



**THE DATASHEET OF
MC10H116FNG**



MC10H116

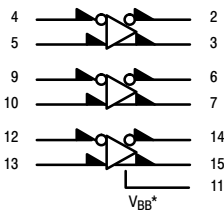
Triple Line Receiver

Description

The MC10H116 is a triple differential amplifier designed for use in sensing differential signals over long lines and is a functional/pinout duplication of the MC10116, with 100% improvement in propagation delay and no increase in power supply current. For termination information see [AND8020](#).

Features

- Propagation Delay, 1.0 ns Typical
- Power Dissipation 85 mW Typ/Pkg (same as MECL 10K™)
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K Compatible
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant



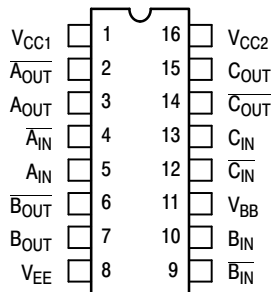
V_{CC1} = Pin 1
V_{CC2} = Pin 16
V_{EE} = Pin 8

When input pin with bubble goes positive it's respective output pin with bubble goes positive.

*V_{BB} to be used to supply bias to the MC10H116 only and bypassed (when used) with 0.01 μF to 0.1 μF capacitor to ground (0 V). V_{BB} can source < 1.0 mA.
The MC10H116 is designed to be used in sensing differential signals over long lines. The bias supply (V_{BB}) is made available to make the device useful as a Schmitt trigger, or in other applications where a stable reference voltage is necessary.
Active current sources provide these receivers with excellent common-mode noise rejection. If any amplifier in a package is not used, one input of that amplifier must be connected to V_{BB} to prevent unbalancing the current-source bias network.
The MC10H116 does not have internal-input pull-down resistors. This provides high impedance to the amplifier input and facilitates differential connections.

- Applications:
- Low Level Receiver
 - Schmitt Trigger
 - Voltage Level Interface

Figure 1. Logic Diagram



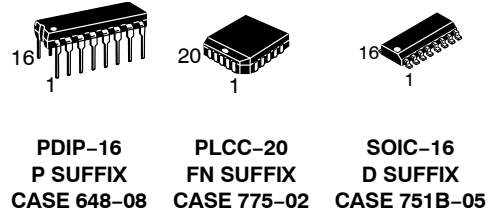
Pin assignment is for Dual-in-Line Package.
For PLCC pin assignment, see TND309, the Pin Conversion Tables, page 9.

Figure 2. Dip Pin Assignment

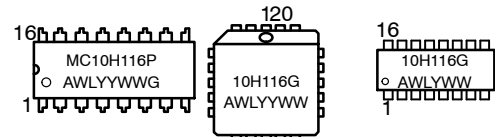


ON Semiconductor®

www.onsemi.com



MARKING DIAGRAMS*



- A = Assembly Location
- WL = Wafer Lot
- YY = Year
- WW = Work Week

*For additional marking information, refer to Application Note [AND8002/D](#).

ORDERING INFORMATION

Device	Package	Shipping†
MC10H116DG	SOIC-16 (Pb-Free)	48 Units/Tube
MC10H116DR2G	SOIC-16 (Pb-Free)	2500/Tape & Reel
MC10H116FNG	PLCC-20 (Pb-Free)	46 Units/Tube
MC10H116FNR2G	PLCC-20 (Pb-Free)	500/Tape & Reel
MC10H116PG	PDIP-16 (Pb-Free)	25 Units/Tube

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

MC10H116

Table 1. MAXIMUM RATINGS

Symbol	Characteristic	Rating	Unit
V _{EE}	Power Supply (V _{CC} = 0)	-8.0 to 0	Vdc
V _I	Input Voltage (V _{CC} = 0)	0 to V _{EE}	Vdc
I _{out}	Output Current Continuous Surge	50 100	mA
T _A	Operating Temperature Range	0 to +75	°C
T _{stg}	Storage Temperature Range Plastic Ceramic	-55 to +150 -55 to +165	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Table 2. ELECTRICAL CHARACTERISTICS (V_{EE} = -5.2 V ±5%) (Note 2)

