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September 2015

FL73282
Half-Bridge Gate Driver

Features

- Floating Channel for Bootstrap Operation to +900 V
- Typically 350 mA / 650 mA Sourcing/Sinking Current Driving Capability for Both Channels
- Common-Mode dv/dt Noise Canceling Circuit
- Extended Allowable Negative V_S Swing to -9.8 V for Signal Propagation at V_{CC}=V_{BS}=15 V
- V_{CC} & V_{BS} Supply Range from 10 V to 20 V
- UVLO Functions for Both Channels
- Matched Propagation Delay Below 50 ns
- Built-in 170 ns Dead-Time
- Output in Phase with Input Signal

Applications

- Fluorescent Lamp Ballast
- HID Ballast
- SMPS
- Motor Driver
- General Purpose Half Bridge Topology

Description

The FL73282, a monolithic half bridge gate-drive IC, can drive MOSFETs and IGBTs that operate up to +900 V. Fairchild's high-voltage process and common mode noise canceling technique provides stable operation of the high-side driver under high-dV_S/dt noise circumstances. An advanced level-shift circuit allows high-side gate driver operation up to V_S=-9.8 V (typical) for V_{BS}=15 V. The UVLO circuits for both channels prevent malfunction when V_{CC} or V_{BS} is lower than the specified threshold voltage. Output drivers typically source/sink 350 mA / 650 mA, respectively, which is suitable for all kinds of half- and full-bridge inverters.

Figure 1. SOP 8

Ordering Information

Part Number	Operating Temperature Range	Package	Packing Method
FL73282MX(1)	-40°C to +125°C	8-Lead, Small Outline Integrated Circuit, (SOIC)	Tape & Reel

Note:
1. These devices passed wave-soldering test by JESD22A-111.

