delay Matching	50 ns

Description

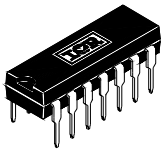
The IR2101/IR21014/IR2102/IR21024 are high voltage, high speed power MOSFET and IGBT drivers with independent high and low side referenced output channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS or 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.

Packages

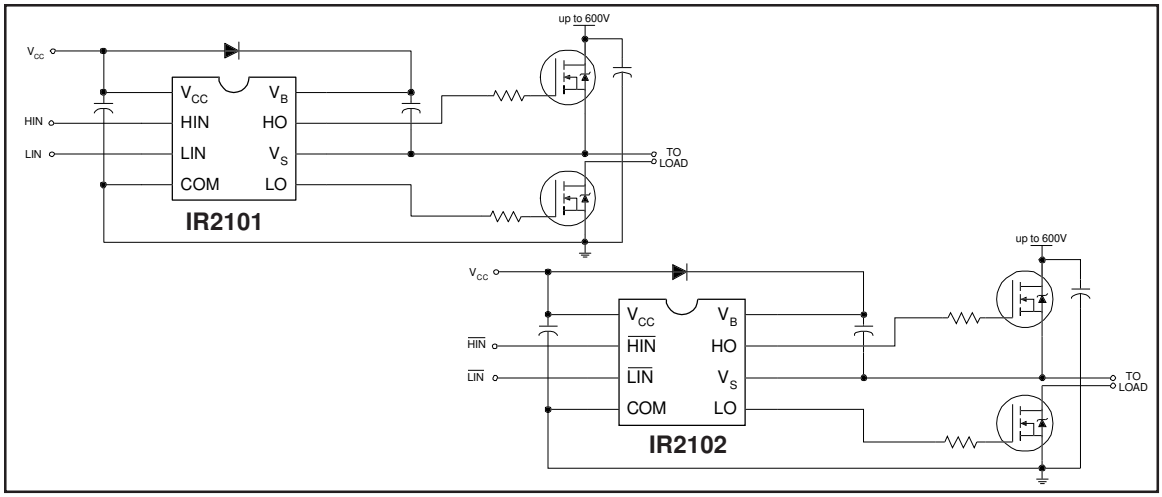

8 Lead SOIC


14 Lead SOIC


8 Lead PDIP


14 Lead PDIP

Typical Connection



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 supply 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 @ $T_A \leq +25°C$	(8 lead PDIP)	—	1.0	W
		(8 lead SOIC)	—	0.625	
		(14 lead PDIP)	—	1.6	
		(14 lead SOIC)	—	1.0	
Rth_{JA}	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		-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) (IR2101) & ($\overline{HIN}$ & $\overline{LIN}$) (IR2102)	0	V_{CC}	
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, C_L = 1000 pF and T_A = 25°C unless otherwise specified.

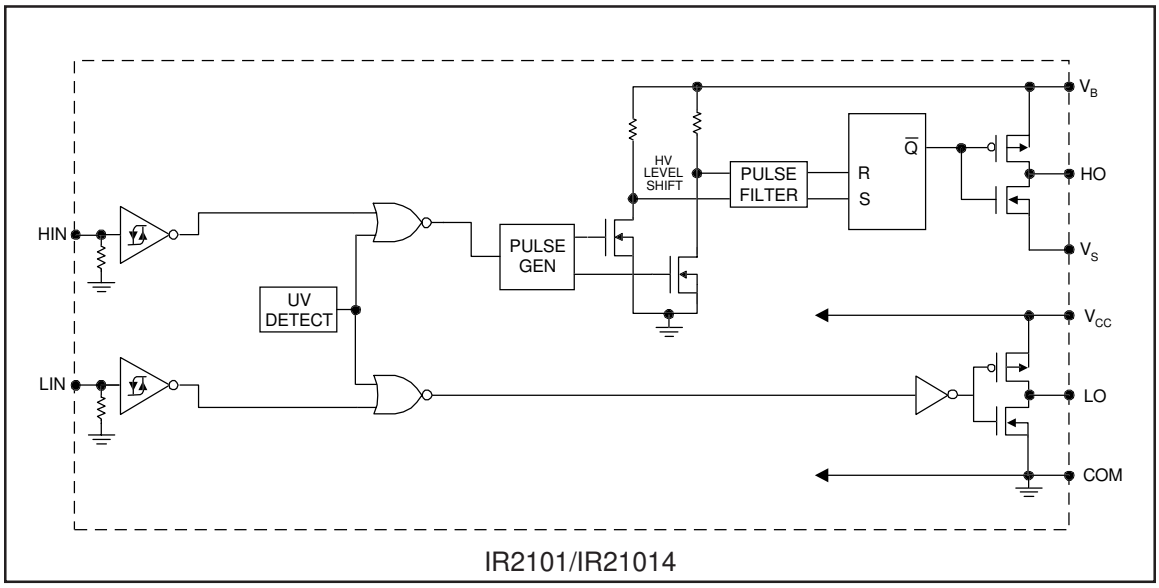
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
t_{on}	Turn-on propagation delay	—	160	220	ns	V_S = 0V
t_{off}	Turn-off propagation delay	—	150	220		V_S = 600V
t_r	Turn-on rise time	—	100	170		
t_f	Turn-off fall time	—	50	90		
MT	Delay matching, HS & LS turn-on/off	—	—	50		

