

Schmitt Trigger Buffer, Dual, Non-Inverting

NLV27WZ17

The NLV27WZ17 is a high performance dual buffer with Schmitt-Trigger inputs operating from a 1.65 to 5.5 V supply.

Features

- Designed for 1.65 V to 5.5 V V_{CC} Operation
- 3.7 ns t_{PD} at $V_{CC} = 5$ V (Typ)
- Inputs/Outputs Overvoltage Tolerant up to 5.5 V
- I_{OFF} Supports Partial Power Down Protection
- Sink 32 mA at 4.5 V
- Available in SC-88 Package
- Chip Complexity < 100 FETs
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

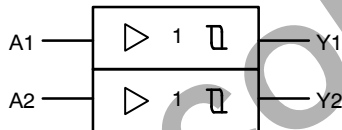
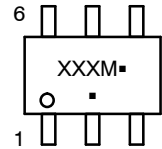


Figure 1. Logic Symbol



SC-88
DF SUFFIX
CASE 419B-02

MARKING DIAGRAMS



XXX = Specific Device Code
M = Date Code*
▪ = Pb-Free Package

(Note: Microdot may be in either location)

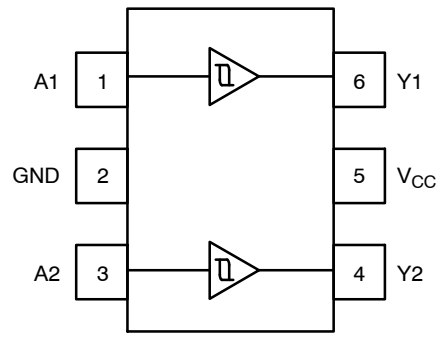
*Date Code orientation and/or position may vary depending upon manufacturing location.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

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NLV27WZ17



(SC-88)

Figure 2. Pinout (Top View)

PIN ASSIGNMENT

Pin	Function
1	A1
2	GND
3	A2
4	Y2
5	V _{CC}
6	Y1

FUNCTION TABLE

A Input	Y Output
L	L
H	H

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MAXIMUM RATINGS

Symbol	Characteristics	Value	Units
V _{CC}	DC Supply Voltage	-0.5 to +7.0	V
V _{IN}	DC Input Voltage	-0.5 to +7.0	V
V _{OUT}	DC Output Voltage Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode (V _{CC} = 0 V)	-0.5 to V _{CC} +0.5 -0.5 to +7.0 -0.5 to +7.0	V
I _{IK}	DC Input Diode Current, V _{IN} < GND	-50	mA
I _{OK}	DC Output Diode Current, V _{OUT} < GND	-50	mA
I _{OUT}	DC Output Source/Sink Current	±50	mA
I _{CC} or I _{GND}	DC Supply Current per Supply Pin or Ground Pin	±100	mA
T _{STG}	Storage Temperature Range	-65 to +150	°C
T _L	Lead Temperature, 1 mm from Case for 10 secs	260	°C
T _J	Junction Temperature under Bias	+150	°C
θ _{JA}	Thermal Resistance (Note 2)	SC-88 377	°C/W
P _D	Power Dissipation in Still Air	SC-88 332	mW
MSL	Moisture Sensitivity	Level 1	-
F _R	Flameability Rating	Oxygen Index: 28 to 34 UL 94-V-0 @ 0.125 in	-
V _{ESD}	ESD Withstand Voltage (Note 3)	Human Body Model 2000 Charged Device Model N/A	V
I _{LATCHUP}	Latchup Performance (Note 4)	±500	mA

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.

1. Applicable to devices with outputs that may be tri-stated.
2. Measured with minimum pad spacing on an FR4 board, using 10 mm-by-1 inch, 2 ounce copper trace no air flow per JESD51-7.
3. HBM tested to ANSI/ESDA/JEDEC JS-001-2017. CDM tested to EIA/JESD22-C101-F. JEDEC recommends that ESD qualification to EIA/JESD22-A115-A (Machine Model) be discontinued per JEDEC/JEP172A.
4. Tested to EIA/JESD78 Class II.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	Positive DC Supply Voltage	1.65	5.5	V
V _{IN}	DC Input Voltage	0	5.5	V
V _{OUT}	DC Output Voltage Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode (V _{CC} = 0 V)	0 0 0	V _{CC} 5.5 5.5	V
T _A	Operating Temperature Range	-55	+125	°C
t _r , t _f	Input Transition Rise or Fall Rate V _{CC} = 1.65 V to 1.95 V V _{CC} = 2.3 V to 2.7 V V _{CC} = 3.0 V to 3.6 V V _{CC} = 4.5 V to 5.5 V	0 0 0 0	No Limit No Limit No Limit No Limit	ns

