

# HN1B01FDW1T1G, SHN1B01FDW1T1G

## Complementary Dual General Purpose Amplifier Transistor

PNP and NPN Surface Mount

### Features

- High Voltage and High Current:  $V_{CEO} = 50\text{ V}$ ,  $I_C = 200\text{ mA}$
- High  $h_{FE}$ :  $h_{FE} = 200 \sim 400$
- Moisture Sensitivity Level: 1
- ESD Rating
  - ◆ Human Body Model: 3A
  - ◆ Machine Model: C
- S 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 ( $T_A = 25^\circ\text{C}$ )

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

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.

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Power Dissipation	$P_D$	380	mW
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

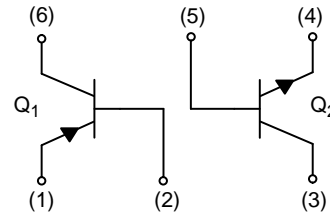


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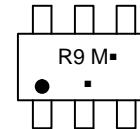
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SC-74  
CASE 318F  
STYLE 3



### MARKING DIAGRAM



R9 = Specific Device Code  
M = Date Code  
■ = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping†
HN1B01FDW1T1G	SC-74 (Pb-Free)	3,000/Tape & Reel
SHN1B01FDW1T1G	SC-74 (Pb-Free)	3,000/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.

# HN1B01FDW1T1G, SHN1B01FDW1T1G

## Q1: PNP

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

Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Breakdown Voltage ( $I_C = 2.0\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	-50	-	Vdc
Collector–Base Breakdown Voltage ( $I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ )	$V_{(BR)CBO}$	-60	-	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$ )	$V_{(BR)EBO}$	-7.0	-	Vdc
Collector–Base Cutoff Current ( $V_{CB} = 45\text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	-	-0.1	$\mu\text{A}$
Collector–Emitter Cutoff Current ( $V_{CE} = 10\text{ Vdc}$ , $I_B = 0$ ) ( $V_{CE} = 30\text{ Vdc}$ , $I_B = 0$ ) ( $V_{CE} = 30\text{ Vdc}$ , $I_B = 0$ , $T_A = 80^\circ\text{C}$ )	$I_{CEO}$	-	-0.1 -2.0 -1.0	$\mu\text{A}$ $\mu\text{A}$ mA
DC Current Gain (Note 1) ( $V_{CE} = 6.0\text{ Vdc}$ , $I_C = 2.0\text{ mA}$ )	$h_{FE}$	-200	-400	-
Collector–Emitter Saturation Voltage ( $I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$ )	$V_{CE(sat)}$	-	-0.3	Vdc

## Q2: NPN

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

Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Breakdown Voltage ( $I_C = 2.0\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	50	-	Vdc
Collector–Base Breakdown Voltage ( $I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ )	$V_{(BR)CBO}$	60	-	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$ )	$V_{(BR)EBO}$	7.0	-	Vdc
Collector–Base Cutoff Current ( $V_{CB} = 45\text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	-	0.1	$\mu\text{A}$
Collector–Emitter Cutoff Current ( $V_{CE} = 10\text{ Vdc}$ , $I_B = 0$ ) ( $V_{CE} = 30\text{ Vdc}$ , $I_B = 0$ ) ( $V_{CE} = 30\text{ Vdc}$ , $I_B = 0$ , $T_A = 80^\circ\text{C}$ )	$I_{CEO}$	-	0.1 2.0 1.0	$\mu\text{A}$ $\mu\text{A}$ mA
DC Current Gain (Note 1) ( $V_{CE} = 6.0\text{ Vdc}$ , $I_C = 2.0\text{ mA}$ )	$h_{FE}$	200	400	-
Collector–Emitter Saturation Voltage ( $I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$ )	$V_{CE(sat)}$	-	0.25	Vdc

1. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , D.C.  $\leq 2\%$ .