Typical Application Diagram

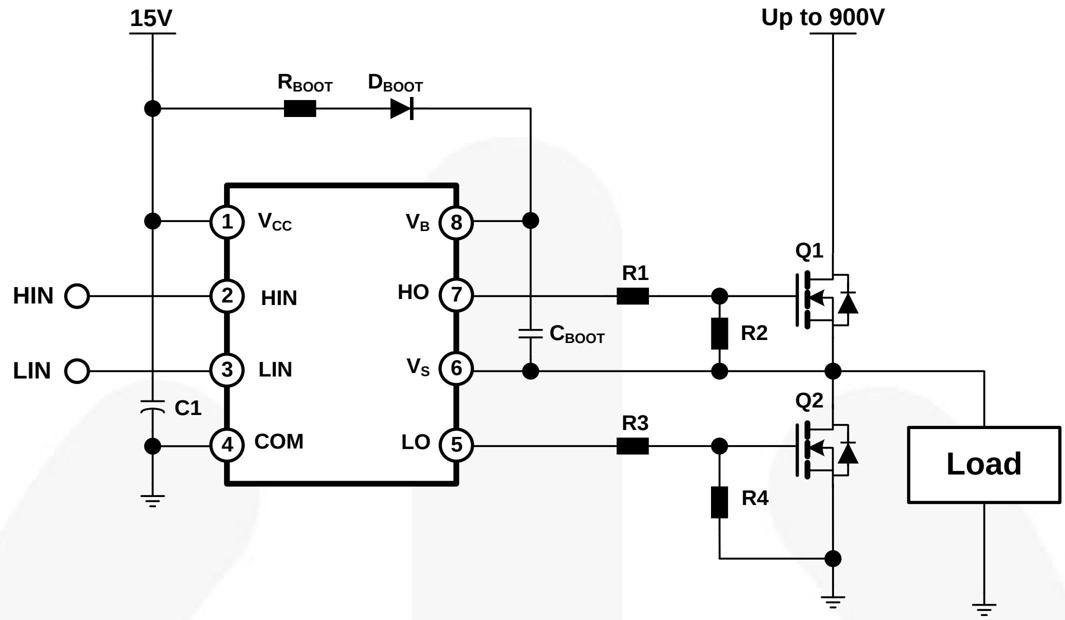


Figure 2. Application Circuit for Half Bridge Topology

Internal Block Diagram

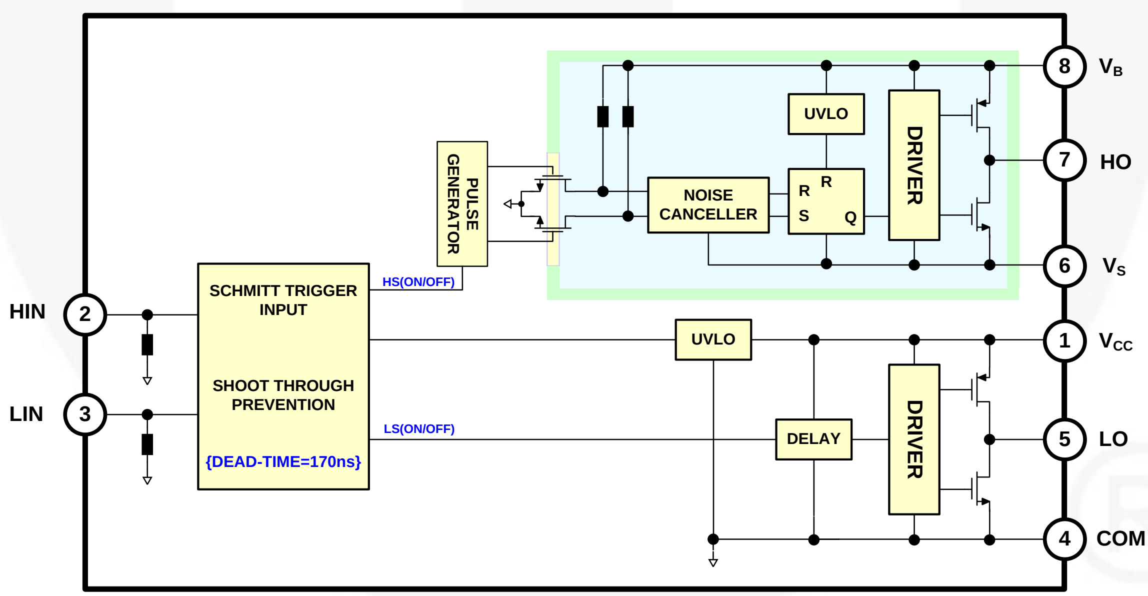


Figure 3. Functional Block Diagram

Pin Configuration

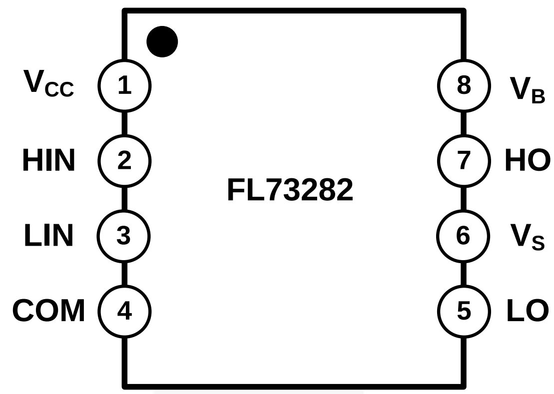


Figure 4. Pin Assignments (Top View)

Pin Definitions

Pin	Name	I/O	Description
1	V_{CC}	I	Low-Side Supply Voltage
2	HIN	I	Logic Input for High-Side Gate Driver Output
3	LIN	I	Logic Input for Low-Side Gate Driver Output
4	COM		Logic Ground and Low-Side Driver Return
5	LO	O	Low-Side Driver Output
6	V_S	I	High-Voltage Floating Supply Return
7	HO	O	High-Side Driver Output
8	V_B	I	High-Side Floating Supply

Absolute Maximum Ratings

Stresses exceeding the Absolute Maximum Ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Min.	Max.	Unit
V_S	High-Side Floating Offset Voltage	V_B-24	V_B+0.3	V
V_B	High-Side Floating Supply Voltage	-0.3	924.0	V
V_{CC}	Low-Side and Logic-Fixed Supply Voltage	-0.3	24	V
V_{HO}	High-Side Floating Output Voltage V_{HO}	V_S-0.3	V_B+0.3	V
V_{LO}	Low-Side Floating Output Voltage V_{LO}	-0.3	V_{CC}+0.3	V
V_{IN}	Logic Input Voltage (HIN, LIN)	-0.3	V_{CC}+0.3	V
COM	Logic Ground	V_{CC}-24	V_{CC}+0.3	V
dV_S/dt	Allowable Offset Voltage Slew Rate		±50	V/ns
P_D[(3)(4)(5)]	Power Dissipation		0.625	W
θ_{JA}	Thermal Resistance		200	°C/W
T_J	Junction Temperature		150	°C
T_{STG}	Storage Temperature	-55	150	°C

Notes:

2. Mounted on 76.2 x 114.3 x 1.6 mm PCB (FR-4 glass epoxy material).
3. Refer to the following standards:
   JESD51-2: Integral circuit's thermal test method environmental conditions, natural convection;
   JESD51-3: Low effective thermal conductivity test board for leaded surface-mount packages.
4. Do not exceed maximum power dissipation (P_D) under any circumstances.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Min.	Max.	Unit
V_B	High-Side Floating Supply Voltage	V_S+10	V_S+20	V
V_S	High-Side Floating Supply Offset Voltage	6-V_{CC}	900	V
V_{HO}	High-Side (HO) Output Voltage	V_S	V_B	V
V_{LO}	Low-Side (LO) Output Voltage	COM	V_{CC}	V
V_{IN}	Logic Input Voltage (HIN, LIN)	COM	V_{CC}	V
V_{CC}	Low-Side Supply Voltage	10	20	V
T_A	Ambient Temperature	-40	+125	°C

Static Electrical Characteristics

V_{BIAS}(V_{CC}, V_{BS}) = 15.0 V, T_A = 25°C, unless otherwise specified. The V_{IN} and I_{IN} parameters are referenced to COM. The V_O and I_O parameters are referenced to V_S and COM and are applicable to the respective outputs HO and LO.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Power Supply Section						
I_{QCC}	Quiescent V_{CC} Supply Current	V_{IN}=0 V or 5 V		80	180	µA
I_{QBS}	Quiescent V_{BS} Supply Current	V_{IN}=0 V or 5 V		50	120	µA
IPCC	Operating V_{CC} Supply Current	f_{IN}=20 kHz, rms value			550	µA
IPBS	Operating V_{BS} Supply Current	f_{IN}=20 kHz, rms value			600	µA
I_{LK}	Offset Supply Leakage Current	V_B=V_S=900 V			10	µA
Bootstrapped Supply Section						
V_{CCUV+} V_{BSUV+}	V_{CC} & V_{BS} Supply Under-Voltage Positive going Threshold		8.2	9.2	10.0	V
V_{CCUV-} V_{BSUV-}	V_{CC} & V_{BS} Supply Under-Voltage Negative going Threshold		7.6	8.7	9.6	V
V_{CCUVH} V_{BSUVH}	V_{CC} Supply Under-Voltage Lockout Hysteresis			0.5		V
Input Section						
V_{IH}	Logic "1" Input Voltage		2.5			V
V_{IL}	Logic "0" Input Voltage				0.8	V
I_{IN+}	Logic "1" Input Bias Current	V_{IN}=5 V		20	50	µA
I_{IN-}	Logic "0" Input Bias Current	V_{IN}=0 V		1.0	2.0	µA
R_{IN}	Logic Input Pull-Down Resistance		100	250		KΩ
Gate Driver Output Section						
V_{OH}	High-Level Output Voltage, V_{BIAS}-V_O	I_O=0 A			85	mV
V_{OL}	Low-Level Output Voltage, V_O	I_O=0 A			85	mV
I_{O+}	Output HIGH Short-Circuit Pulsed Current	V_O=0 V,V_{IN}=5 V with PW≤10 µs	250	350		mA
I_{O-}	Output LOW Short-Circuit Pulsed Current	V_O=15 V,V_{IN}=0 V with PW≤10 µs	500	650		mA
V_S	Allowable Negative V_S Pin Voltage for HIN Signal Propagation to HO			-9.8	-7.0	V

Dynamic Electrical Characteristics

$V_{BIAS}(V_{CC}, V_{BS})$ = 15.0 V, V_S = COM, C_L = 1000 pF and T_A= 25°C, unless otherwise specified..

