

NL27WZ06

Dual Inverter with Open Drain Outputs

The NL27WZ06 is a high performance dual inverter with open drain outputs operating from a 1.65 to 5.5 V supply.

The internal circuit is composed of multiple stages, including an open drain output which provides the capability to set output switching level. This allows the NL27WZ06 to be used to interface 5.0 V circuits to circuits of any voltage between V_{CC} and 7.0 V using an external resistor and power supply.

- Extremely High Speed: t_{PD} 2.4 ns (typical) at $V_{CC} = 5.0$ V
- Designed for 1.65 to 5.5 V V_{CC} Operation
- Over Voltage Tolerant Inputs
- LVTTTL Compatible – Interface Capability With 5.0 V TTL Logic with $V_{CC} = 3.0$ V
- LVC MOS Compatible
- 24 mA Output Sink Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- Chip Complexity: FET = 72; Equivalent Gate = 18

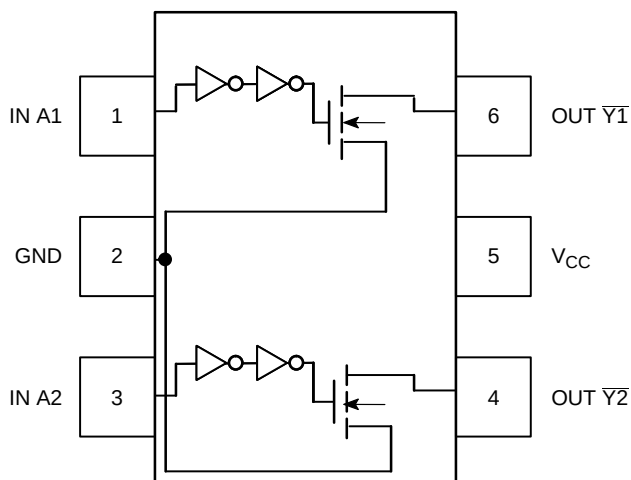


Figure 1. Pinout (Top View)

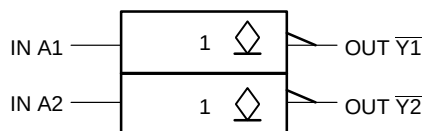


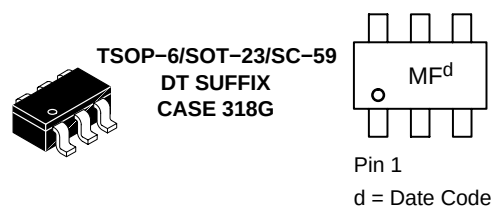
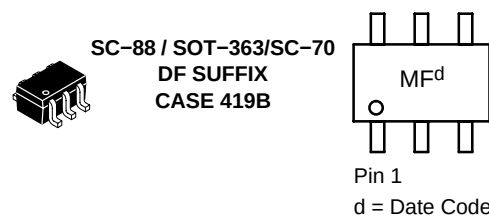
Figure 2. Logic Symbol



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MARKING DIAGRAMS



PIN ASSIGNMENT

1	IN A1
2	GND
3	IN A2
4	OUT $\bar{Y}2$
5	V_{CC}
6	OUT $\bar{Y}1$

FUNCTION TABLE

A Input	$\bar{Y}$ Output
L	Z
H	L

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

NL27WZ06

MAXIMUM RATINGS (Note 1)

Symbol	Characteristics	Value	Unit
V _{CC}	DC Supply Voltage	−0.5 to +7.0	V
V _I	DC Input Voltage	−0.5 ≤ V _I ≤ +7.0	V
V _O	DC Output Voltage Output in Z or LOW State (Note 2)	−0.5 ≤ V _O ≤ 7.0	V
I _{IK}	DC Input Diode Current V _I < GND	−50	mA
I _{OK}	DC Output Diode Current V _O < GND	−50	mA
I _O	DC Output Sink Current	±50	mA
I _{CC}	DC Supply Current Per Supply Pin	±100	mA
I _{GND}	DC Ground Current Per Ground Pin	±100	mA
T _{STG}	Storage Temperature Range	−65 to +150	°C
P _D	Power Dissipation in Still Air SC-88, TSOP-6	200	mW
θ _{JA}	Thermal resistance SC-88, TSOP-6	333	°C/W
T _L	Lead temperature, 1 mm from case for 10 s	260	°C
T _J	Junction temperature under bias	+150	°C
V _{ESD}	ESD Withstand Voltage Human Body Model (Note 3) Machine Model (Note 4) Charged Device Model (Note 5)	> 2000 > 200 N/A	V
I _{Latch-Up}	Latch-Up Performance Above V _{CC} and Below GND at 85°C (Note 6)	±500	mA

