

# MMBT6428LT1G, MMBT6429LT1G, NSVMMBT6429LT1G



ON Semiconductor®

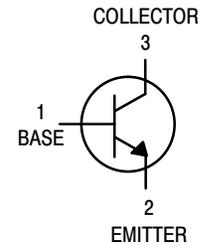
<http://onsemi.com>

## Amplifier Transistors

### NPN Silicon

#### Features

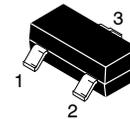
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant



#### MAXIMUM RATINGS

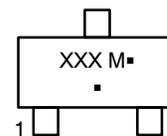
Rating	Symbol	6428LT1	6429LT1	Unit
Collector - Emitter Voltage	$V_{CEO}$	50	45	Vdc
Collector - Base Voltage	$V_{CBO}$	60	55	Vdc
Emitter - Base Voltage	$V_{EBO}$	6.0		Vdc
Collector Current - Continuous	$I_C$	200		mAdc

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



SOT-23 (TO-236)  
CASE 318  
STYLE 6

#### MARKING DIAGRAM



XXX = Specific Device Code  
MMBT6428LT1 - 1KM  
NSV/MMBT6429LT1 - M1L  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)  
\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

#### THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Total Device Dissipation FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	225	mW
		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (Note 2) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	300	mW
		2.4	mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

1. FR-5 =  $1.0 \times 0.75 \times 0.062$  in.
2. Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.

#### ORDERING INFORMATION

Device	Package	Shipping†
MMBT6428LT1G	SOT-23 (Pb-Free)	3000 Tape & Reel
MMBT6429LT1G	SOT-23 (Pb-Free)	3000 Tape & Reel
NSVMMBT6429LT1G	SOT-23 (Pb-Free)	3000 Tape & Reel

†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.

# MMBT6428LT1G, MMBT6429LT1G, NSVMMBT6429LT1G

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>					
Collector – Emitter Breakdown Voltage ( $I_C = 1.0\text{ mAdc}$ , $I_B = 0$ ) ( $I_C = 1.0\text{ mAdc}$ , $I_B = 0$ )	MMBT6428 MMBT6429 / NSVMMBT6429	$V_{(BR)CEO}$	50 45	– –	Vdc
Collector – Base Breakdown Voltage ( $I_C = 0.1\text{ mAdc}$ , $I_E = 0$ ) ( $I_C = 0.1\text{ mAdc}$ , $I_E = 0$ )	MMBT6428 MMBT6429 / NSVMMBT6429	$V_{(BR)CBO}$	60 55	– –	Vdc
Collector Cutoff Current ( $V_{CE} = 30\text{ Vdc}$ )		$I_{CES}$	–	0.1	$\mu\text{A dc}$
Collector Cutoff Current ( $V_{CB} = 30\text{ Vdc}$ , $I_E = 0$ )		$I_{CBO}$	–	0.01	$\mu\text{A dc}$
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	–	0.01	$\mu\text{A dc}$

## ON CHARACTERISTICS

DC Current Gain ( $I_C = 0.01\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )  ( $I_C = 0.1\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )  ( $I_C = 1.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )  ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	MMBT6428 MMBT6429 / NSVMMBT6429  MMBT6428 MMBT6429 / NSVMMBT6429  MMBT6428 MMBT6429 / NSVMMBT6429  MMBT6428 MMBT6429 / NSVMMBT6429	$h_{FE}$	250 500  250 500  250 500  250 500	– –  650 1250  – –  – –	–
Collector – Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 0.5\text{ mAdc}$ ) ( $I_C = 100\text{ mAdc}$ , $I_B = 5.0\text{ mAdc}$ )		$V_{CE(sat)}$	– –	0.2 0.6	Vdc
Base – Emitter On Voltage ( $I_C = 1.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ mAdc}$ )		$V_{BE(on)}$	0.56	0.66	Vdc

## SMALL-SIGNAL CHARACTERISTICS

Current – Gain – Bandwidth Product ( $I_C = 1.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )		$f_T$	100	700	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )		$C_{obo}$	–	3.0	pF
Input Capacitance ( $V_{EB} = 0.5\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )		$C_{ibo}$	–	8.0	pF