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t_{ON}	Turn-On Propagation Delay	V_S=0 V	80	150	220	ns
t_{OFF}	Turn-Off Propagation Delay	V_S=0 V or 900 V[(5)]	80	150	220	ns
t_R	Turn-On Rise Time	V_{LIN}=V_{HIN}=5 V		60	140	ns
t_F	Turn-Off Fall Time	V_{LIN}=V_{HIN}=0 V		30	80	ns
DT	Dead Time		70	170	270	ns
MT	Delay Matching, HS & LS Turn-on/off				50	ns
t_{PW}	Minimum Input Pulse Width that changes the Output[(5)(6)]				220	ns

Notes:
5. These parameters are guaranteed by design.
6. The minimum input pulse width time included dead time

Typical Characteristics

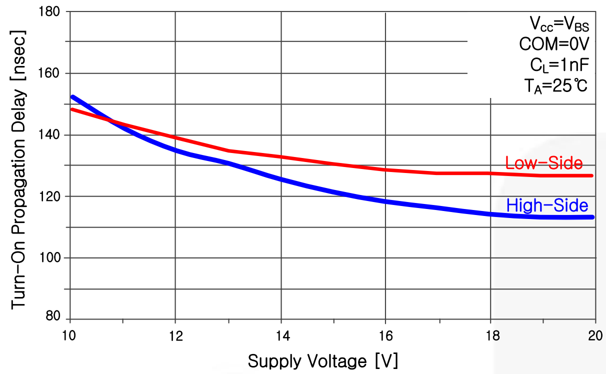


Figure 5. Turn-On Propagation Delay vs. Supply Voltage

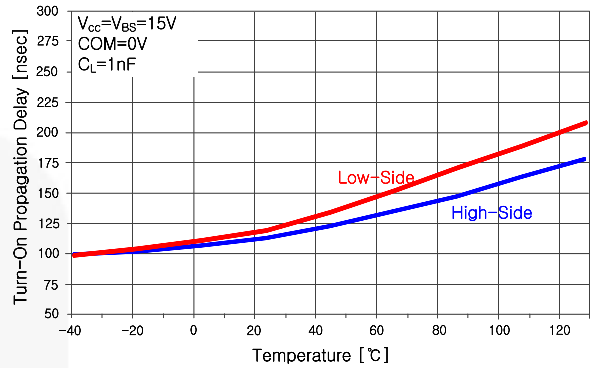


Figure 6. Turn-On Propagation Delay vs. Temperature

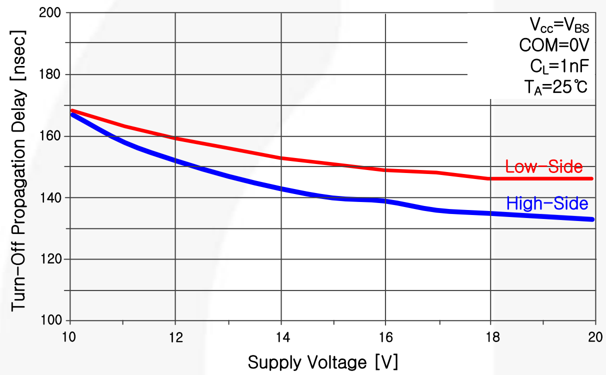


Figure 7. Turn-Off Propagation Delay vs. Supply Voltage

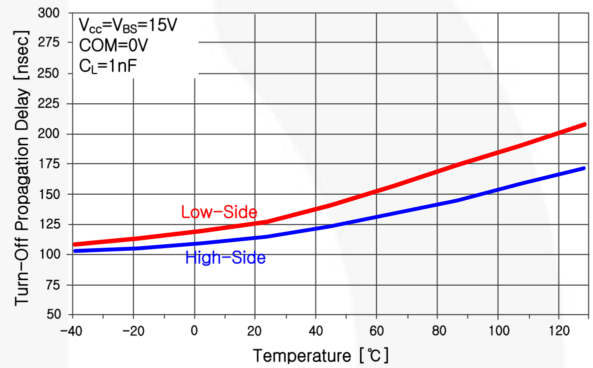


Figure 8. Turn-Off Propagation Delay vs. Temperature

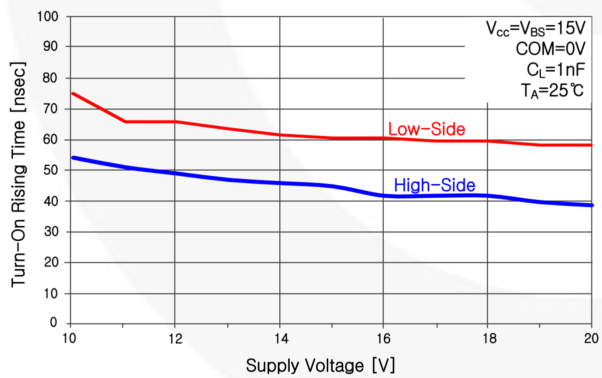


Figure 9. Turn-On Rising Time vs. Supply Voltage

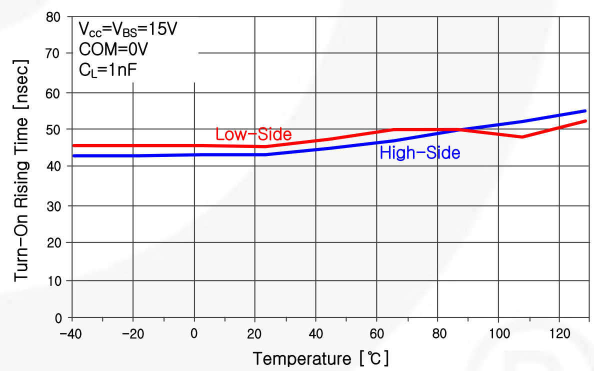


Figure 10. Turn-On Rising Time vs. Temperature

Typical Characteristics (Continued)