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

NLV27WZ17

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		-55°C ≤ T _A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V _{T+}	Positive Input Threshold Voltage		1.65	0.6	1.0	1.4	0.6	1.4	0.6	1.4	V
			2.3	1.0	1.5	1.8	1.0	1.8	1.0	1.8	
			2.7	1.2	1.7	2.0	1.2	2.0	1.2	2.0	
			3.0	1.3	1.9	2.2	1.3	2.2	1.3	2.2	
			4.5	1.9	2.7	3.1	1.9	3.1	1.9	3.1	
			5.5	2.2	3.3	3.6	2.2	3.6	2.2	3.6	
V _{T-}	Negative Input Threshold Voltage		1.65	0.2	0.5	0.8	0.2	0.8	0.2	0.8	V
			2.3	0.4	0.75	1.15	0.4	1.15	0.4	1.15	
			2.7	0.5	0.87	1.4	0.5	1.4	0.5	1.4	
			3.0	0.6	1.0	1.5	0.6	1.5	0.6	1.5	
			4.5	1.0	1.5	2.0	1.0	2.0	1.0	2.0	
			5.5	1.2	1.9	2.3	1.2	2.3	1.2	2.3	
V _H	Input Hysteresis Voltage		1.65	0.1	0.48	0.9	0.1	0.9	0.1	0.9	V
			2.3	0.25	0.75	1.1	0.25	1.1	0.25	1.1	
			2.7	0.3	0.83	1.15	0.3	1.15	0.3	1.15	
			3	0.4	0.93	1.2	0.4	1.2	0.4	1.2	
			4.5	0.6	1.2	1.5	0.6	1.5	0.6	1.5	
			5.5	0.7	1.4	1.7	0.7	1.7	0.7	1.7	
V _{OH}	High-Level Output Voltage V _{IN} = V _{IH} or V _{IL}	I _{OH} = -100 μA	1.65 to 5.5	V _{CC} - 0.1	V _{CC}	-	V _{CC} - 0.1	-	V _{CC} - 0.1	-	V
		I _{OH} = -4 mA	1.65	1.29	1.52	-	1.29	-	1.29	-	
		I _{OH} = -8 mA	2.3	1.9	2.1	-	1.9	-	1.9	-	
		I _{OH} = -12 mA	2.7	2.2	2.4	-	2.2	-	2.2	-	
		I _{OH} = -16 mA	3	2.4	2.7	-	2.4	-	2.4	-	
		I _{OH} = -24 mA	3	2.3	2.5	-	2.3	-	2.3	-	
		I _{OH} = -32 mA	4.5	3.8	4	-	3.8	-	3.8	-	
V _{OL}	Low-Level Output Voltage V _{IN} = V _{IH} or V _{IL}	I _{OL} = 100 μA	1.65 to 5.5	-	-	0.1	-	0.1	-	0.1	V
		I _{OL} = 4 mA	1.65	-	0.08	0.24	-	0.24	-	0.24	
		I _{OL} = 8 mA	2.3	-	0.2	0.3	-	0.3	-	0.3	
		I _{OL} = 12 mA	2.7	-	0.22	0.4	-	0.4	-	0.4	
		I _{OL} = 16 mA	3	-	0.28	0.4	-	0.4	-	0.4	
		I _{OL} = 24 mA	3	-	0.38	0.55	-	0.55	-	0.55	
		I _{OL} = 32 mA	4.5	-	0.42	0.55	-	0.55	-	0.55	
		I _{IN}	Input Leakage Current	V _{IN} = 5.5 V or GND	1.65 to 5.5	-	-	±0.1	-	±1.0	
I _{OFF}	Power Off Leakage Current	V _{IN} = 5.5 V or V _{OUT} = 5.5 V	0	-	-	1	-	10	-	10	μA
I _{CC}	Quiescent Supply Current	V _{IN} = 5.5 V or GND	5.5	-	-	1	-	10	-	10	μA