1. Absolute maximum continuous ratings are those values beyond which damage to the device may occur. Exposure to these conditions or conditions beyond those indicated may adversely affect device reliability. Functional operation under absolute-maximum-rated conditions is not implied.
2. I_O absolute maximum rating must be observed.
3. Tested to EIA/JESD22-A114-A
4. Tested to EIA/JESD22-A115-A
5. Tested to JESD22-C101-A
6. Tested to EIA/JESD78

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	Supply Voltage Operating Data Retention Only	1.65 1.5	5.5 5.5	V
V _I	Input Voltage	0	5.5	V
V _O	Output Voltage (Z or LOW State)	0	5.5	V
T _A	Operating Free-Air Temperature	−40	+85	°C
Δt/ΔV	Input Transition Rise or Fall Rate V _{CC} = 2.5 V ±0.2 V V _{CC} = 3.0 V ±0.3 V V _{CC} = 5.0 V ±0.5 V	0 0 0	20 10 5	ns/V

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
V _{IH}	High-Level Input Voltage		1.65 2.3 to 5.5	0.75 V _{CC} 0.70 V _{CC}			0.75 V _{CC} 0.70 V _{CC}		V
V _{IL}	Low-Level Input Voltage		1.65 2.3 to 5.5			0.25 V _{CC} 0.30 V _{CC}		0.25 V _{CC} 0.30 V _{CC}	V
I _{LKG}	Z-State Output Leakage Current	V _{IN} = V _{IL} V _{OUT} = V _{CC} or GND	1.65 to 5.5			±5.0		±10.0	μA
V _{OL}	Low-Level Output Voltage V _{IN} = V _{IH}	I _{OL} = 100 μA	1.65 to 5.5		0.0	0.1		0.1	V
		I _{OL} = 3 mA	1.65		0.08	0.24			
		I _{OL} = 8 mA	2.3		0.22	0.3		0.3	
		I _{OL} = 12 mA	2.7		0.22	0.4		0.4	
		I _{OL} = 16 mA	3.0		0.28	0.4		0.4	
		I _{OL} = 24 mA	3.0		0.38	0.55		0.55	
		I _{OL} = 32 mA	4.5		0.42	0.55		0.55	
I _{IN}	Input Leakage Current	V _{IN} or V _{OUT} = V _{CC} or GND	0 to 5.5			±0.1		±1.0	μA
I _{OFF}	Power Off-Output Leakage Current	V _{OUT} = 5.5 V	0			1		10	μA
I _{CC}	Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5			1		10	μA

AC ELECTRICAL CHARACTERISTICS t_R = t_F = 2.5 ns; C_L = 50 pF; R_L = 500 Ω

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-40°C ≤ T _A ≤ 85°C		Unit
				Min	Typ	Max	Min	Max	
t _{PZL}	Propagation Delay (Figure 3 and 4)	R _L = R ₁ = 5000 Ω, C _L = 15 pF	1.8 ± 0.15	2.0	5.7	10.5	2.0	11.0	ns
		R _L = R ₁ = 500 Ω, C _L = 50 pF	2.5 ± 0.20	0.8	3.0	3.6	0.8	4.1	
		R _L = R ₁ = 500 Ω, C _L = 50 pF	3.3 ± 0.30	0.8	2.4	3.2	0.8	3.7	
		R _L = R ₁ = 500 Ω, C _L = 50 pF	5.0 ± 0.50	0.5	2.4	3.0	0.5	3.5	
t _{PLZ}	Propagation Delay (Figure 3 and 4)	R _L = R ₁ = 5000 Ω, C _L = 15 pF	1.8 ± 0.15	2.0	5.7	10.5	2.0	11.0	ns
		R _L = R ₁ = 500 Ω, C _L = 50 pF	2.5 ± 0.20	0.8	3.0	3.6	0.8	4.1	
		R _L = R ₁ = 500 Ω, C _L = 50 pF	3.3 ± 0.30	0.8	2.1	3.2	0.8	3.7	
		R _L = R ₁ = 500 Ω, C _L = 50 pF	5.0 ± 0.50	0.5	1.2	3.0	0.5	3.5	