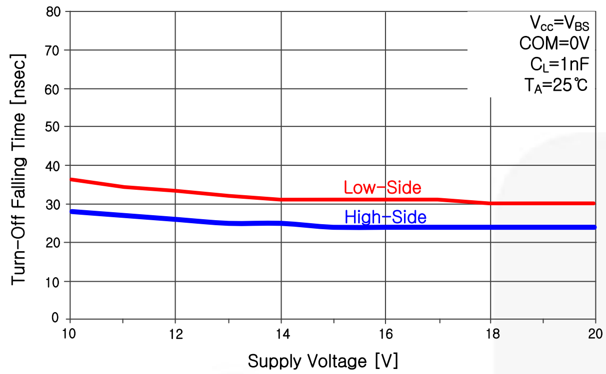


Figure 11. Turn-Off Falling Time vs. Supply Voltage

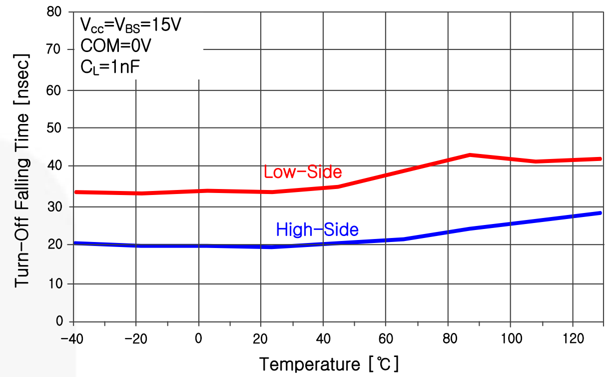


Figure 12. Turn-Off Falling vs. Temperature

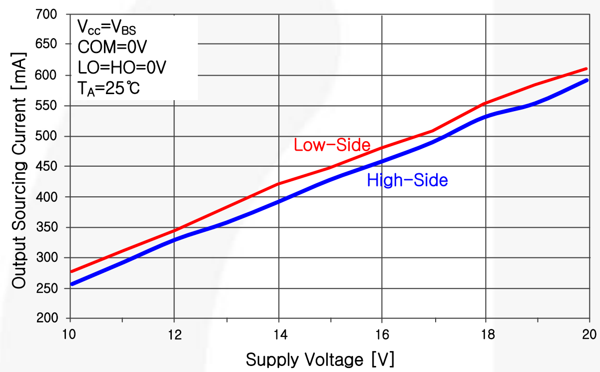


Figure 13. Output Sourcing Current vs. Supply Voltage

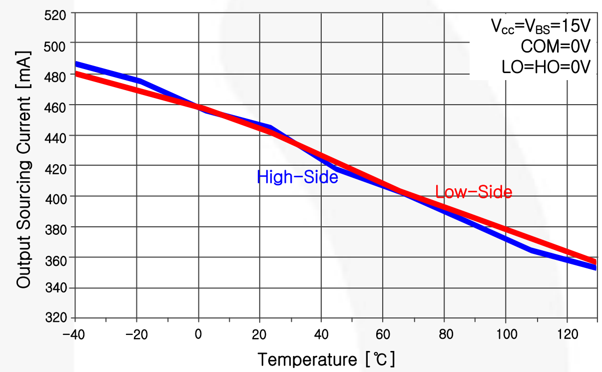


Figure 14. Output Sourcing Current vs. Temperature

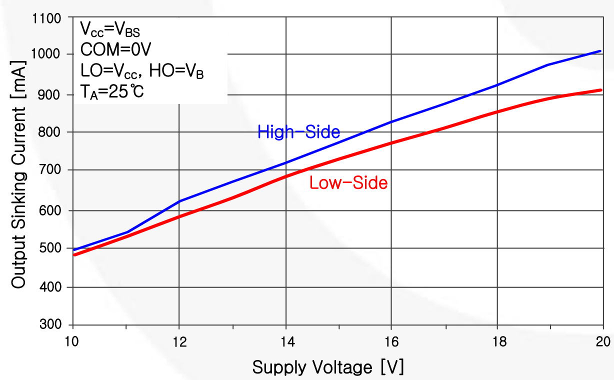


Figure 15. Output Sinking Current vs. Supply Voltage

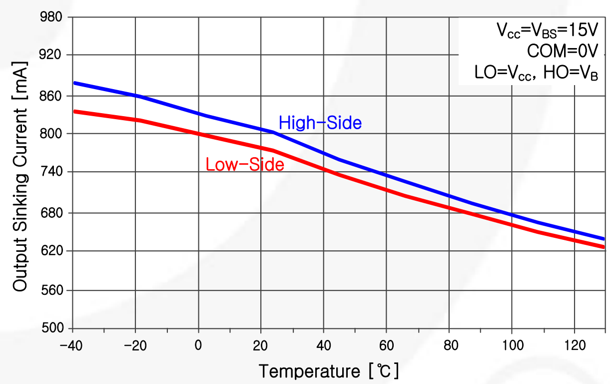


Figure 16. Output Sinking Current vs. Temperature

Typical Characteristics (Continued)

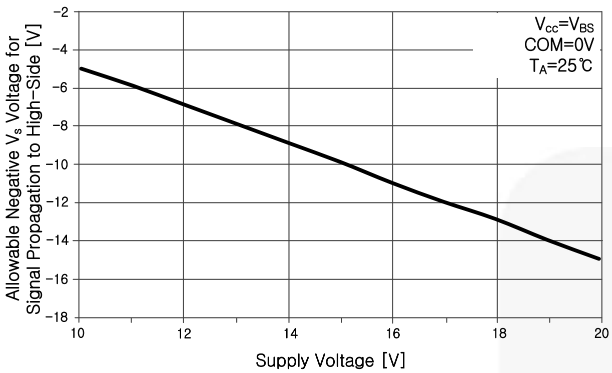


Figure 17. Allowable Negative V_S Voltage for Signal Propagation to High Side vs. Supply Voltage