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		-55°C ≤ T _A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t _{PLH} , t _{PHL}	Propagation Delay, A to Y (Figures 3 and 4)	R _L = 1 MΩ, C _L = 15 pF	1.65 to 1.95	-	9.1	15	-	15.6	-	15.6	ns
			2.3 to 2.7	-	5.0	9.0	-	9.5	-	9.5	
		R _L = 1 MΩ, C _L = 15 pF	3.0 to 3.6	-	3.7	6.3	-	6.5	-	6.5	
			4.5 to 5.5	-	3.1	5.2	-	5.5	-	5.5	
			R _L = 500 Ω, C _L = 50 pF	3.0 to 3.6	-	4.4	7.2	-	7.5	-	
		4.5 to 5.5		-	3.7	5.9	-	6.2	-	6.2	

CAPACITIVE CHARACTERISTICS

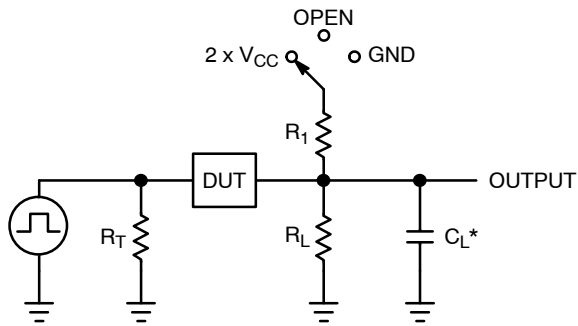
Symbol	Parameter	Condition	Typical	Unit
C _{IN}	Input Capacitance	V _{CC} = 5.5 V, V _I = 0 V or V _{CC}	2.5	pF
C _{OUT}	Output Capacitance	V _{CC} = 5.5 V, V _I = 0 V or V _{CC}	4.0	pF
C _{PD}	Power Dissipation Capacitance (Note 5)	10 MHz, V _{CC} = 3.3 V, V _{IN} = 0 V or V _{CC} 10 MHz, V _{CC} = 5.0 V, V _{IN} = 0 V or V _{CC}	11 12.5	pF

5. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: I_{CC(OPR)} = C_{PD} · V_{CC} · f_{in} / I_{CC}. C_{PD} is used to determine the no-load dynamic power consumption; P_D = C_{PD} · V_{CC}² · f_{in} / I_{CC} · V_{CC}.

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NLV27WZ17



C_L includes probe and jig capacitance
 R_T is Z_{OUT} of pulse generator (typically 50 Ω)
 $f = 1$ MHz

Figure 3. Test Circuit

Test	Switch Position	C_L , pF	R_L , Ω	R_1 , Ω
t_{PLH} / t_{PHL}	Open	See AC Characteristics Table		
t_{PLZ} / t_{PZL}	$2 \times V_{CC}$	-	-	-
		See AC Characteristics Table		
t_{PHZ} / t_{PZH}	GND	-	-	-
		See AC Characteristics Table		