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	pF
C _{PD}	Power Dissipation Capacitance (Note 7)	10 MHz, V _{CC} = 5.5 V, V _I = 0 V or V _{CC}	4	pF

7. 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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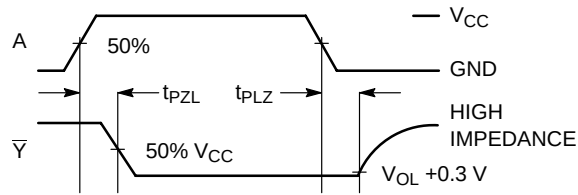


Figure 3. Switching Waveforms

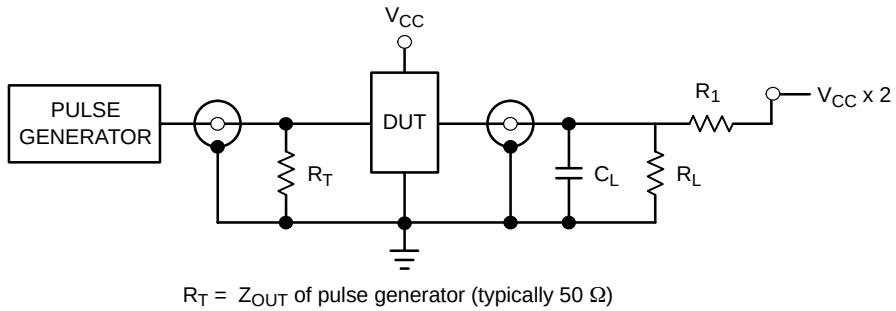


Figure 4. Test Circuit

DEVICE ORDERING INFORMATION

Device Order Number	Device Nomenclature							Package Type (Name/SOT#/ Common Name)	Tape and Reel Size
	Logic Circuit Indicator	No. of Gates per Package	Temp Range Identifier	Technology	Device Function	Package Suffix	Tape & Reel Suffix†		
NL27WZ06DFT2	NL	2	7	WZ	06	DF	T2	SC-88 / SOT-363 / SC-70	178 mm (7") 3000 Unit
NL27WZ06DTT1	NL	2	7	WZ	06	DT	T1	TSOP-6 / SOT-23 / SC-59	178 mm (7") 3000 Unit

†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.

