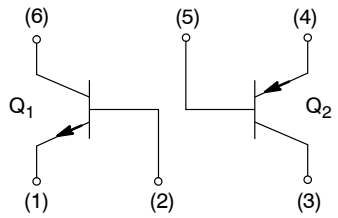
Complementary Dual General Purpose Amplifier Transistor

PNP and NPN Surface Mount

UMZ1NT1G



1

SC-88
CASE 419B

Features

- High Voltage and High Current: V_{CEO} = 50 V, I_C = 200 mA
- High h_{FE}: h_{FE} = 200～400
- Moisture Sensitivity Level: 1
- ESD Rating - Human Body Model: 3A
  - Machine Model: C
- 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 (T_A = 25 °C)

Rating	Symbol	Value	Unit
Collector-Base Voltage	$V_{(BR)CBO}$	60	Vdc
Collector-Emitter Voltage	$V_{(BR)CEO}$	50	Vdc
Emitter-Base Voltage	$V_{(BR)EBO}$	7.0	Vdc
Collector Current - Continuous	I_C	200	mAdc

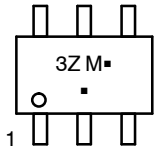
THERMAL CHARACTERISTICS

Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation T_A = 25 °C Derate above 25 °C	P_D	187 (Note 1) 256 (Note 2) 1.5 (Note 1) 2.0 (Note 2)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	670 (Note 1) 490 (Note 2)	°C/W
Characteristic (Both Junctions Heated)	**Symbol**	**Max**	**Unit**
Total Device Dissipation T_A = 25 °C Derate above 25 °C	P_D	250 (Note 1) 385 (Note 2) 2.0 (Note 1) 3.0 (Note 2)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	493 (Note 1) 325 (Note 2)	°C/W
Thermal Resistance, Junction-to-Lead	$R_{\theta JL}$	188 (Note 1) 208 (Note 2)	°C/W
Junction and Storage Temperature	T_J, T_{stg}	−55 to +150	°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.

1. FR-4 @ Minimum Pad
2. FR-4 @ 1.0 x 1.0 inch Pad

MARKING DIAGRAM



3Z = Device Code
M = Date Code
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
UMZ1NT1G	SC-88 (Pb-Free)	3000 / Tape & Reel
NSVUMZ1NT1G	SC-88 (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.

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Q1: NPN

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage (I_C = 2.0 mAdc, I_B = 0)	$V_{(BR)CEO}$	50	–	–	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$	60	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	7.0	–	–	Vdc
Collector-Base Cutoff Current (V_{CB} = 45 Vdc, I_E = 0)	I_{CBO}	–	–	0.1	μAdc
Collector-Emitter Cutoff Current (V_{CE} = 10 Vdc, I_B = 0) (V_{CE} = 30 Vdc, I_B = 0) (V_{CE} = 30 Vdc, I_B = 0, T_A = 80 °C)	I_{CEO}	 – – –	 – – –	 0.1 2.0 1.0	 μAdc μAdc mAdc
DC Current Gain (Note 3) (V_{CE} = 6.0 Vdc, I_C = 2.0 mAdc)	h_{FE}	200	–	400	–
Collector-Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 10 mAdc)	$V_{CE(sat)}$	–	–	0.25	Vdc
Transistor Frequency	f_T	–	114	–	MHz

3. Pulse Test: Pulse Width ≤ 300 μs, D.C. ≤ 2%.

Q2: PNP

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage (I_C = 2.0 mAdc, I_B = 0)	$V_{(BR)CEO}$	–50	–	–	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$	–60	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	–7.0	–	–	Vdc
Collector-Base Cutoff Current (V_{CB} = 45 Vdc, I_E = 0)	I_{CBO}	–	–	–0.1	μAdc
Collector-Emitter Cutoff Current (V_{CE} = 10 Vdc, I_B = 0) (V_{CE} = 30 Vdc, I_B = 0) (V_{CE} = 30 Vdc, I_B = 0, T_A = 80 °C)	I_{CEO}	 – – –	 – – –	 –0.1 –2.0 –1.0	 μAdc μAdc mAdc
DC Current Gain (Note 3) (V_{CE} = 6.0 Vdc, I_C = 2.0 mAdc)	h_{FE}	200	–	400	–
Collector-Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 10 mAdc)	$V_{CE(sat)}$	–	–	–0.3	Vdc
Transistor Frequency	f_T	–	142	–	MHz