Static Electrical Characteristics

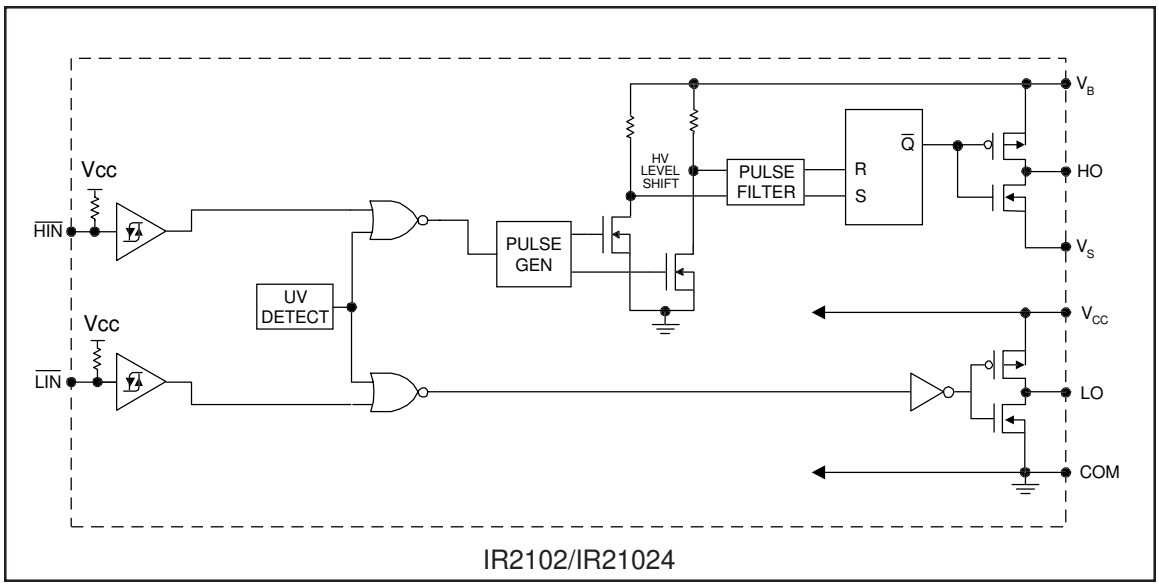
V_{BIAS} (V_{CC}, V_{BS}) = 15V and T_A = 25°C unless otherwise specified. The V_{IN}, V_{TH} and I_{IN} parameters are referenced to COM. The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO or LO.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V_{IH}	Logic "1" input voltage (IR2101) Logic "0" input voltage (IR2102)	3	—	—	V	V_{CC} = 10V to 20V
V_{IL}	Logic "0" input voltage (IR2101) Logic "1"input voltage (IR2102)	—	—	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		V_{IN} = 5V (IR2101) V_{IN} = 0V (IR2102)
I_{IN-}	Logic "0" input bias current	—	—	1		V_{IN} = 0V (IR2101) V_{IN} = 5V (IR2102)
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} = Logic "1" PW ≤ 10 µs
I_{O-}	Output low short circuit pulsed current	270	360	—		V_O = 15V V_{IN} = Logic "0" PW ≤ 10 µs

Functional Block Diagram



IR2101/IR21014

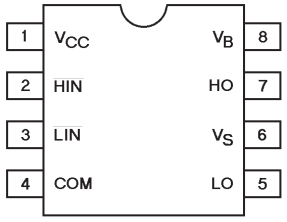


IR2102/IR21024

Lead Definitions

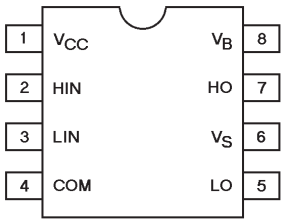
Symbol	Description
HIN	Logic input for high side gate driver output (HO), in phase (IR2101)
$\overline{\text{HIN}}$	Logic input for high side gate driver output (HO), out of phase (IR2102)
LIN	Logic input for low side gate driver output (LO), in phase (IR2101)
$\overline{\text{LIN}}$	Logic input for low side gate driver output (LO), out of phase (IR2102)
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 IR2101