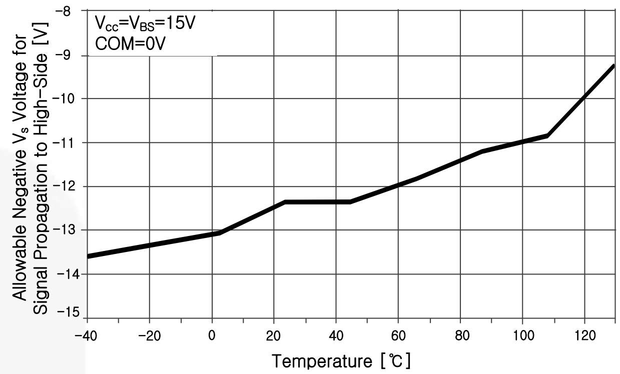


Figure 18. Allowable Negative V_S Voltage for Signal Propagation to High Side vs. Temperature

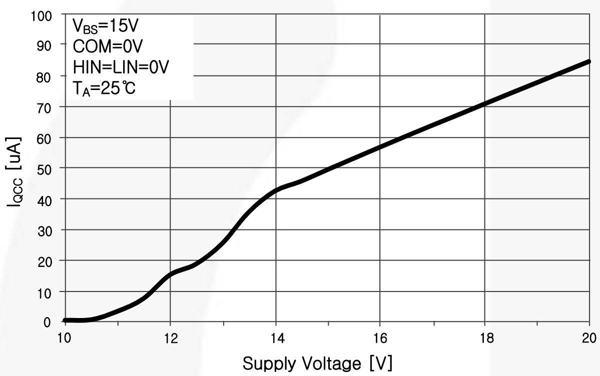


Figure 19. I_{QCC} vs. Supply Voltage

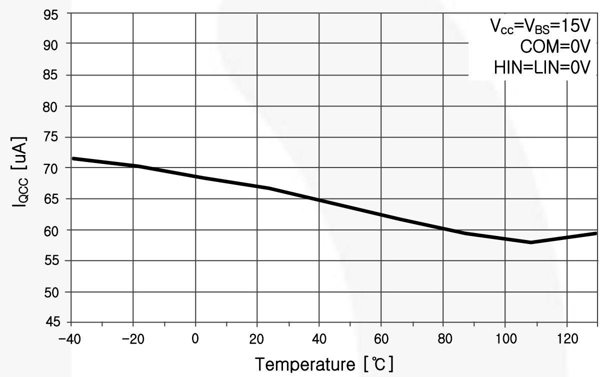


Figure 20. I_{QCC} vs. Temperature

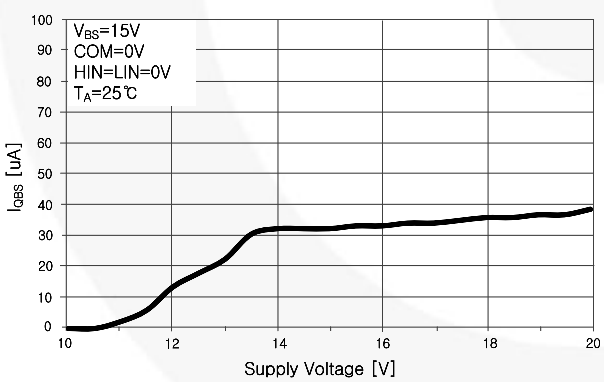


Figure 21. I_{QBS} vs. Supply Voltage

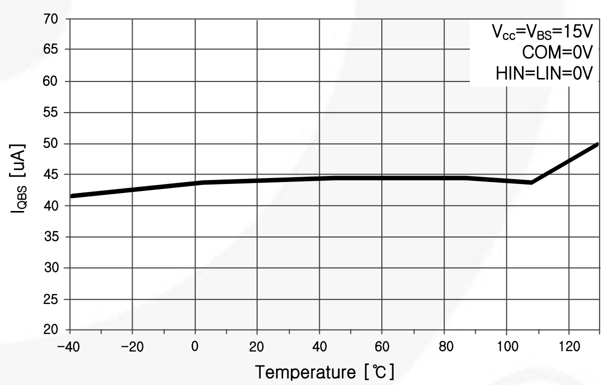


Figure 22. I_{QBS} vs. Temperature

Typical Characteristics (Continued)