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TYPICAL ELECTRICAL CHARACTERISTICS: PNP TRANSISTOR

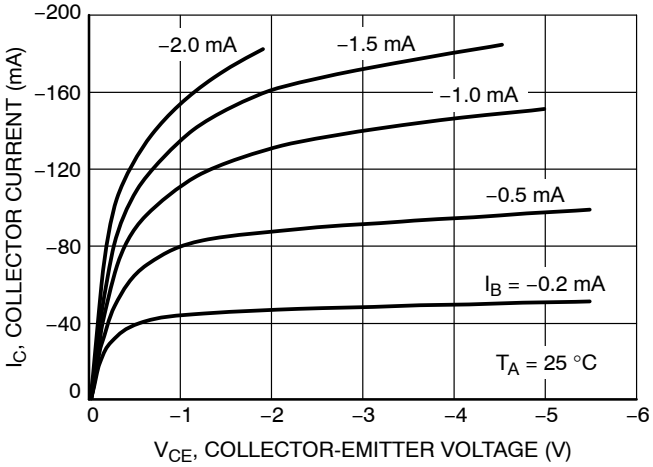

Figure 1. Collector Saturation Region

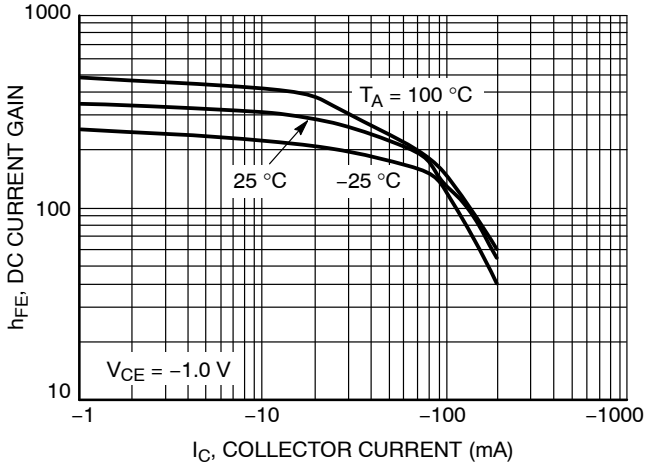

Figure 2. DC Current Gain

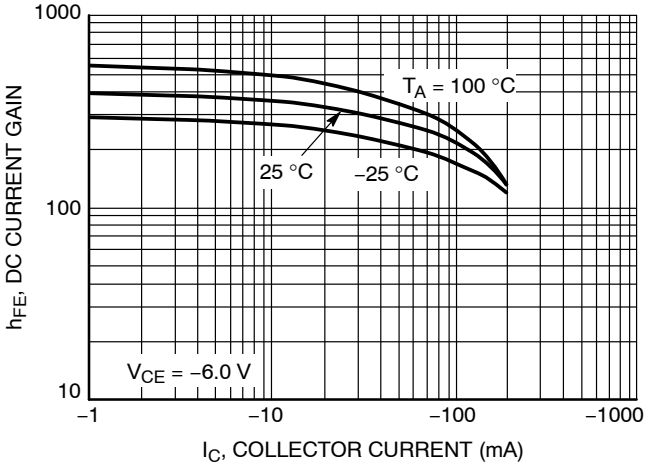

Figure 3. DC Current Gain

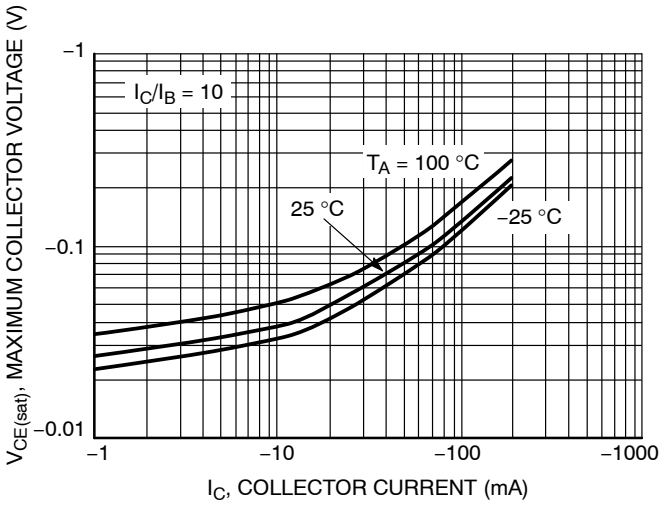

Figure 4. $V_{CE(sat)}$ versus I_C

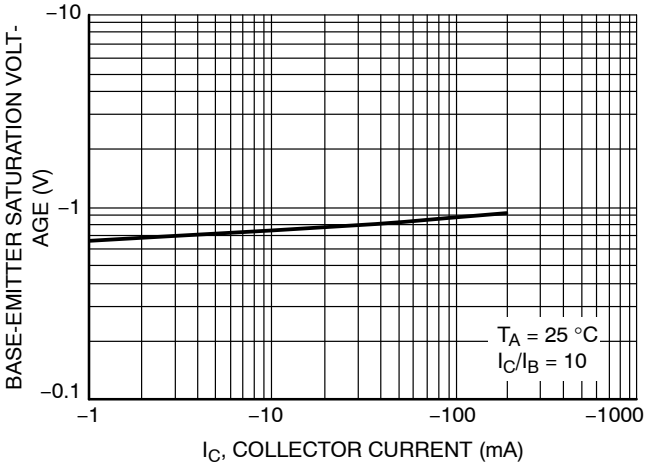

Figure 5. $V_{BE(sat)}$ versus I_C

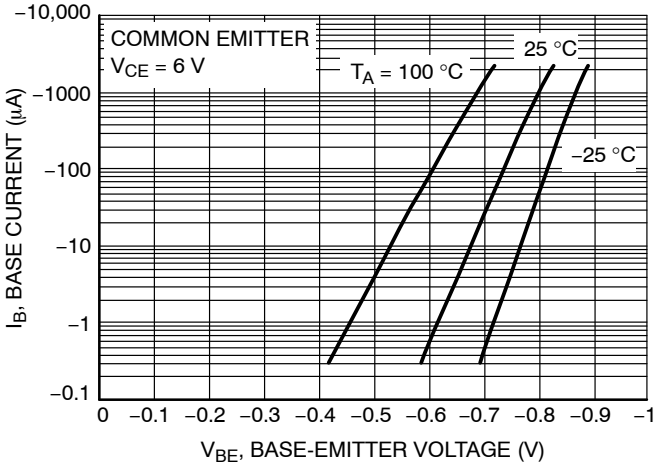

Figure 6. Base-Emitter Voltage

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TYPICAL ELECTRICAL CHARACTERISTICS: NPN TRANSISTOR