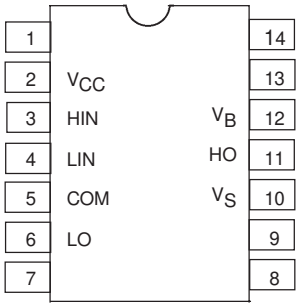
8 Lead PDIP

IR2101



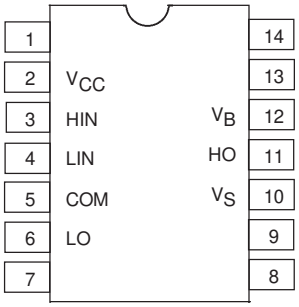
8 Lead SOIC

IR2101S



14 Lead PDIP

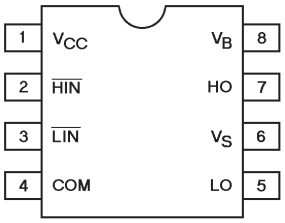
IR21014



14 Lead SOIC

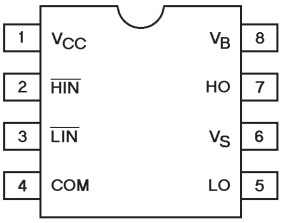
IR21014S

Lead Assignments IR2102



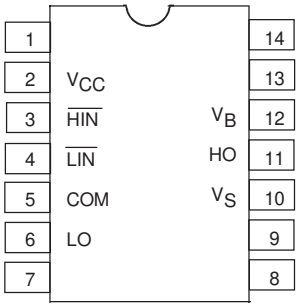
8 Lead PDIP

IR2102



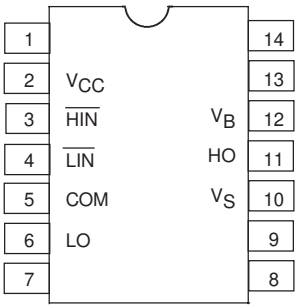
8 Lead SOIC

IR2102S



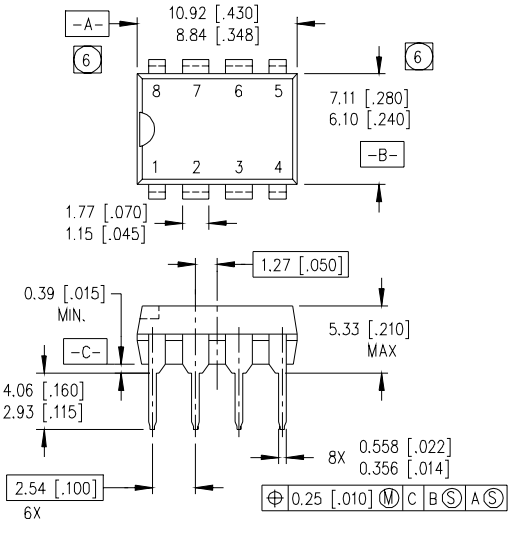
14 Lead PDIP

IR21024



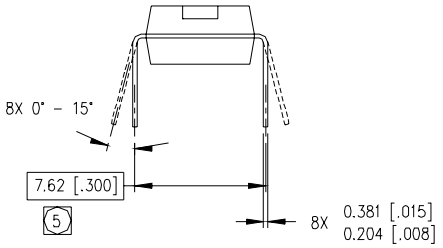
14 Lead SOIC

IR21024S



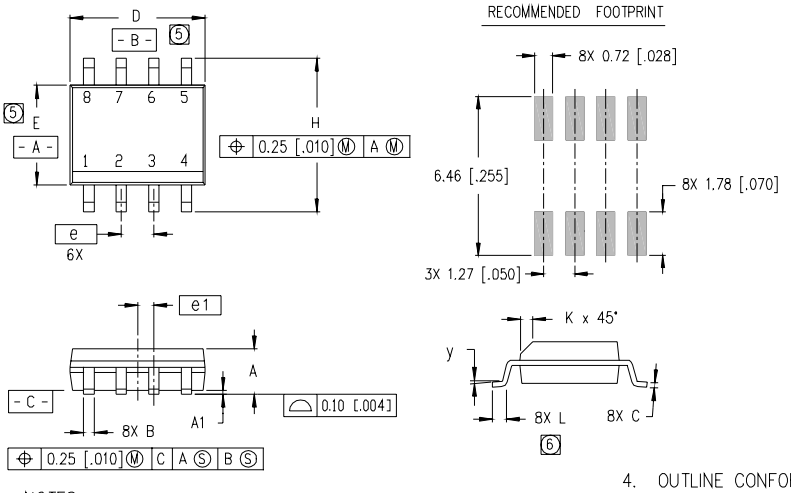
NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-001AB.
5. MEASURED WITH THE LEADS CONSTRAINED TO BE PERPENDICULAR TO DATUM PLANE C.
6. DIMENSION DOES NOT INCLUDE MOLD PROTUSIONS. MOLD PROTUSIONS SHALL NOT EXCEED 0.25 [.010].



8 Lead PDIP

01-3003 01



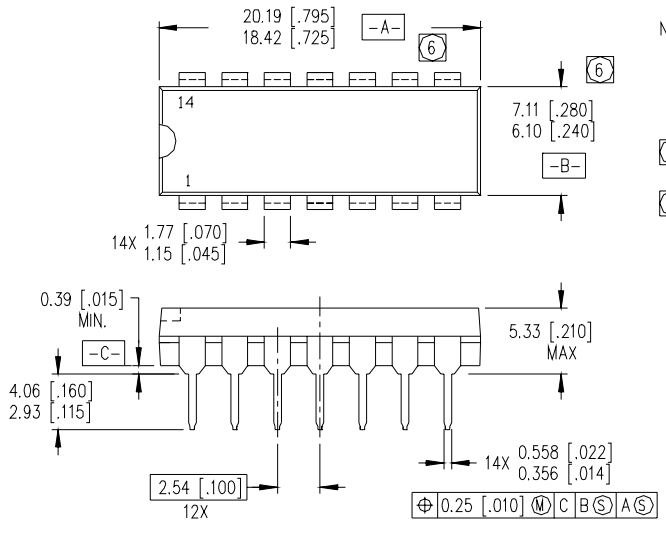
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	.016	.050	0.41	1.27
y	0°	8°	0°	8°

NOTES:

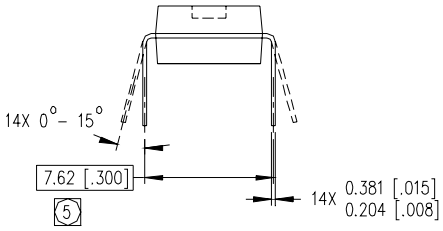
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.006].
6. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