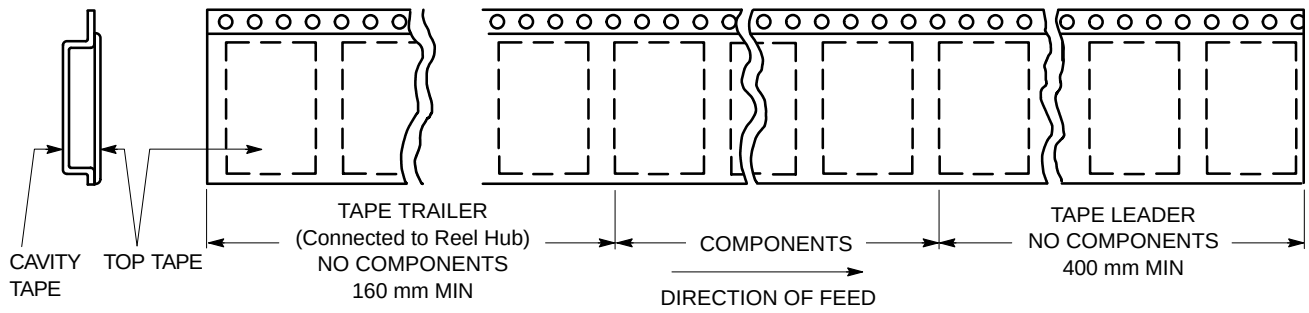


Figure 5. Tape Ends for Finished Goods

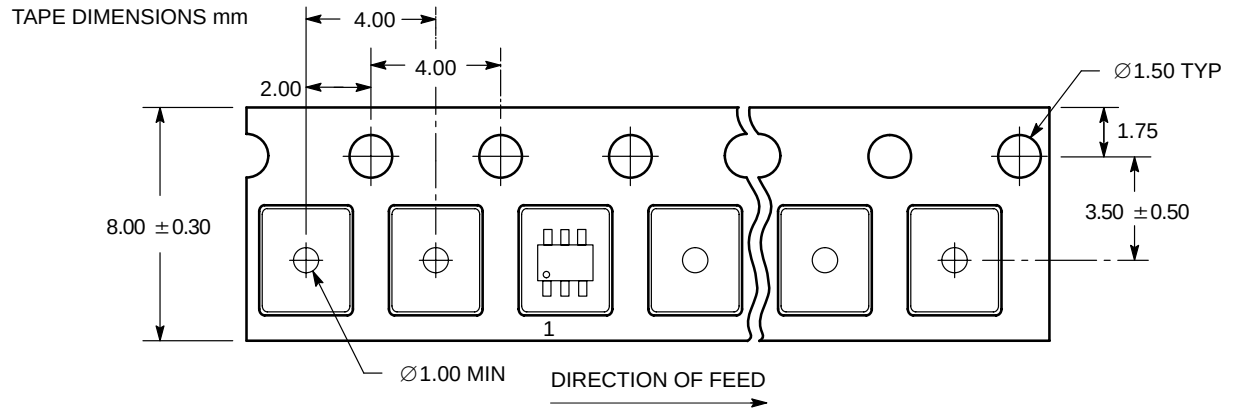


Figure 6. SC70-6/SC-88/SOT-363 DFT2 and SOT23-6/TSOP-6/SC59-6 DTT1 Reel Configuration/Orientation

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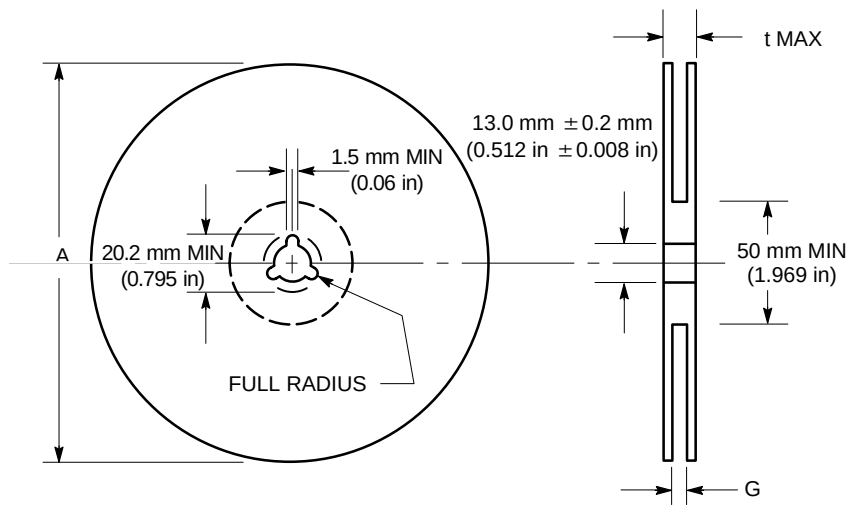


Figure 7. Reel Dimensions

REEL DIMENSIONS

Tape Size	T and R Suffix	A Max	G	t Max
8 mm	T1, T2	178 mm (7 in)	8.4 mm, + 1.5 mm, -0.0 (0.33 in + 0.059 in, -0.00)	14.4 mm (0.56 in)

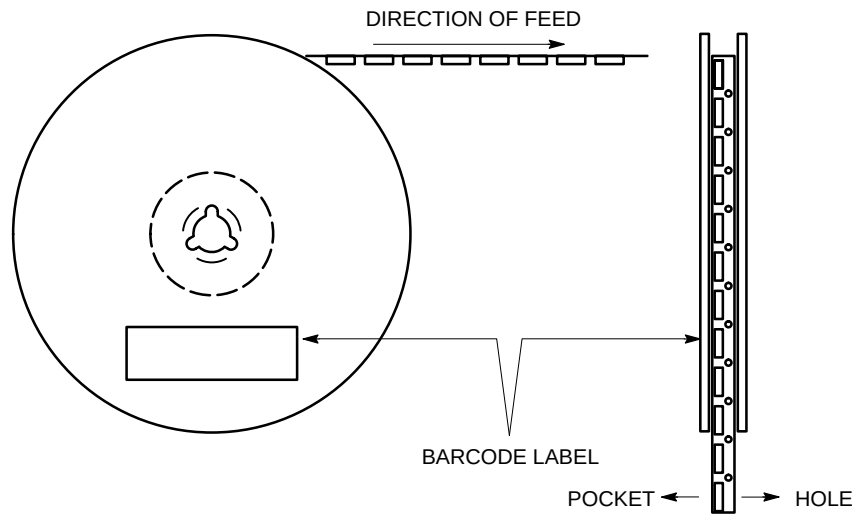
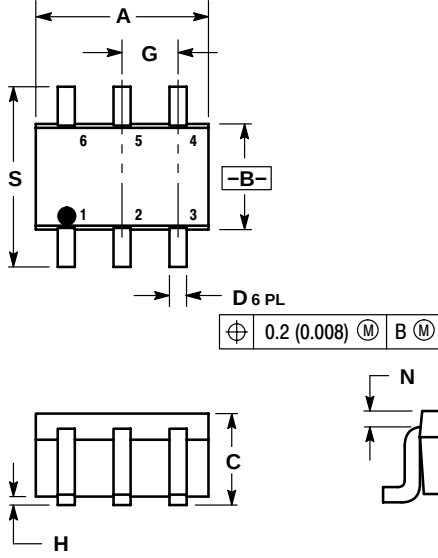