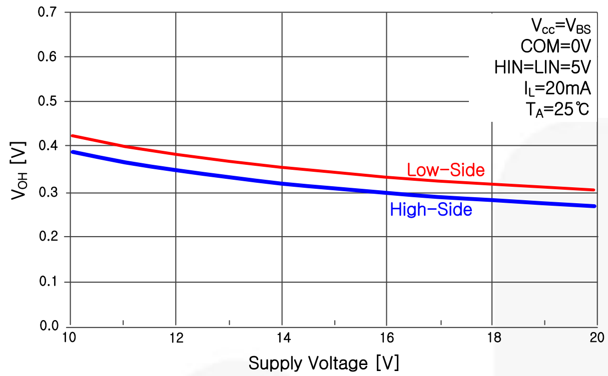


Figure 23. High-Level Output Voltage vs. Supply Voltage

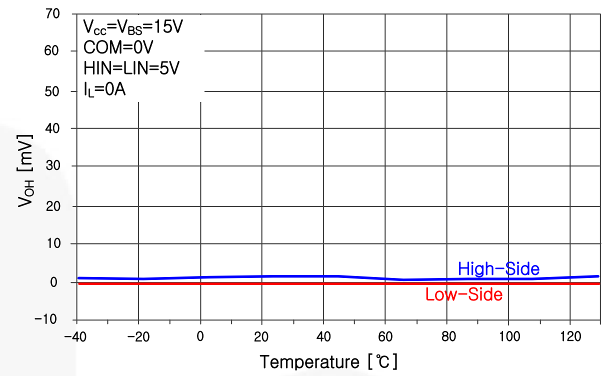


Figure 24. High-Level Output Voltage vs. Temperature

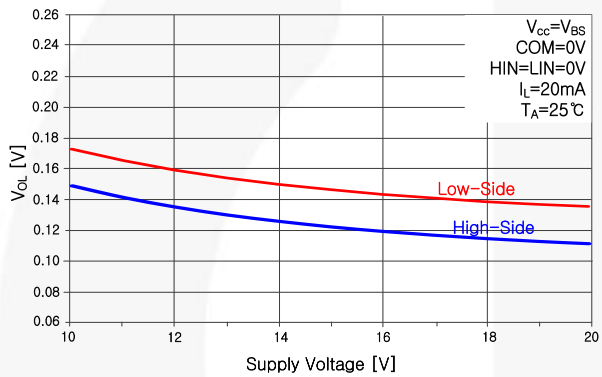


Figure 25. Low-Level Output Voltage vs. Supply Voltage

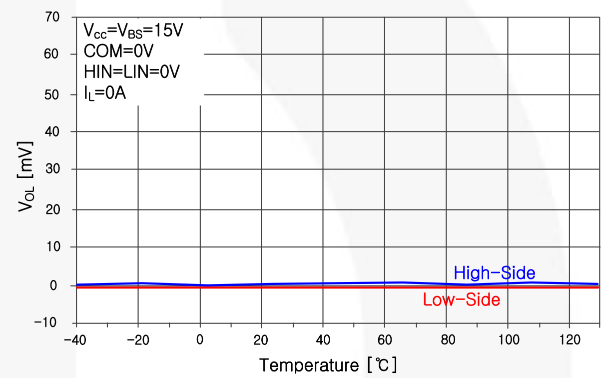


Figure 26. Low-Level Output Voltage vs. Temperature

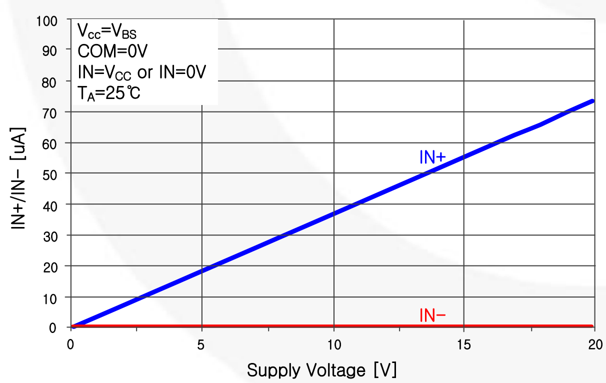


Figure 27. Input Bias Current vs. Supply Voltage

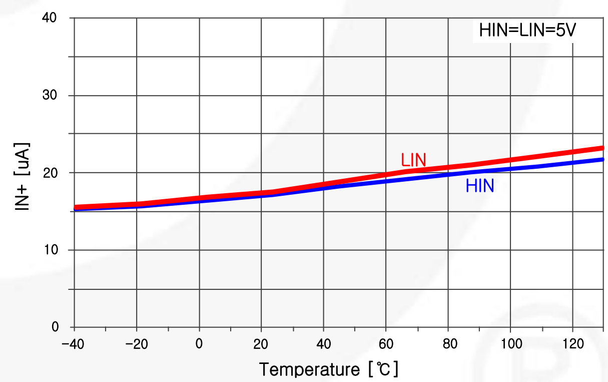


Figure 28. Input Bias Current vs. Temperature

Typical Characteristics (Continued)