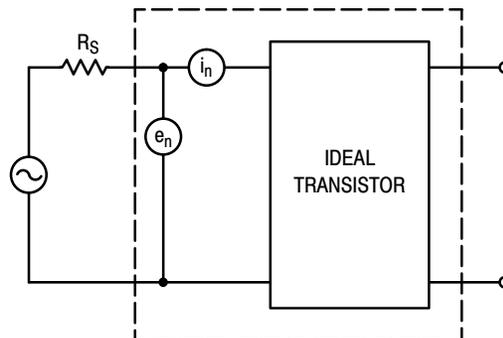


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

( $V_{CE} = 5.0 \text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$ )

NOISE VOLTAGE

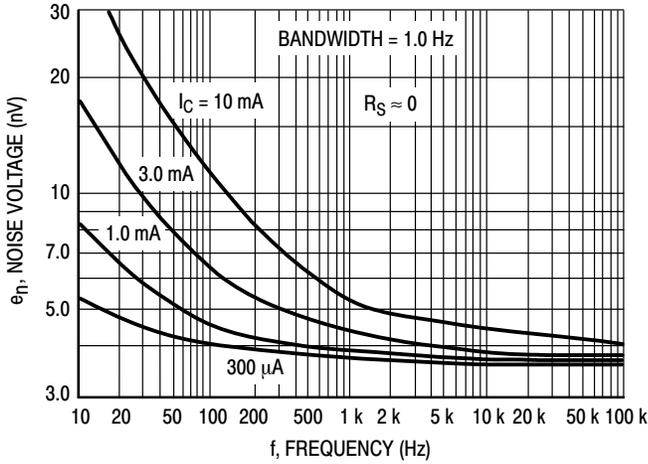


Figure 2. Effects of Frequency

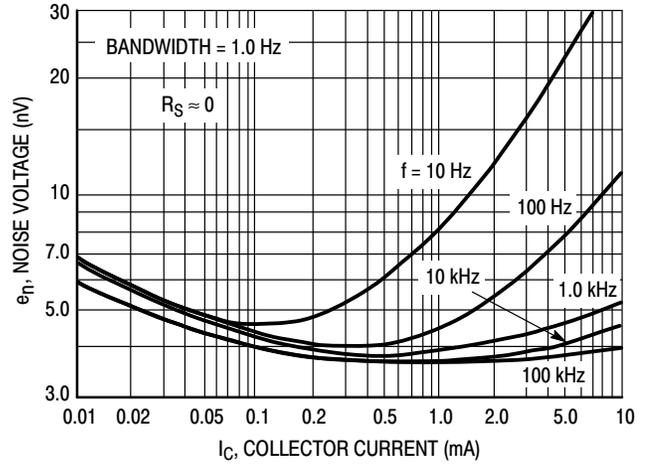


Figure 3. Effects of Collector Current

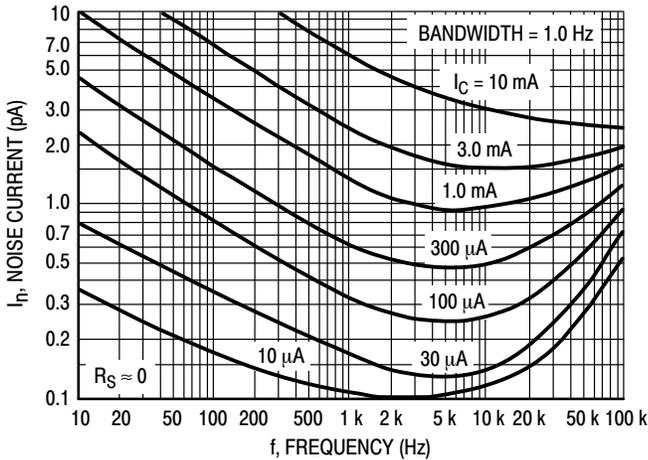


Figure 4. Noise Current

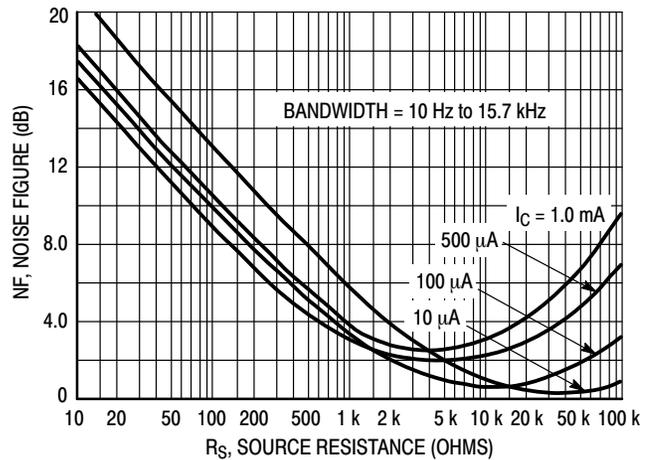


Figure 5. Wideband Noise Figure

100 Hz NOISE DATA

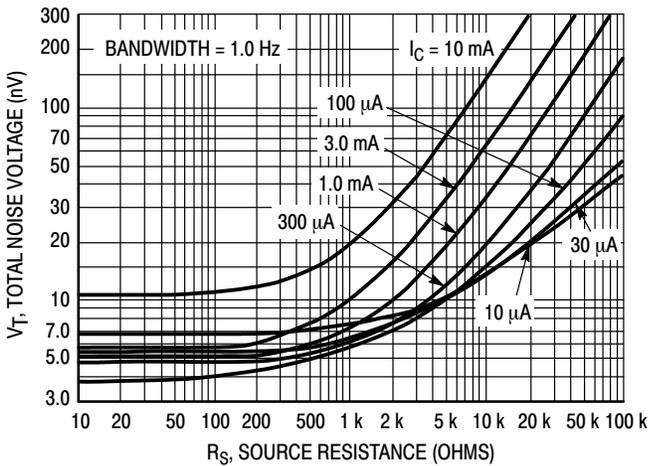


Figure 6. Total Noise Voltage