Symbol	Characteristic	0°		25°		75°		Unit
		Min	Max	Min	Max	Min	Max	
I _E	Power Supply Current	-	23	-	21	-	23	mA
I _{inH}	Input Current High	-	150	-	95	-	95	μA
I _{CBO}	Input Leakage Current	-	1.5	-	1.0	-	1.0	μA
V _{BB}	Reference Voltage	-1.38	-1.27	-1.35	-1.25	-1.31	-1.19	Vdc
V _{OH}	High Output Voltage	-1.02	-0.84	-0.98	-0.81	-0.92	-0.735	Vdc
V _{OL}	Low Output Voltage	-1.95	-1.63	-1.95	-1.63	-1.95	-1.60	Vdc
V _{IH}	High Input Voltage (Note 1)	-1.17	-0.84	-1.13	-0.81	-1.07	-0.735	Vdc
V _{IL}	Low Input Voltage (Note 1)	-1.95	-1.48	-1.95	-1.48	-1.95	-1.45	Vdc
V _{CMR}	Common Mode Range (Note 4)	-	-	-2.85 to -0.8		-	-	Vdc
V _{PP}	Input Sensitivity (Note 3)	-	-	150 typ		-	-	mV _{PP}

1. When V_{BB} is used as the reference voltage.
2. Each MECL 10H™ series circuit has been designed to meet the specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lfpm is maintained. Outputs are terminated through a 50 ohm resistor to -2.0 V.
3. Differential input not to exceed 1.0 Vdc.
4. 150 mV_{p-p} differential input required to obtain full logic swing on output.

Table 3. AC CHARACTERISTICS

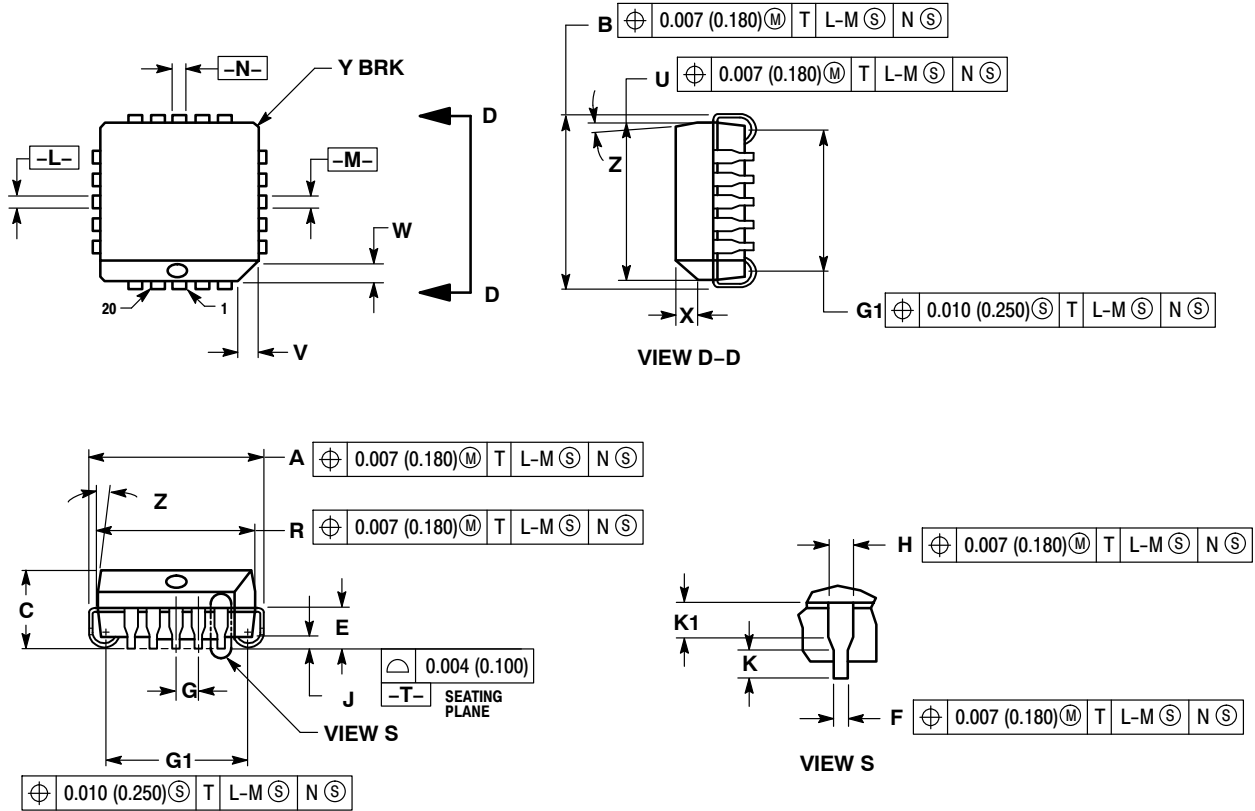
Symbol	Characteristic	0°		25°		75°		Unit
		Min	Max	Min	Max	Min	Max	
t _{pd}	Propagation Delay	0.4	1.3	0.4	1.3	0.45	1.45	ns
t _r	Rise Time	0.5	1.5	0.5	1.6	0.5	1.7	ns
t _f	Fall Time	0.5	1.5	0.5	1.6	0.5	1.7	ns