TYPICAL ELECTRICAL CHARACTERISTICS: PNP Transistor



Figure 1. Collector Saturation Region

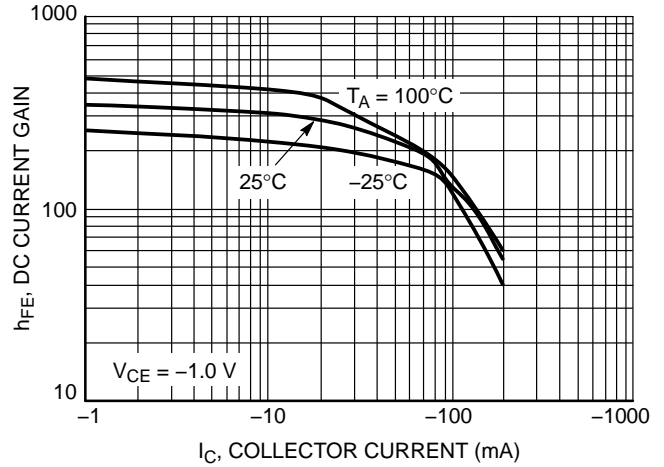


Figure 2. DC Current Gain

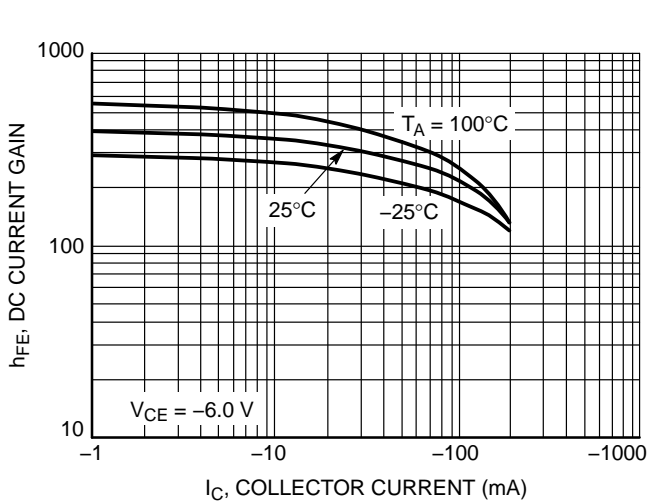


Figure 3. DC Current Gain

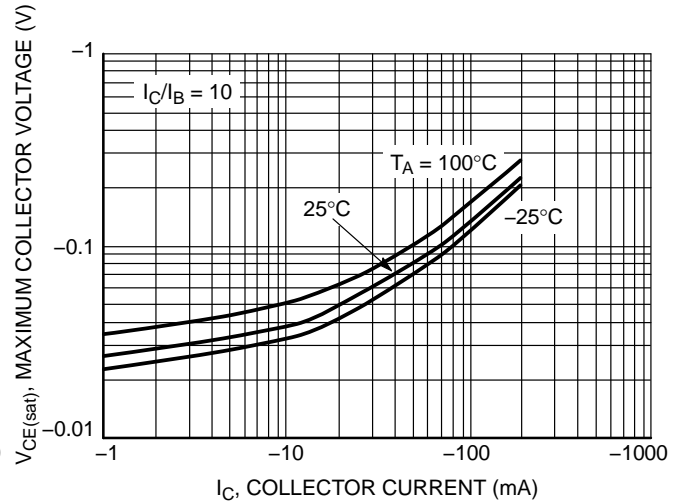


Figure 4.  $V_{CE(sat)}$  versus  $I_C$

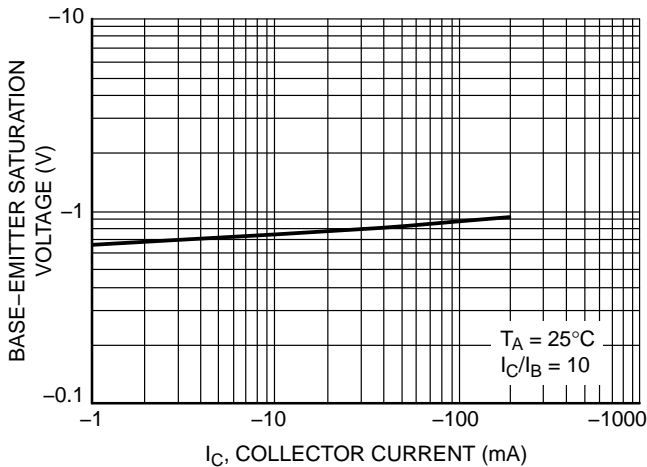


Figure 5.  $V_{BE(sat)}$  versus  $I_C$

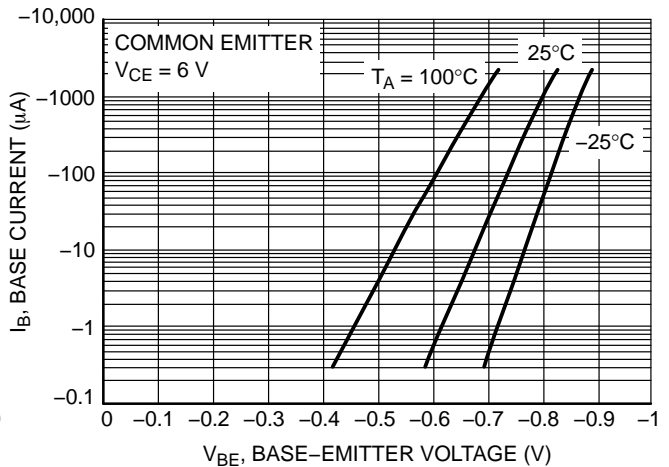