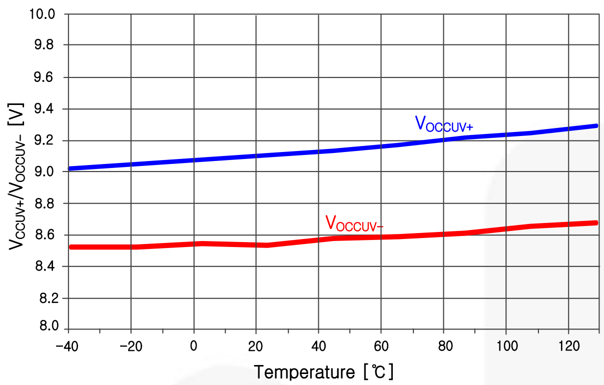


Figure 29. V_{CC} UVLO Threshold Voltage vs. Temperature

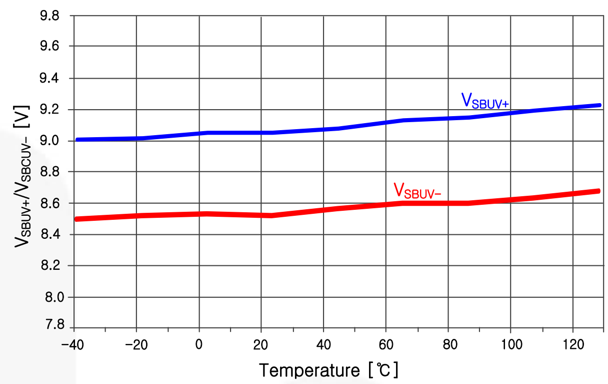


Figure 30. V_{BS} UVLO Threshold Voltage vs. Temperature

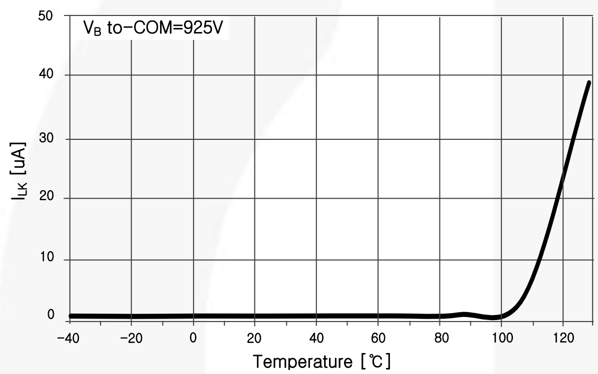


Figure 31. V_B to COM Leakage Current vs. Temperature

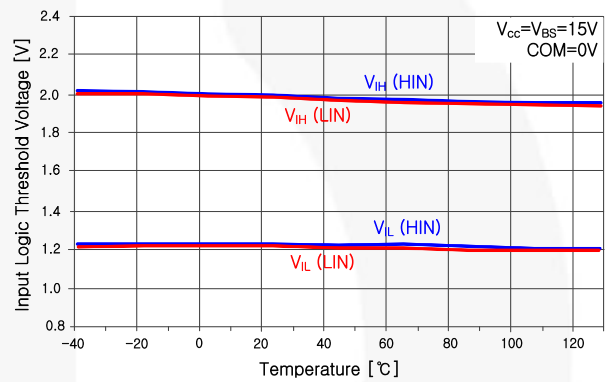


Figure 32. Input Logic Threshold Voltage vs. Temperature

Switching Time Definitions

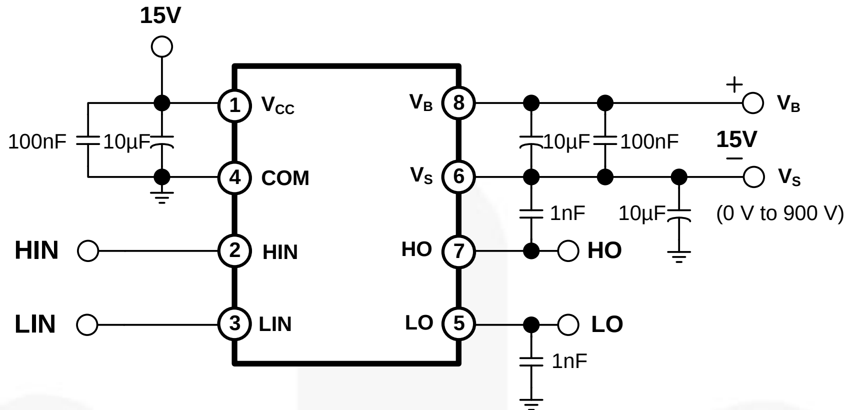


Figure 33. Switching Time Test Circuit

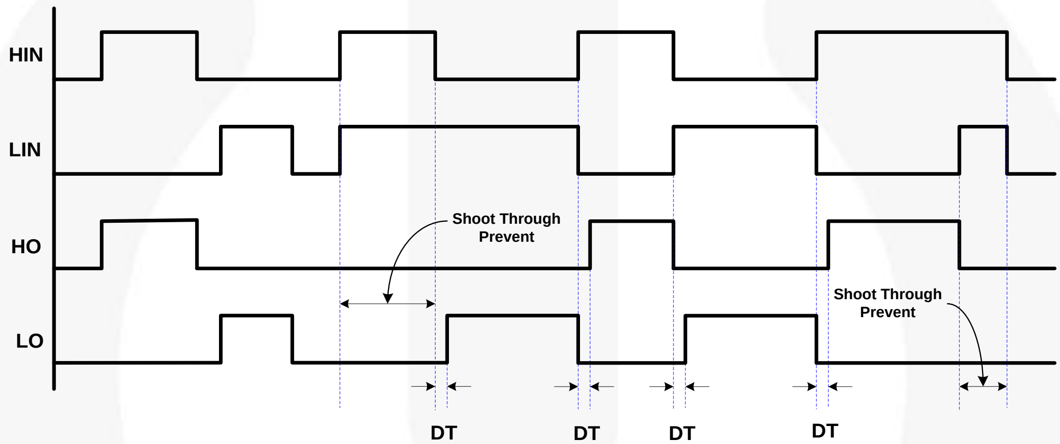


Figure 34. Input / Output Timing Diagram

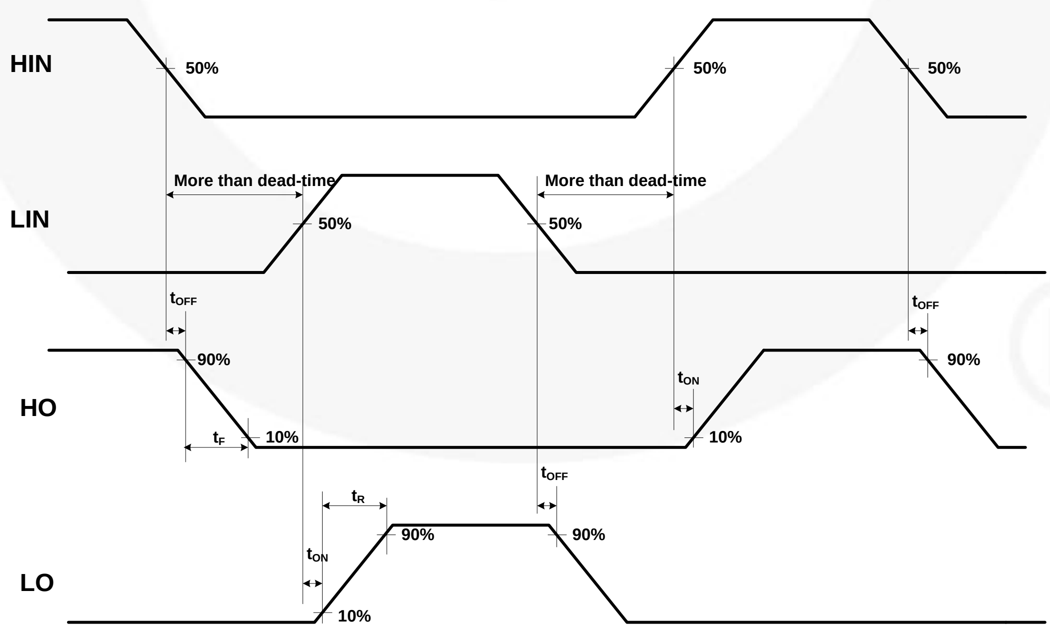


Figure 35. Switching Time Definition

Switching Time Definitions (Continued)