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

MC10H116

PACKAGE DIMENSIONS

20 LEAD PLLC
CASE 775-02
ISSUE F



NOTES:

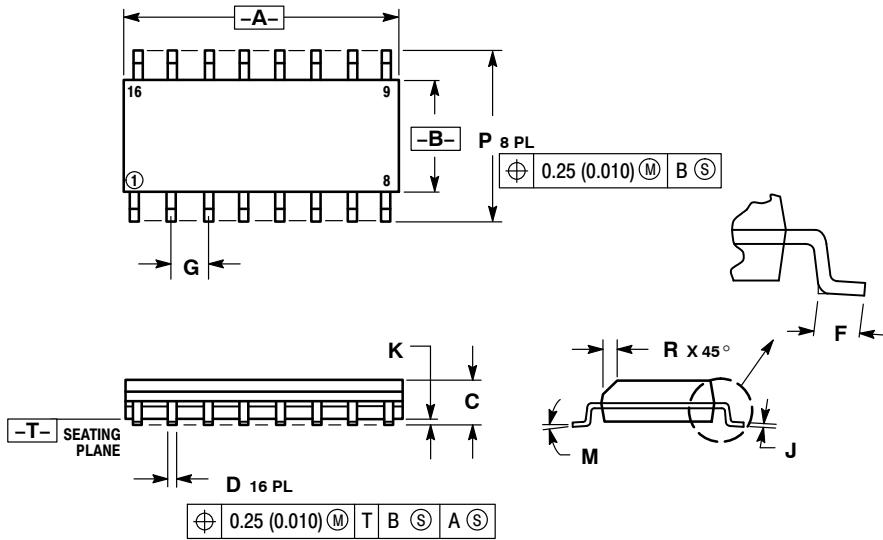
1. DIMENSIONS AND TOLERANCING PER ANSI Y14.5M, 1982.
2. DIMENSIONS IN INCHES.
3. DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
4. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
5. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
6. DIMENSIONS IN THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
7. DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.385	0.395	9.78	10.03
B	0.385	0.395	9.78	10.03
C	0.165	0.180	4.20	4.57
E	0.090	0.110	2.29	2.79
F	0.013	0.021	0.33	0.53
G	0.050 BSC		1.27 BSC	
H	0.026	0.032	0.66	0.81
J	0.020	----	0.51	----
K	0.025	----	0.64	----
R	0.350	0.356	8.89	9.04
U	0.350	0.356	8.89	9.04
V	0.042	0.048	1.07	1.21
W	0.042	0.048	1.07	1.21
X	0.042	0.056	1.07	1.42
Y	----	0.020	----	0.50
Z	2° 10°		2° 10°	
G1	0.310	0.330	7.88	8.38
K1	0.040	----	1.02	----

MC10H116

PACKAGE DIMENSIONS

SOIC-16
CASE 751B-05
ISSUE K



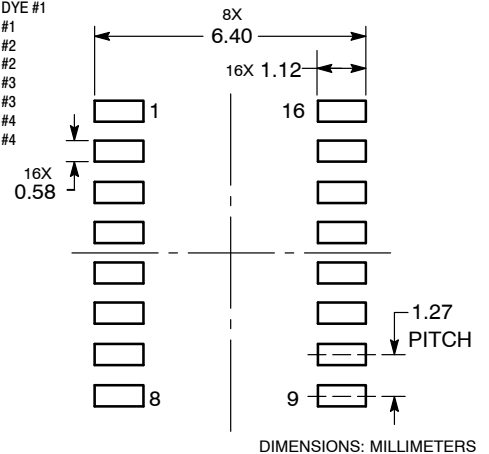
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0° - 7°		0° - 7°	
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