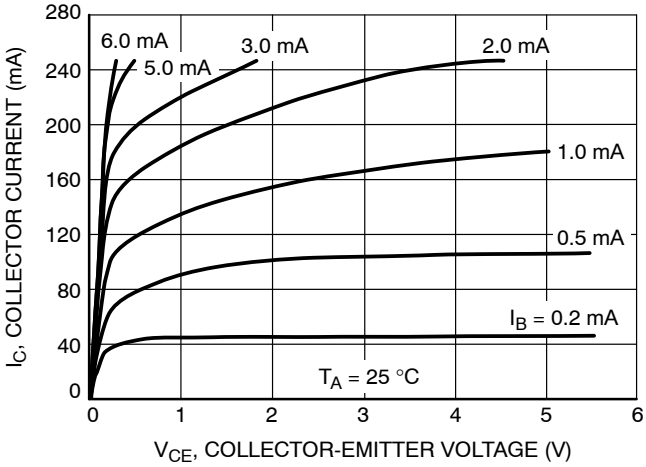

Figure 7. Collector Saturation Voltage

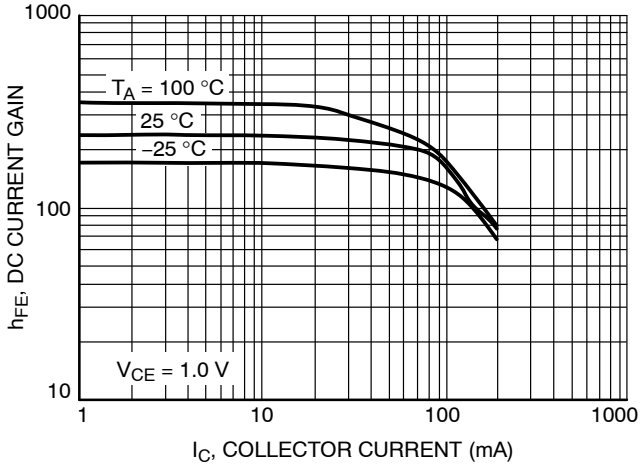

Figure 8. DC Current Gain

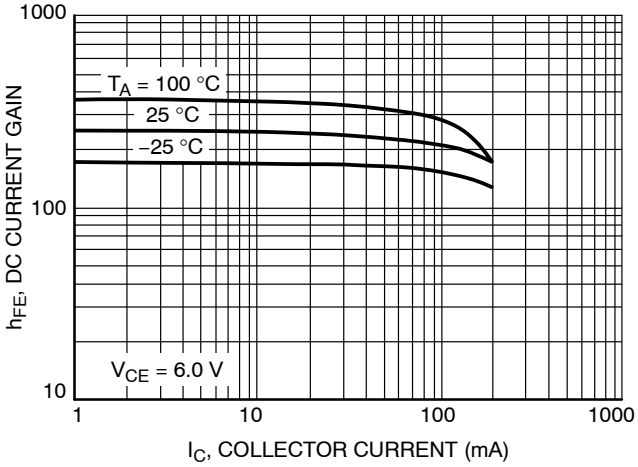

Figure 9. DC Current Gain

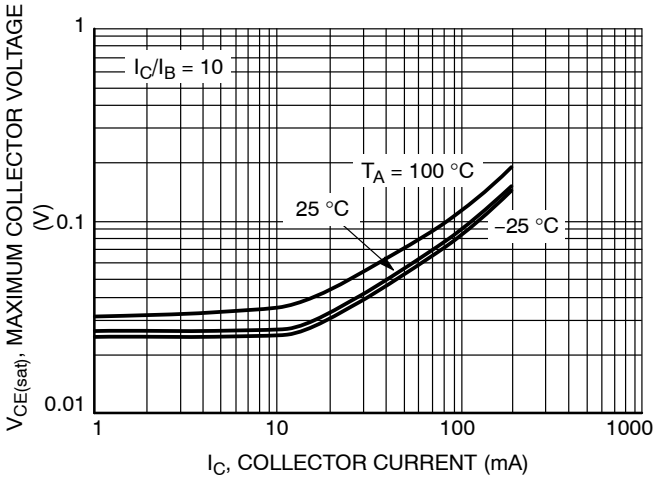

Figure 10. $V_{CE(sat)}$ versus I_C

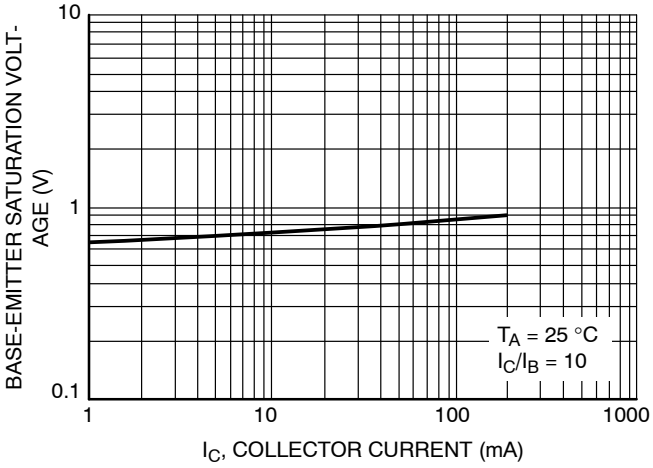

Figure 11. $V_{BE(sat)}$ versus I_C

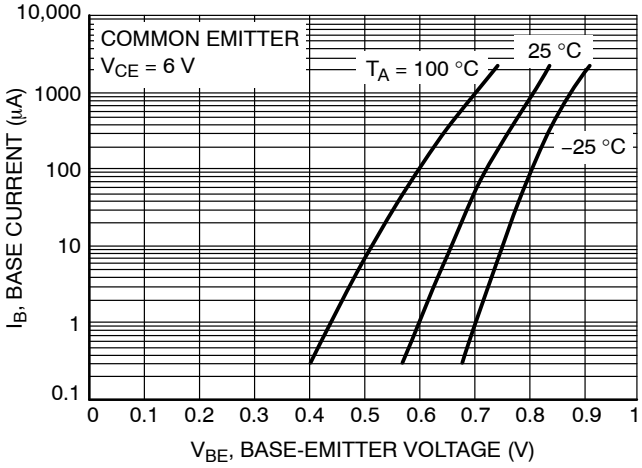

Figure 12. Base-Emitter Voltage

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REVISION HISTORY

Revision	Description of Changes	Date
10	Rebranded the Data Sheet to **onsemi** format.	6/3/2025