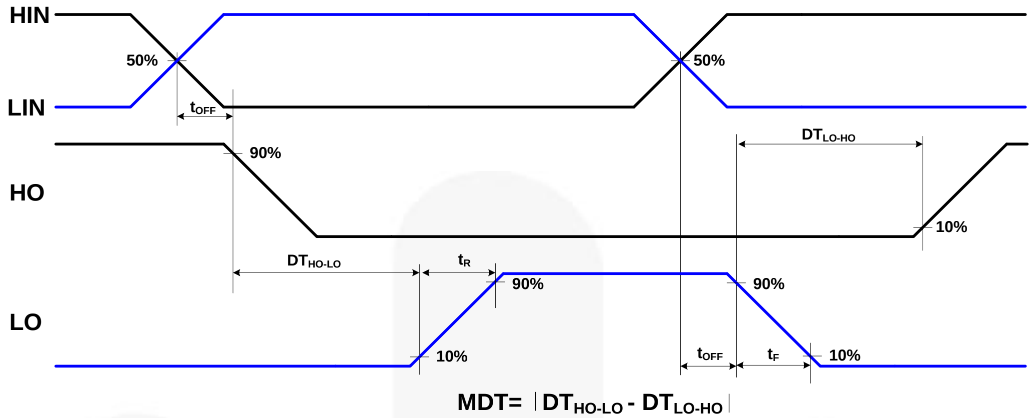
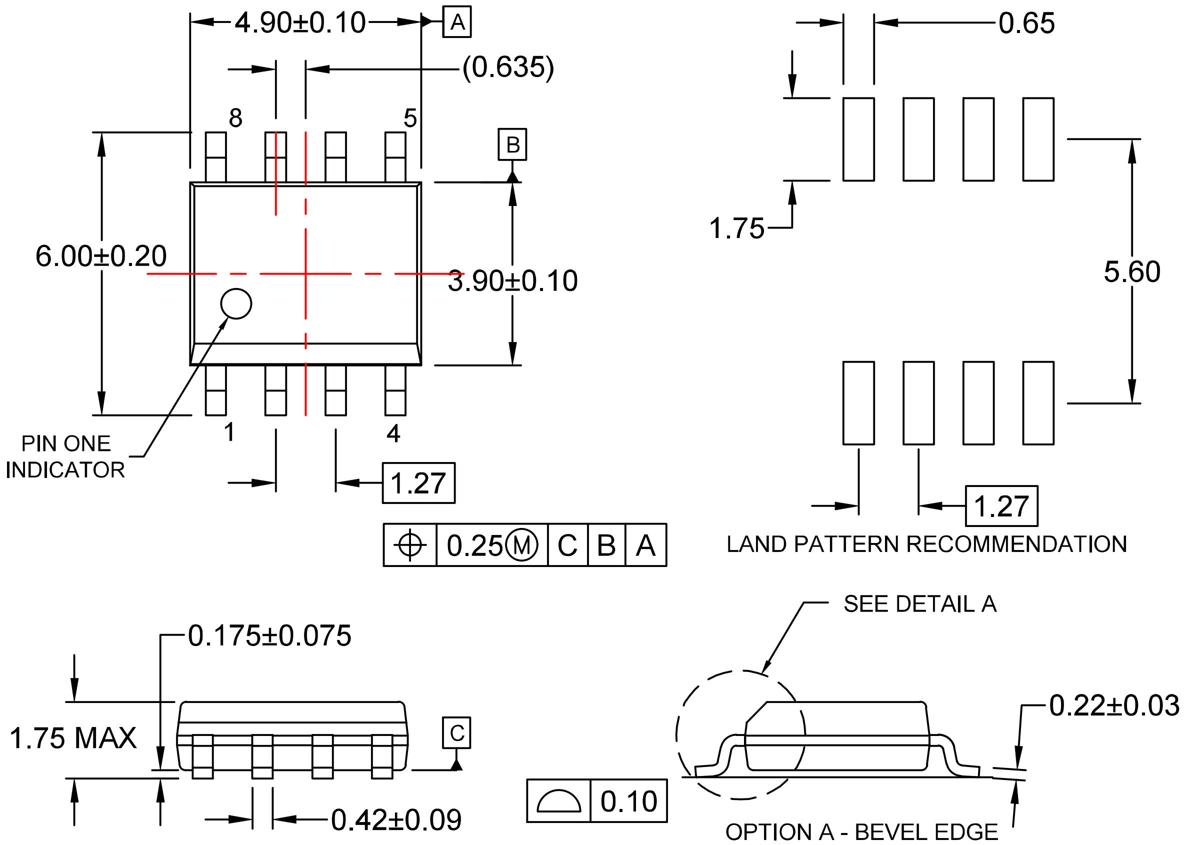
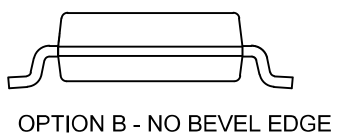
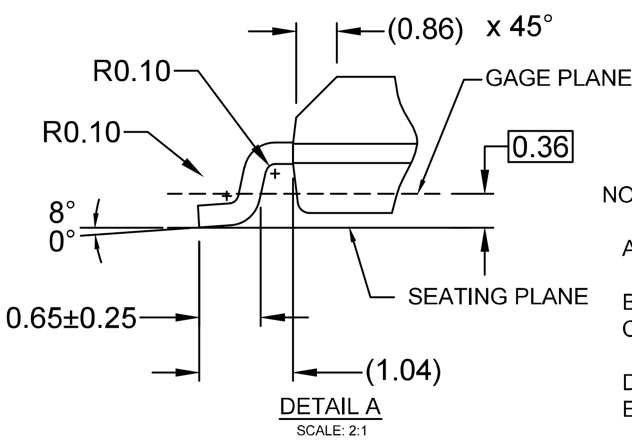


Figure 36. Internal Dead Time Definition







NOTES:

A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
D) LANDPATTERN STANDARD: SOIC127P600X175-8M
E) DRAWING FILENAME: M08Arev16

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MotionMax™
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SuperSOT™-6
SuperSOT™-8
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TinyPower™
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ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Terms of Use

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

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