- | | | | |
|-------------------|-------------------|--------------------------|--------------------------|
| STYLE 1: | STYLE 2: | STYLE 3: | STYLE 4: |
| PIN 1. COLLECTOR | PIN 1. CATHODE | PIN 1. COLLECTOR, DYE #1 | PIN 1. COLLECTOR, DYE #1 |
| 2. BASE | 2. ANODE | 2. BASE, #1 | 2. COLLECTOR, #1 |
| 3. EMITTER | 3. NO CONNECTION | 3. EMITTER, #1 | 3. COLLECTOR, #2 |
| 4. NO CONNECTION | 4. CATHODE | 4. COLLECTOR, #1 | 4. COLLECTOR, #3 |
| 5. EMITTER | 5. ANODE | 5. COLLECTOR, #2 | 5. COLLECTOR, #4 |
| 6. BASE | 6. NO CONNECTION | 6. BASE, #2 | 6. COLLECTOR, #3 |
| 7. COLLECTOR | 7. ANODE | 7. EMITTER, #2 | 7. COLLECTOR, #4 |
| 8. COLLECTOR | 8. CATHODE | 8. COLLECTOR, #2 | 8. COLLECTOR, #4 |
| 9. BASE | 9. CATHODE | 9. COLLECTOR, #3 | 9. BASE, #4 |
| 10. EMITTER | 10. ANODE | 10. BASE, #3 | 10. EMITTER, #4 |
| 11. NO CONNECTION | 11. NO CONNECTION | 11. EMITTER, #3 | 11. BASE, #3 |
| 12. EMITTER | 12. CATHODE | 12. COLLECTOR, #3 | 12. EMITTER, #3 |
| 13. BASE | 13. CATHODE | 13. COLLECTOR, #4 | 13. BASE, #2 |
| 14. COLLECTOR | 14. NO CONNECTION | 14. BASE, #4 | 14. EMITTER, #2 |
| 15. EMITTER | 15. ANODE | 15. EMITTER, #4 | 15. BASE, #1 |
| 16. COLLECTOR | 16. CATHODE | 16. COLLECTOR, #4 | 16. EMITTER, #1 |
-
- | | | |
|----------------------|-----------------|---------------------------|
| STYLE 5: | STYLE 6: | STYLE 7: |
| PIN 1. DRAIN, DYE #1 | PIN 1. CATHODE | PIN 1. SOURCE N-CH |
| 2. DRAIN, #1 | 2. CATHODE | 2. COMMON DRAIN (OUTPUT) |
| 3. DRAIN, #2 | 3. CATHODE | 3. COMMON DRAIN (OUTPUT) |
| 4. DRAIN, #2 | 4. CATHODE | 4. GATE P-CH |
| 5. DRAIN, #3 | 5. CATHODE | 5. COMMON DRAIN (OUTPUT) |
| 6. DRAIN, #3 | 6. CATHODE | 6. COMMON DRAIN (OUTPUT) |
| 7. DRAIN, #4 | 7. CATHODE | 7. COMMON DRAIN (OUTPUT) |
| 8. DRAIN, #4 | 8. CATHODE | 8. SOURCE P-CH |
| 9. GATE, #4 | 9. ANODE | 9. SOURCE P-CH |
| 10. SOURCE, #4 | 10. ANODE | 10. COMMON DRAIN (OUTPUT) |
| 11. GATE, #3 | 11. ANODE | 11. COMMON DRAIN (OUTPUT) |
| 12. SOURCE, #3 | 12. ANODE | 12. COMMON DRAIN (OUTPUT) |
| 13. GATE, #2 | 13. ANODE | 13. GATE N-CH |
| 14. SOURCE, #2 | 14. ANODE | 14. COMMON DRAIN (OUTPUT) |
| 15. GATE, #1 | 15. ANODE | 15. COMMON DRAIN (OUTPUT) |
| 16. SOURCE, #1 | 16. ANODE | 16. SOURCE N-CH |

SOLDERING FOOTPRINT



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, [SOLDERRM/D](http://www.onsemi.com/SOLDERRM/D).

MC10H116

PACKAGE DIMENSIONS

PDIP-16
CASE 648-08
ISSUE V



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSIONS A, A1 AND L ARE MEASURED WITH THE PACKAGE SEATED IN JEDEC SEATING PLANE GAUGE GS-3.
4. DIMENSIONS D, D1 AND E1 DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS ARE NOT TO EXCEED 0.10 INCH.
5. DIMENSION E IS MEASURED AT A POINT 0.015 BELOW DATUM PLANE H WITH THE LEADS CONSTRAINED PERPENDICULAR TO DATUM C.
6. DIMENSION eB IS MEASURED AT THE LEAD TIPS WITH THE LEADS UNCONSTRAINED.
7. DATUM PLANE H IS COINCIDENT WITH THE BOTTOM OF THE LEADS, WHERE THE LEADS EXIT THE BODY.
8. PACKAGE CONTOUR IS OPTIONAL (ROUNDED OR SQUARE CORNERS).

STYLE 1:

- PIN 1. CATHODE
- CATHODE
- CATHODE
- CATHODE
- CATHODE
- CATHODE
- CATHODE
- CATHODE
- ANODE
- ANODE
- ANODE
- ANODE
- ANODE
- ANODE
- ANODE
- ANODE

STYLE 2:

- PIN 1. COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- COMMON DRAIN
- GATE
- SOURCE
- GATE
- SOURCE
- GATE
- SOURCE
- GATE
- SOURCE

MECL is a trademark of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries.

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marketing.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- ⊖ [View MC10H116FNG on WIN SOURCE](#)
- ⊖ [ON Semiconductor Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

- ✓ Global Sourcing Solution
- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management