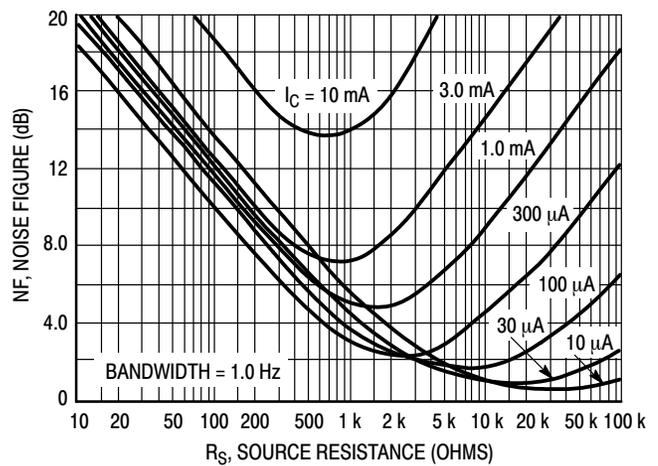


Figure 7. Noise Figure

# MMBT6428LT1G, MMBT6429LT1G, NSVMMBT6429LT1G

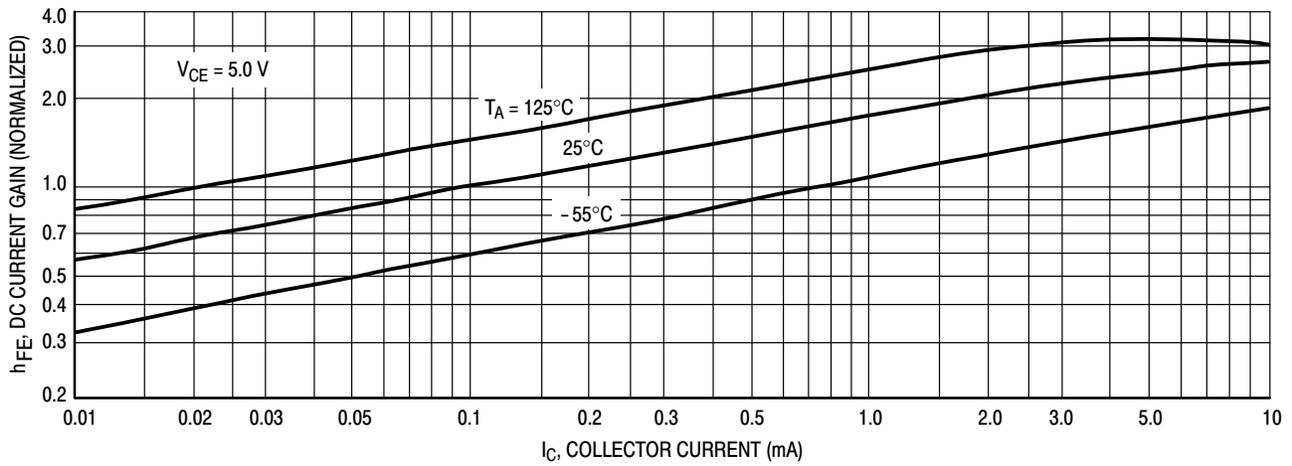


Figure 8. DC Current Gain

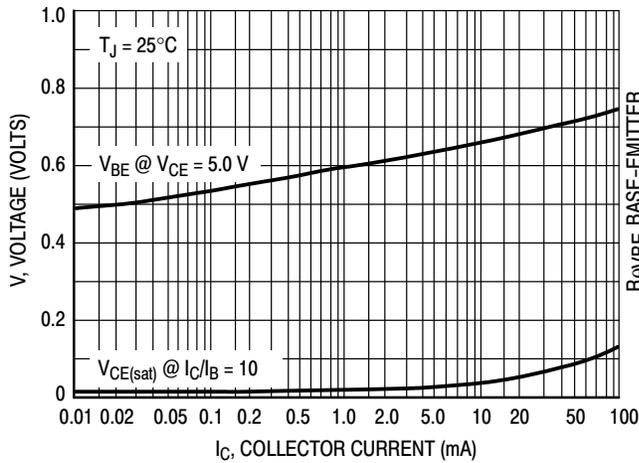


Figure 9. "On" Voltages

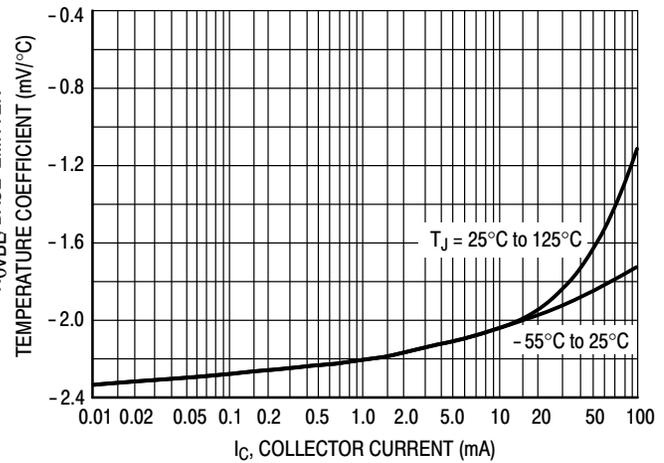


Figure 10. Temperature Coefficients

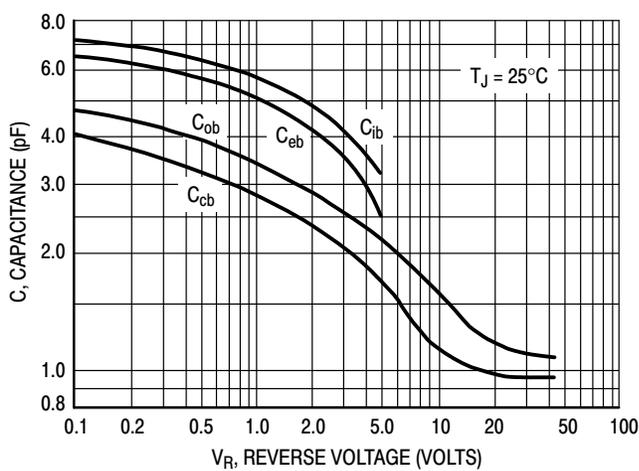


Figure 11. Capacitance

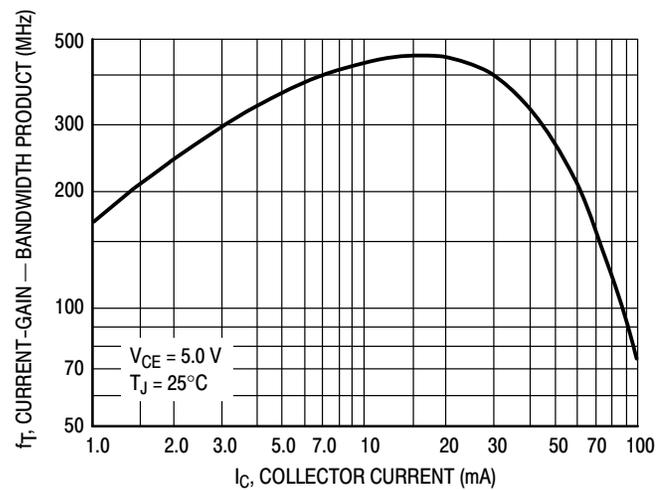
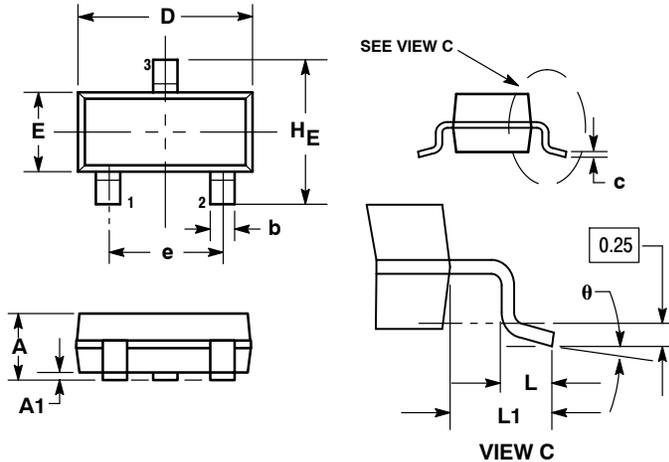


Figure 12. Current-Gain — Bandwidth Product

# MMBT6428LT1G, MMBT6429LT1G, NSVMMBT6429LT1G

## PACKAGE DIMENSIONS

SOT-23 (TO236)  