Figure 8. Reel Winding Direction

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PACKAGE DIMENSIONS

SC70-6/SC-88/SOT-363 DF SUFFIX CASE 419B-02 ISSUE S



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

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. VCC
5. VEN
6. VREF

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

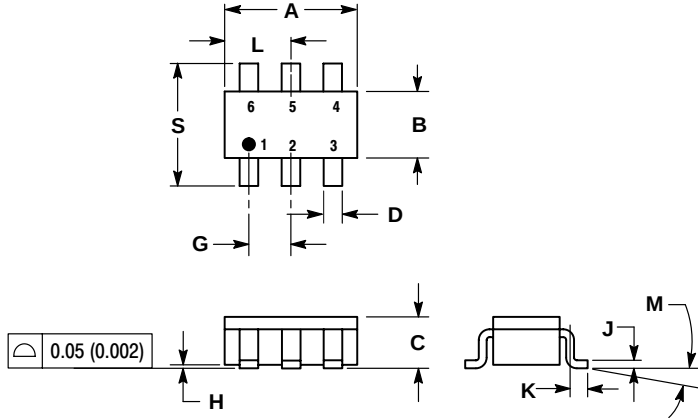
STYLE 24:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 25:
PIN 1. BASE 1
2. CATHODE
3. COLLECTOR 2
4. BASE 2
5. EMITTER
6. COLLECTOR 1

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PACKAGE DIMENSIONS

SOT23-6/TSOP-6/SC59-6 DT SUFFIX CASE 318G-02 ISSUE J



NOTES:

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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.1142	0.1220
B	1.30	1.70	0.0512	0.0669
C	0.90	1.10	0.0354	0.0433
D	0.25	0.50	0.0098	0.0197
E	0.85	1.05	0.0335	0.0413
F	0.013	0.100	0.0005	0.0040
G	0.10	0.26	0.0040	0.0102
H	0.20	0.60	0.0079	0.0236
I	1.25	1.55	0.0493	0.0610
J	0	10	0	10
K	2.50	3.00	0.0984	0.1181

STYLE 1:

- PIN 1. DRAIN
- 2. DRAIN
- 3. GATE
- 4. SOURCE
- 5. DRAIN
- 6. DRAIN

STYLE 2:

- PIN 1. EMITTER 2
- 2. BASE 1
- 3. COLLECTOR 1
- 4. EMITTER 1
- 5. BASE 2
- 6. COLLECTOR 2

STYLE 3:

- PIN 1. ENABLE
- 2. N/C
- 3. R BOOST
- 4. Vz
- 5. V in
- 6. V out

STYLE 4:

- PIN 1. N/C
- 2. V in
- 3. NOT USED
- 4. GROUND
- 5. ENABLE
- 6. LOAD

STYLE 5:

- PIN 1. EMITTER 2
- 2. BASE 2
- 3. COLLECTOR 1
- 4. EMITTER 1
- 5. BASE 1
- 6. COLLECTOR 2

STYLE 6:

- PIN 1. COLLECTOR
- 2. COLLECTOR
- 3. BASE
- 4. EMITTER
- 5. COLLECTOR
- 6. COLLECTOR

STYLE 7:

- PIN 1. COLLECTOR
- 2. COLLECTOR
- 3. BASE
- 4. N/C
- 5. COLLECTOR
- 6. EMITTER

STYLE 8:

- PIN 1. Vbus
- 2. D(in)
- 3. D(in)+
- 4. D(out)+
- 5. D(out)
- 6. GND

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