X = Don't Care

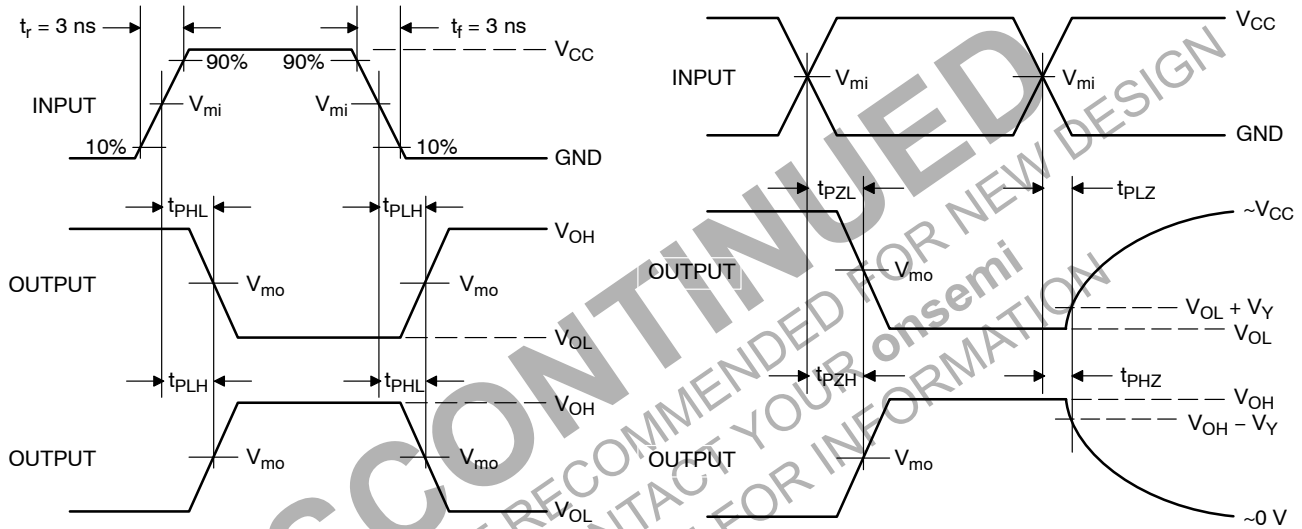


Figure 4. Switching Waveforms

V_{CC} , V	V_{mi} , V	V_{mo} , V		V_Y , V
		t_{PLH} , t_{PHL}	t_{PZL} , t_{PLZ} , t_{PZH} , t_{PHZ}	
1.65 to 1.95	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.15
2.3 to 2.7	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.15
3.0 to 3.6	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.3
4.5 to 5.5	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.3

NLV27WZ17

ORDERING INFORMATION

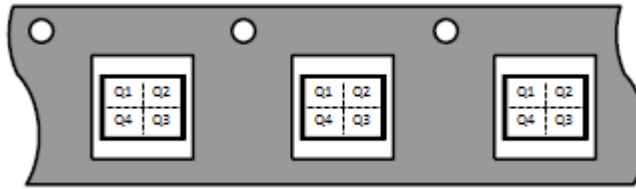
Device	Package	Specific Device Code	Pin1 Orientation (See below)	Shipping [†]
NL27WZ17DFT2G-L22348	SC-88	MX	Q4	3000 / Tape & Reel
NLV27WZ17DFT2G*	SC-88	MX	Q4	3000 / Tape & Reel

[†]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.

*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

Pin 1 Orientation in Tape and Reel

Direction of Feed



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MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

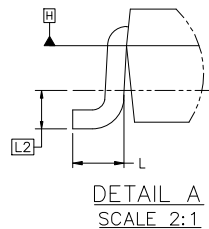
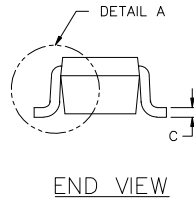
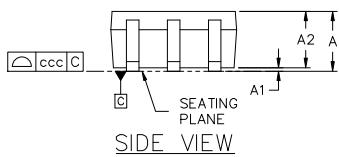
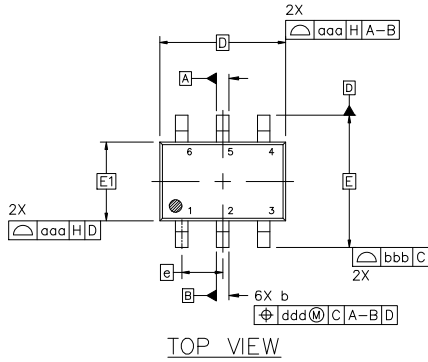


SC-88 2.00x1.25x0.90, 0.65P CASE 419B-02 ISSUE Z

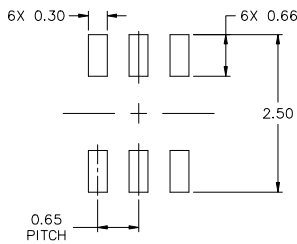
DATE 18 APR 2024

NOTES:

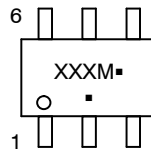
1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.10
A1	0.00	---	0.10
A2	0.70	0.90	1.00
b	0.15	0.20	0.25
c	0.08	0.15	0.22
D	2.00 BSC		
E	2.10 BSC		
E1	1.25 BSC		
e	0.65 BSC		
L	0.26	0.36	0.46
L2	0.15 BSC		
aaa	0.15		
bbb	0.30		
ccc	0.10		
ddd	0.10		



GENERIC MARKING DIAGRAM*



- XXX = Specific Device Code
- M = Date Code*
- = Pb-Free Package
- = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