8 Lead SOIC

01-0021 08

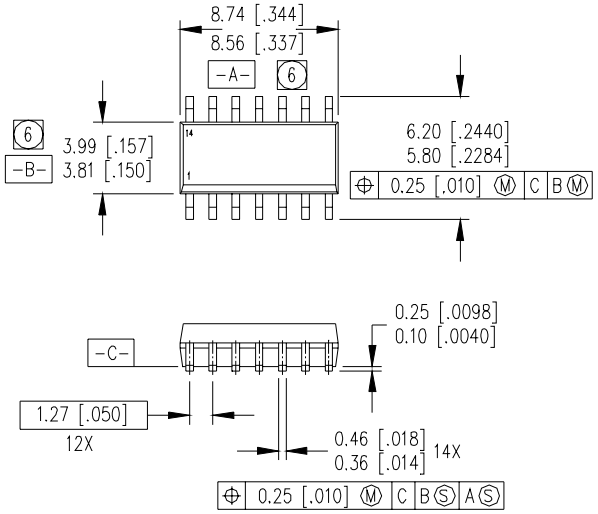


NOTES:
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-001AC.
5. MEASURED WITH THE LEADS CONSTRAINED TO BE PERPENDICULAR TO DATUM PLANE C.
6. DIMENSION DOES NOT INCLUDE MOLD PROTUSIONS. MOLD PROTUSIONS SHALL NOT EXCEED 0.25 [.010].

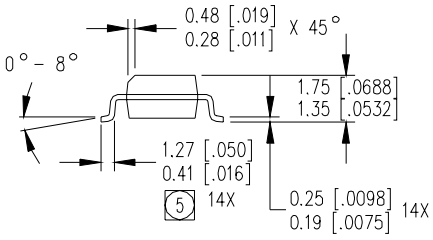


14 Lead PDIP

01-3002 03



NOTES:
1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2 CONTROLLING DIMENSION: MILLIMETER
3 DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4 OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AB.
5 DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.
6 DIMENSION DOES NOT INCLUDE MOLD PROTUSIONS. MOLD PROTUSIONS SHALL NOT EXCEED 0.15 [.006].