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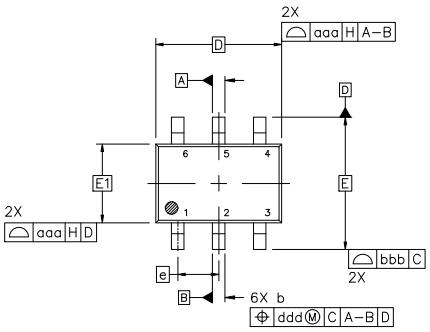
CASE 419B−02
ISSUE Z

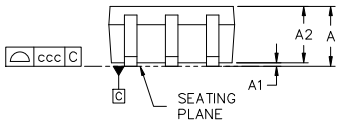
DATE 18 APR 2024



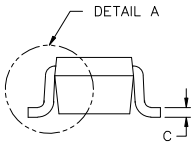
TOP VIEW

NOTES:

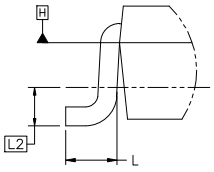
1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5−2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE 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.



SIDE VIEW

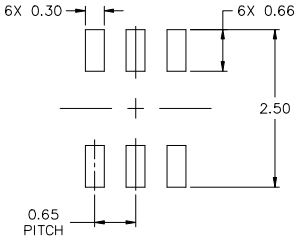


END VIEW



DETAIL A
SCALE 2:1

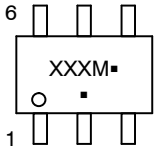
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	−−−	−−−	1.10
A1	0.00	−−−	0.10
A2	0.70	0.90	1.00
b	0.15	0.20	0.25
c	0.08	0.15	0.22
D	2.00 BSC		
E	2.10 BSC		
E1	1.25 BSC		
e	0.65 BSC		
L	0.26	0.36	0.46
L2	0.15 BSC		
aaa	0.15		
bbb	0.30		
ccc	0.10		
ddd	0.10		



RECOMMENDED MOUNTING FOPTPRINT*

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

GENERIC MARKING DIAGRAM*



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.

*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.

STYLES ON PAGE 2

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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. I OUT
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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