Figure 6. Base-Emitter Voltage

TYPICAL ELECTRICAL CHARACTERISTICS: NPN Transistor



Figure 7. Collector Saturation Voltage

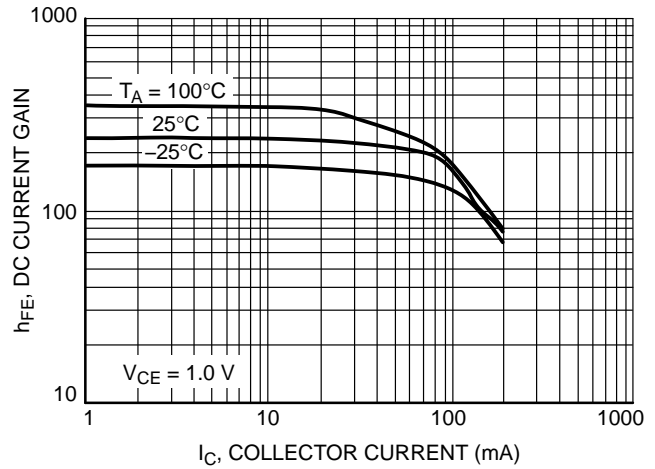


Figure 8. DC Current Gain

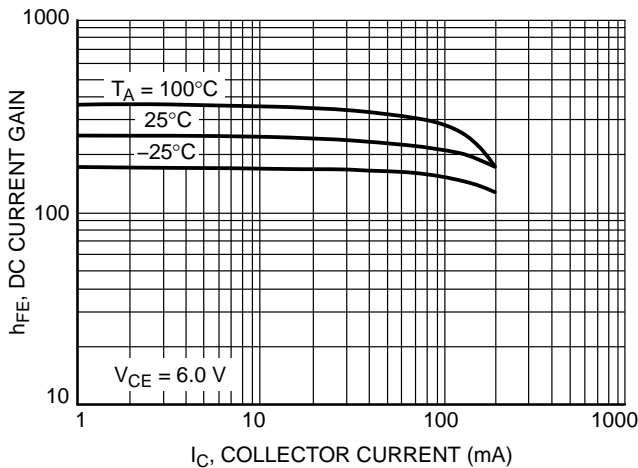


Figure 9. DC Current Gain

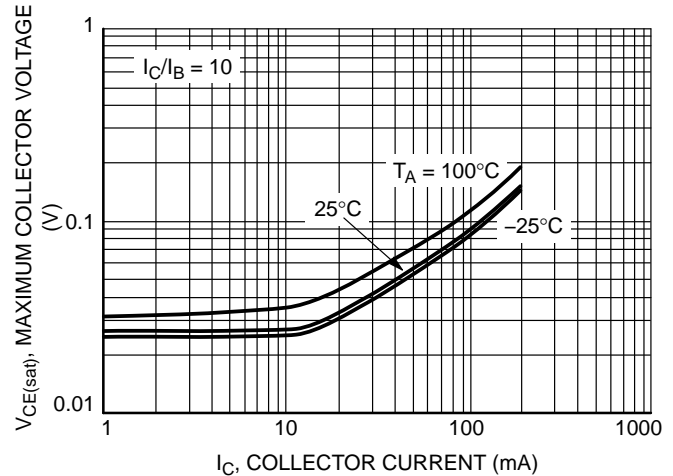


Figure 10.  $V_{CE(sat)}$  versus  $I_C$

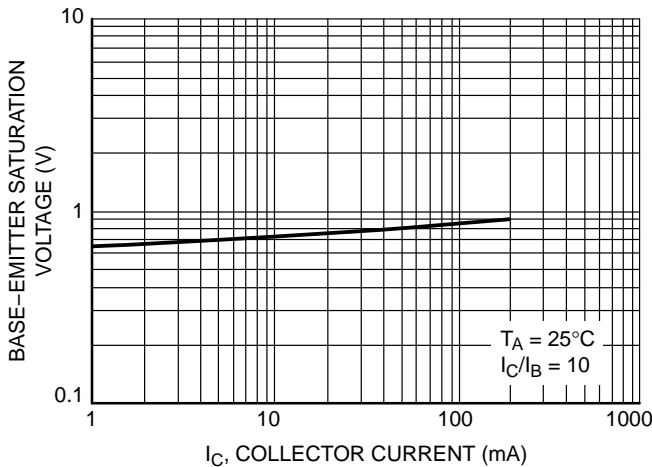