14 Lead SOIC (narrow body)

01-3063 00

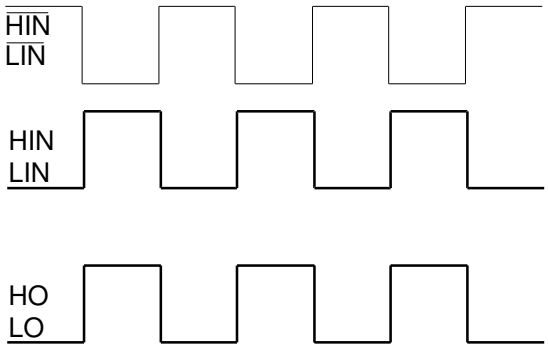


Figure 1. Input/Output Timing Diagram

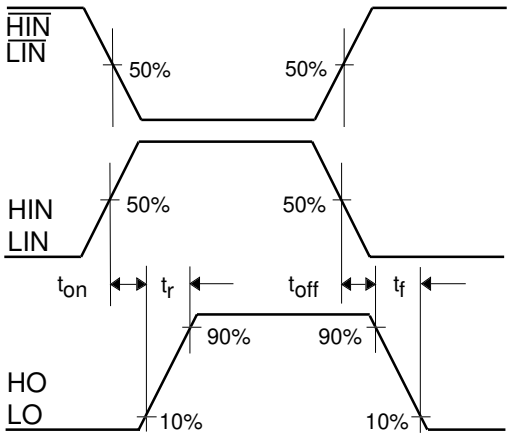


Figure 2. Switching Time Waveform Definitions

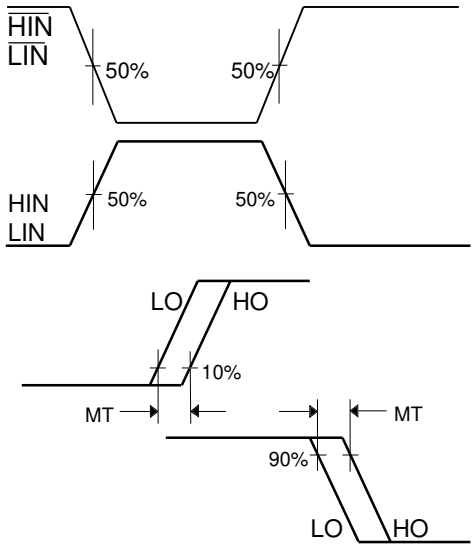


Figure 3. Delay Matching Waveform Definitions

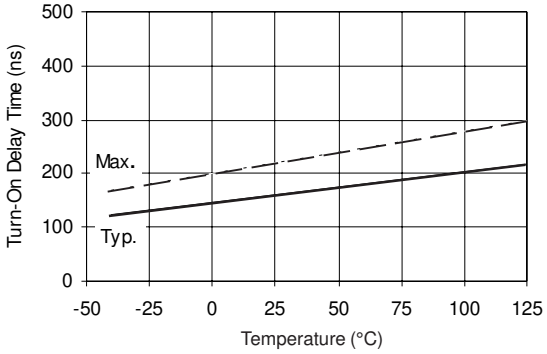


Figure 6A. Turn-On Time vs Voltage

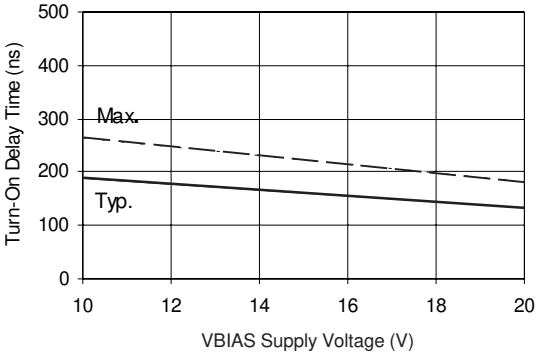


Figure 6B. Turn-On Time vs Voltage

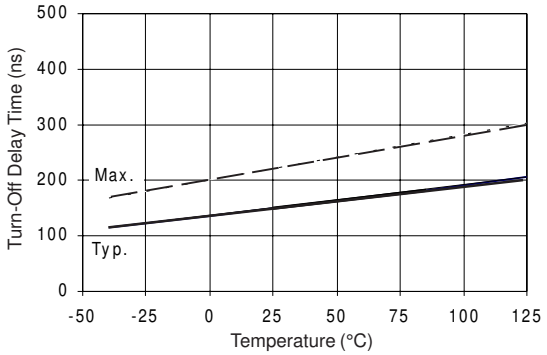


Figure 7A. Turn-Off Time vs Temperature

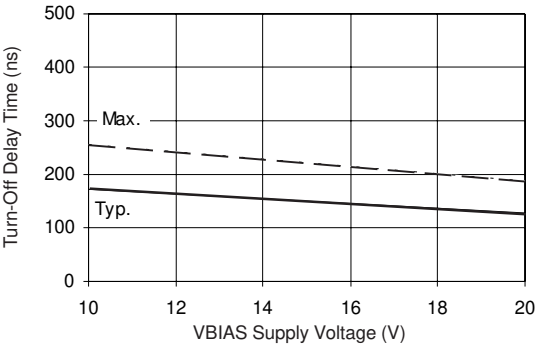


Figure 7B. Turn-Off Time vs Voltage

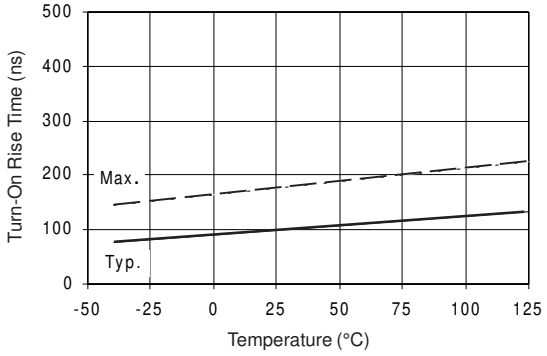


Figure 9A. Turn-On Rise Time vs Temperature

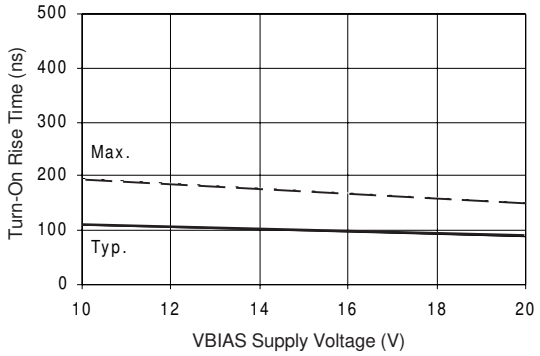


Figure 9B. Turn-On Rise Time vs Voltage

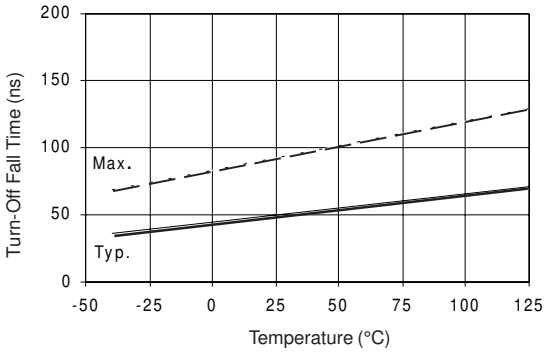


Figure 10A. Turn-Off Fall Time vs Temperature