CASE 318-08  
ISSUE AP



NOTES:

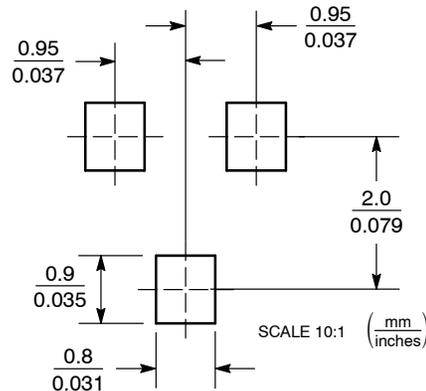
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
HE	2.10	2.40	2.64	0.083	0.094	0.104
θ	0°	---	10°	0°	---	10°

STYLE 6:

1. BASE
2. EMITTER
3. COLLECTOR

### SOLDERING FOOTPRINT



**ON Semiconductor** and **ON** are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC 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  
P.O. Box 5163, Denver, Colorado 80217 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](mailto: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](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative

# AMEYA360

## Components Supply Platform

Authorized Distribution Brand :



Website :

Welcome to visit [www.ameya360.com](http://www.ameya360.com)

Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd  
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email [amall@ameya360.com](mailto:amall@ameya360.com)

QQ 800077892

Skype [ameyasales1](#) [ameyasales2](#)

➤ Customer Service :

Email [service@ameya360.com](mailto:service@ameya360.com)

➤ Partnership :

Tel +86 (21) 64016692-8333

Email [mkt@ameya360.com](mailto:mkt@ameya360.com)