Figure 11.  $V_{BE(sat)}$  versus  $I_C$

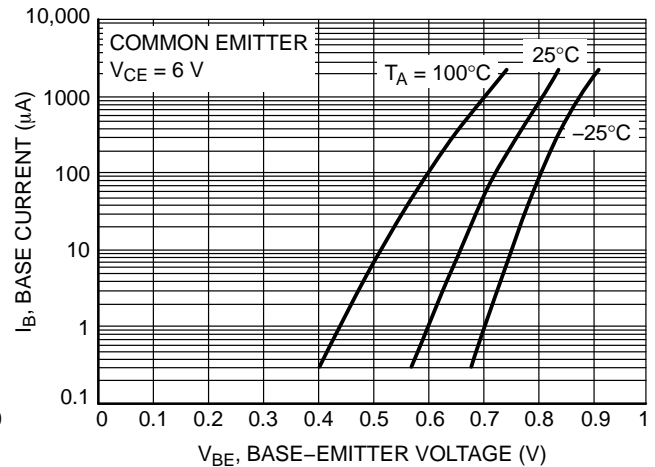


Figure 12. Base-Emitter Voltage

# HN1B01FDW1T1G, SHN1B01FDW1T1G

## TYPICAL ELECTRICAL CHARACTERISTICS

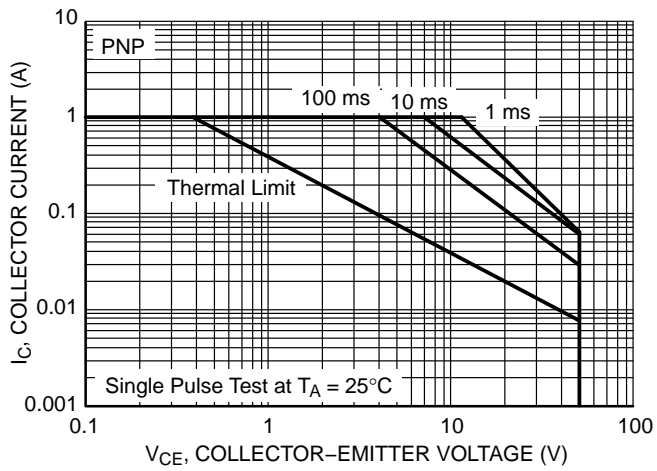


Figure 13. PNP Safe Operating Area

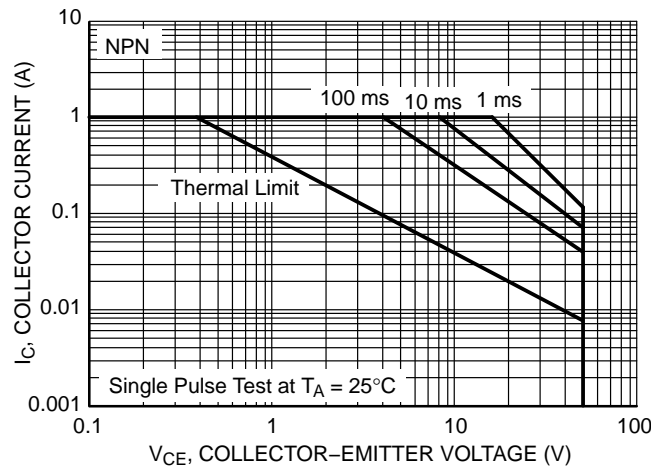


Figure 14. NPN Safe Operating Area

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



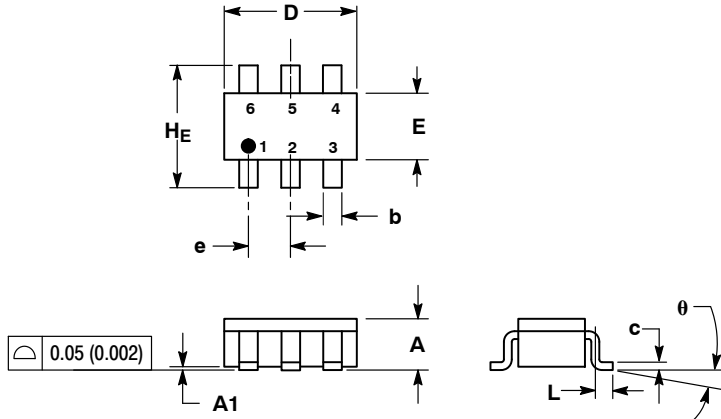
### SC-74

#### CASE 318F-05

#### ISSUE N

DATE 08 JUN 2012

SCALE 2:1

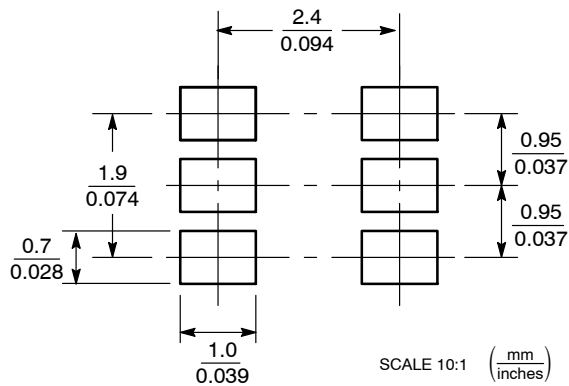


**NOTES:**

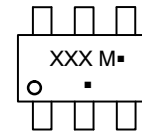
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318F-01, -02, -03, -04 OBSOLETE. NEW STANDARD 318F-05.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.37	0.50	0.010	0.015	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	-	10°	0°	-	10°