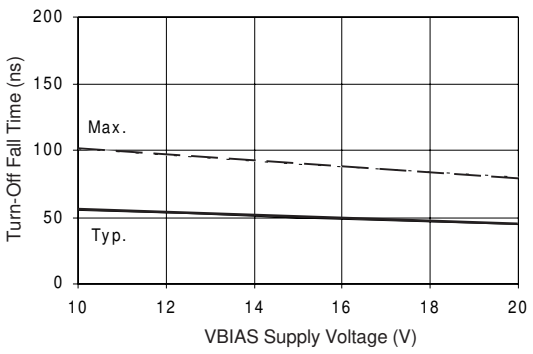


Figure 10B. Turn-Off Fall Time vs Voltage

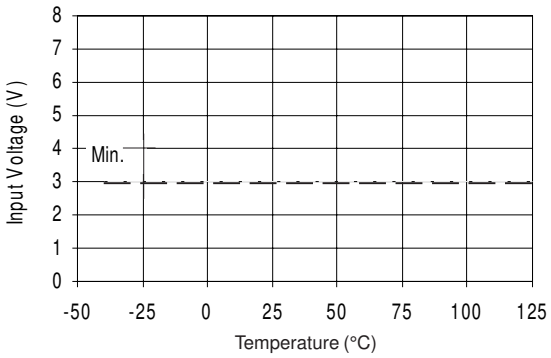


**Figure 12A. Logic "1" Input Voltage (IR2101)
Logic "0" Input Voltage (IR2102)
vs Temperature**

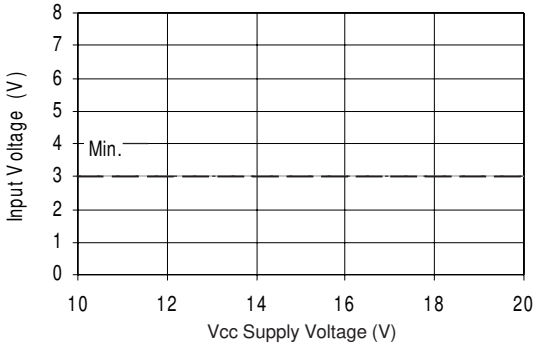


**Figure 12B. Logic "1" Input Voltage (IR2101)
Logic "0" Input Voltage (IR2102)
vs Voltage**

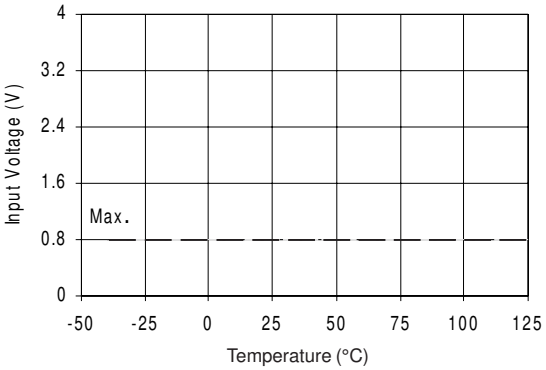


**Figure 13A. Logic "0" Input Voltage (IR2101)
Logic "1" Input Voltage (IR2102)
vs Temperature**

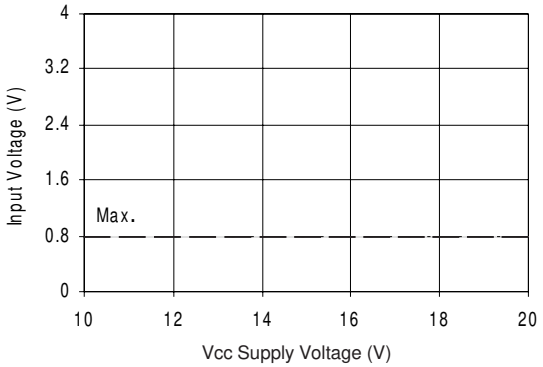


**Figure 13B. Logic "0" Input Voltage (IR2101)
Logic "1" Input Voltage (IR2102)
vs Voltage**

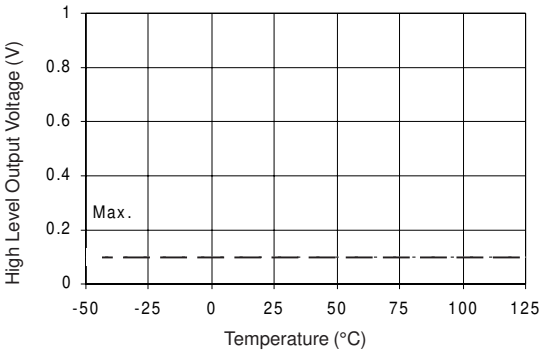


Figure 14A. High Level Output vs Temperature

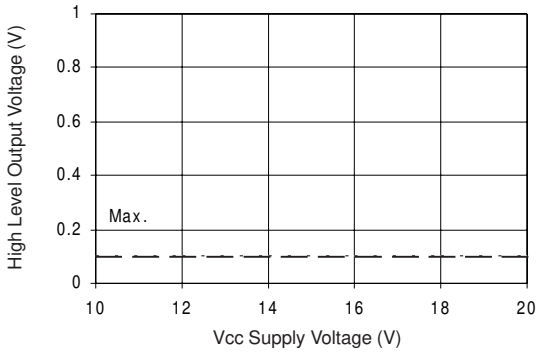


Figure 14B. High Level Output vs Voltage

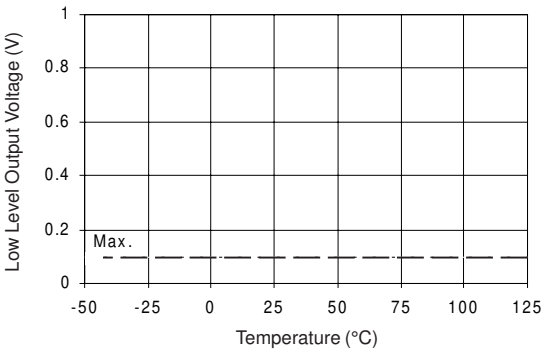


Figure 15A. Low Level Output vs Temperature