STYLES ON PAGE 2

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SC-88 2.00x1.25x0.90, 0.65P
CASE 419B-02
ISSUE Z

DATE 18 APR 2024

STYLE 1: PIN 1. EMITTER 2 2. BASE 2 3. COLLECTOR 1 4. EMITTER 1 5. BASE 1 6. COLLECTOR 2	STYLE 2: CANCELLED	STYLE 3: CANCELLED	STYLE 4: PIN 1. CATHODE 2. CATHODE 3. COLLECTOR 4. EMITTER 5. BASE 6. ANODE	STYLE 5: PIN 1. ANODE 2. ANODE 3. COLLECTOR 4. EMITTER 5. BASE 6. CATHODE	STYLE 6: PIN 1. ANODE 2 2. N/C 3. CATHODE 1 4. ANODE 1 5. N/C 6. CATHODE 2
STYLE 7: PIN 1. SOURCE 2 2. DRAIN 2 3. GATE 1 4. SOURCE 1 5. DRAIN 1 6. GATE 2	STYLE 8: CANCELLED	STYLE 9: PIN 1. EMITTER 2 2. EMITTER 1 3. COLLECTOR 1 4. BASE 1 5. BASE 2 6. COLLECTOR 2	STYLE 10: PIN 1. SOURCE 2 2. SOURCE 1 3. GATE 1 4. DRAIN 1 5. DRAIN 2 6. GATE 2	STYLE 11: PIN 1. CATHODE 2 2. CATHODE 2 3. ANODE 1 4. CATHODE 1 5. CATHODE 1 6. ANODE 2	STYLE 12: PIN 1. ANODE 2 2. ANODE 2 3. CATHODE 1 4. ANODE 1 5. ANODE 1 6. CATHODE 2
STYLE 13: PIN 1. ANODE 2. N/C 3. COLLECTOR 4. EMITTER 5. BASE 6. CATHODE	STYLE 14: PIN 1. VREF 2. GND 3. GND 4. IOUT 5. VEN 6. VCC	STYLE 15: PIN 1. ANODE 1 2. ANODE 2 3. ANODE 3 4. CATHODE 3 5. CATHODE 2 6. CATHODE 1	STYLE 16: PIN 1. BASE 1 2. EMITTER 2 3. COLLECTOR 2 4. BASE 2 5. EMITTER 1 6. COLLECTOR 1	STYLE 17: PIN 1. BASE 1 2. EMITTER 1 3. COLLECTOR 2 4. BASE 2 5. EMITTER 2 6. COLLECTOR 1	STYLE 18: PIN 1. VIN1 2. VCC 3. VOUT2 4. VIN2 5. GND 6. VOUT1
STYLE 19: PIN 1. IOUT 2. GND 3. GND 4. V CC 5. V EN 6. V REF	STYLE 20: PIN 1. COLLECTOR 2. COLLECTOR 3. BASE 4. EMITTER 5. COLLECTOR 6. COLLECTOR	STYLE 21: PIN 1. ANODE 1 2. N/C 3. ANODE 2 4. CATHODE 2 5. N/C 6. CATHODE 1	STYLE 22: PIN 1. D1 (i) 2. GND 3. D2 (i) 4. D2 (c) 5. VBUS 6. D1 (c)	STYLE 23: PIN 1. Vn 2. CH1 3. Vp 4. N/C 5. CH2 6. N/C	STYLE 24: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE
STYLE 25: PIN 1. BASE 1 2. CATHODE 3. COLLECTOR 2 4. BASE 2 5. EMITTER 6. COLLECTOR 1	STYLE 26: PIN 1. SOURCE 1 2. GATE 1 3. DRAIN 2 4. SOURCE 2 5. GATE 2 6. DRAIN 1	STYLE 27: PIN 1. BASE 2 2. BASE 1 3. COLLECTOR 1 4. EMITTER 1 5. EMITTER 2 6. COLLECTOR 2	STYLE 28: PIN 1. DRAIN 2. DRAIN 3. GATE 4. SOURCE 5. DRAIN 6. DRAIN	STYLE 29: PIN 1. ANODE 2. ANODE 3. COLLECTOR 4. EMITTER 5. BASE/ANODE 6. CATHODE	STYLE 30: PIN 1. SOURCE 1 2. DRAIN 2 3. DRAIN 2 4. SOURCE 2 5. GATE 1 6. DRAIN 1

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

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Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

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