**SOLDERING FOOTPRINT\***



**GENERIC MARKING DIAGRAM\***



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

(Note: Microdot may be in either 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.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

- |  |   |  |   |  |  |
|--|---|--|---|--|--|
| <p><b>STYLE 1:</b></p> <p>PIN 1. CATHODE</p> <p>PIN 2. ANODE</p> <p>PIN 3. CATHODE</p> <p>PIN 4. CATHODE</p> <p>PIN 5. ANODE</p> <p>PIN 6. CATHODE</p>     | <p><b>STYLE 2:</b></p> <p>PIN 1. NO CONNECTION</p> <p>PIN 2. COLLECTOR</p> <p>PIN 3. EMITTER</p> <p>PIN 4. NO CONNECTION</p> <p>PIN 5. COLLECTOR</p> <p>PIN 6. BASE</p> | <p><b>STYLE 3:</b></p> <p>PIN 1. EMITTER 1</p> <p>PIN 2. BASE 1</p> <p>PIN 3. COLLECTOR 2</p> <p>PIN 4. EMITTER 2</p> <p>PIN 5. BASE 2</p> <p>PIN 6. COLLECTOR 1</p> | <p><b>STYLE 4:</b></p> <p>PIN 1. COLLECTOR 2</p> <p>PIN 2. EMITTER 1/EMITTER 2</p> <p>PIN 3. COLLECTOR 1</p> <p>PIN 4. EMITTER 3</p> <p>PIN 5. BASE 1/BASE 2/COLLECTOR 3</p> <p>PIN 6. BASE 3</p> | <p><b>STYLE 5:</b></p> <p>PIN 1. CHANNEL 1</p> <p>PIN 2. ANODE</p> <p>PIN 3. CHANNEL 2</p> <p>PIN 4. CHANNEL 3</p> <p>PIN 5. CATHODE</p> <p>PIN 6. CHANNEL 4</p> | <p><b>STYLE 6:</b></p> <p>PIN 1. CATHODE</p> <p>PIN 2. ANODE</p> <p>PIN 3. CATHODE</p> <p>PIN 4. CATHODE</p> <p>PIN 5. CATHODE</p> <p>PIN 6. CATHODE</p> |
| <p><b>STYLE 7:</b></p> <p>PIN 1. SOURCE 1</p> <p>PIN 2. GATE 1</p> <p>PIN 3. DRAIN 2</p> <p>PIN 4. SOURCE 2</p> <p>PIN 5. GATE 2</p> <p>PIN 6. DRAIN 1</p> | <p><b>STYLE 8:</b></p> <p>PIN 1. EMITTER 1</p> <p>PIN 2. BASE 2</p> <p>PIN 3. COLLECTOR 2</p> <p>PIN 4. EMITTER 2</p> <p>PIN 5. BASE 1</p> <p>PIN 6. COLLECTOR 1</p>    | <p><b>STYLE 9:</b></p> <p>PIN 1. EMITTER 2</p> <p>PIN 2. BASE 2</p> <p>PIN 3. COLLECTOR 1</p> <p>PIN 4. EMITTER 1</p> <p>PIN 5. BASE 1</p> <p>PIN 6. COLLECTOR 2</p> | <p><b>STYLE 10:</b></p> <p>PIN 1. ANODE/CATHODE</p> <p>PIN 2. BASE</p> <p>PIN 3. EMITTER</p> <p>PIN 4. COLLECTOR</p> <p>PIN 5. ANODE</p> <p>PIN 6. CATHODE</p>                                    | <p><b>STYLE 11:</b></p> <p>PIN 1. EMITTER</p> <p>PIN 2. BASE</p> <p>PIN 3. ANODE/CATHODE</p> <p>PIN 4. ANODE</p> <p>PIN 5. CATHODE</p> <p>PIN 6. COLLECTOR</p>   |  |

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