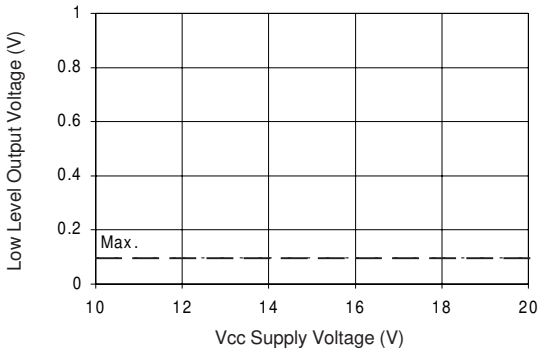


Figure 15B. Low level Output vs Voltage

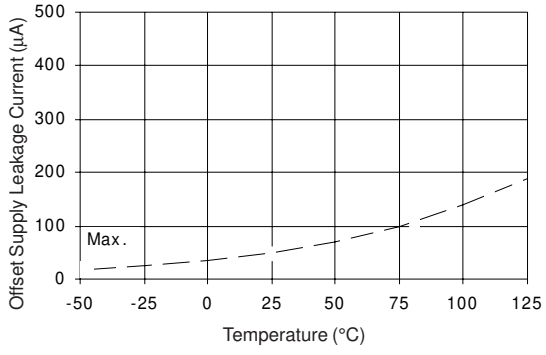


Figure 16A. Offset Supply Current vs Temperature

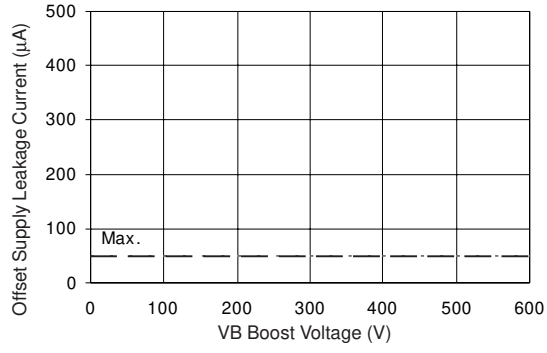


Figure 16B. Offset Supply Current vs Voltage

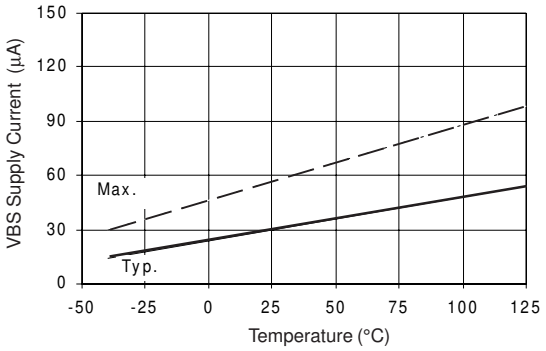


Figure 17A. V_{BS} Supply Current vs Temperature

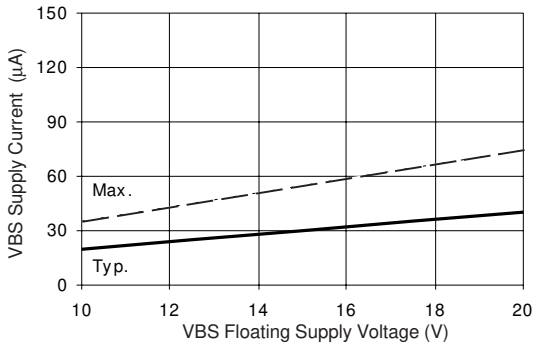


Figure 17B. V_{BS} Supply Current vs Voltage

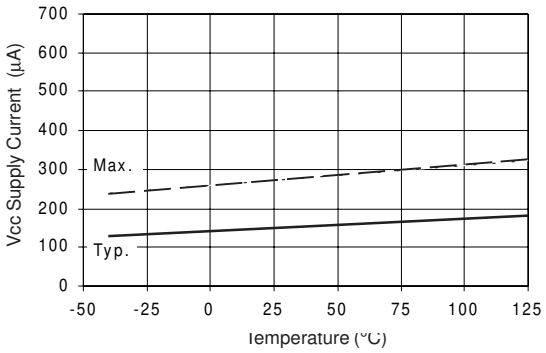


Figure 18A. Vcc Supply Current vs Temperature

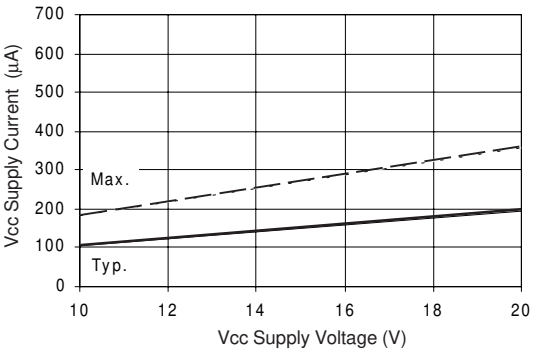


Figure 18B. Vcc Supply Current vs Voltage

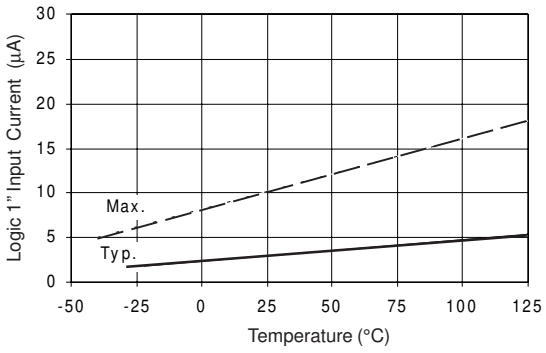


Figure 19A. Logic"1" Input Current vs Temperature

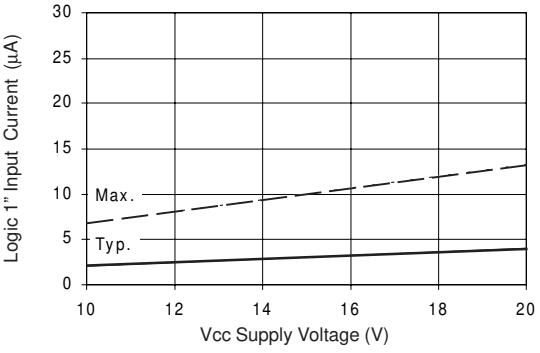


Figure 19B. Logic"1" Input Current vs Voltage

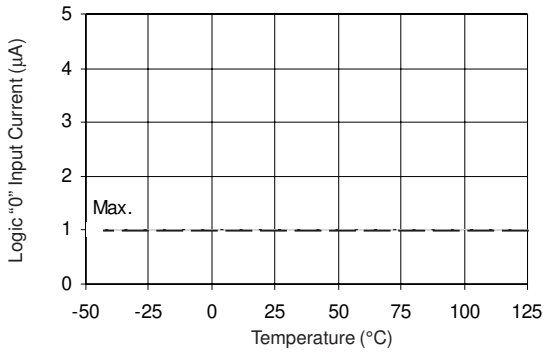


Figure 20A. Logic "0" Input Current vs Temperature

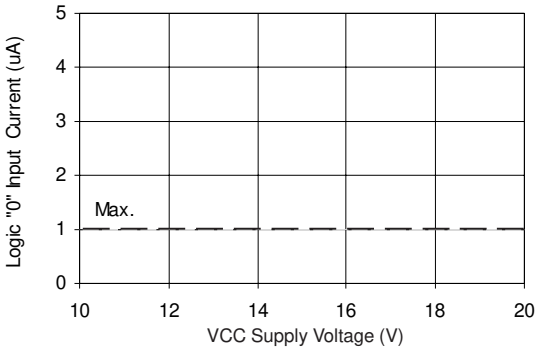


Figure 20B. Logic "0" Input Current vs Voltage

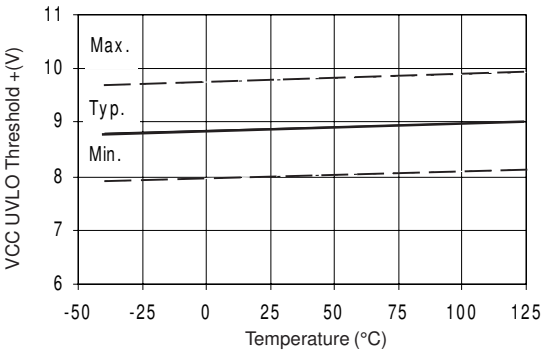


Figure 21A. Vcc Undervoltage Threshold(+) vs Temperature

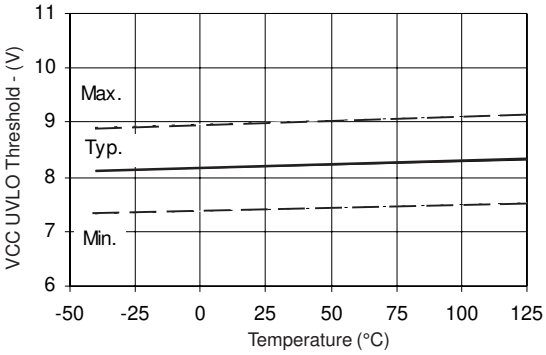


Figure 21B. Vcc Undervoltage Threshold(-) vs Temperature

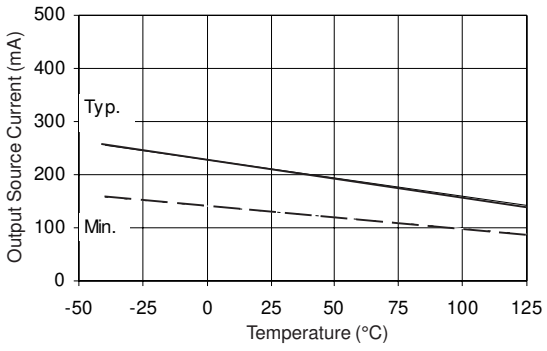


Figure 22A. Output Source Current vs Temperature

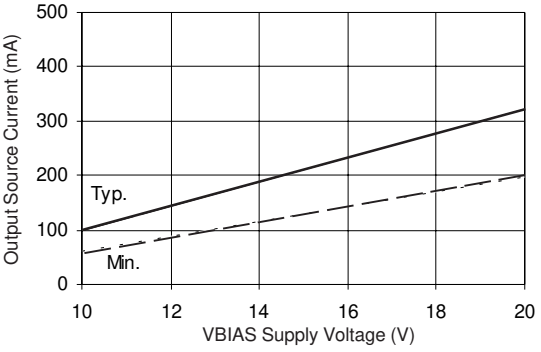


Figure 22B. Output Source Current vs Voltage

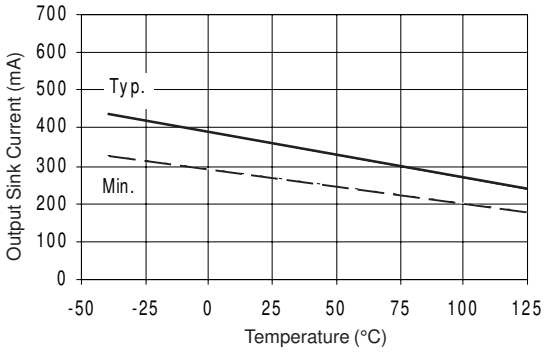


Figure 23A. Output Sink Current vs Temperature

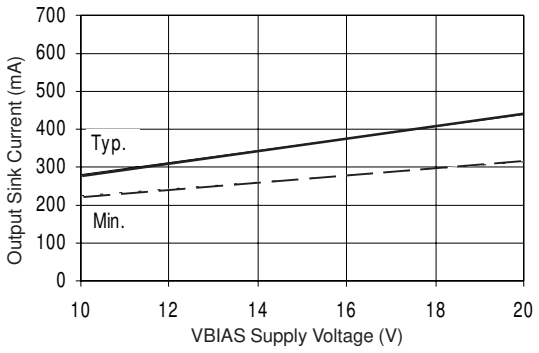


Figure 23B. Output Sink Current vs Voltage

WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 Tel: (310) 322 3331
IR GREAT BRITAIN: Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020
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. 11/29/99