

UMZ1NT1

Complementary Dual General Purpose Amplifier Transistor

PNP and NPN Surface Mount

Features

- High Voltage and High Current: $V_{CEO} = 50$ V, $I_C = 200$ mA
- High h_{FE} : $h_{FE} = 200 \sim 400$
- Moisture Sensitivity Level: 1
- ESD Rating – Human Body Model: 3A
– Machine Model: C
- Pb-Free Package is Available

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

THERMAL CHARACTERISTICS

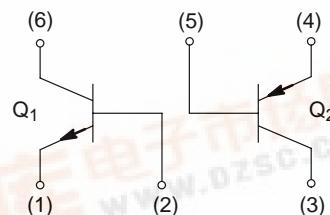
Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	187 (Note 1) 256 (Note 2) 1.5 (Note 1) 2.0 (Note 2)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	670 (Note 1) 490 (Note 2)	°C/W
Characteristic (Both Junctions Heated)	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ 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 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.

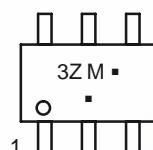
1. FR-4 @ Minimum Pad
2. FR-4 @ 1.0 x 1.0 inch Pad



ON Semiconductor®

<http://onsemi.com>SC-88
CASE 419B

MARKING DIAGRAM



3Z = Device Code

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device*	Package	Shipping†
UMZ1NT1	SC-88	3000 / Tape & Reel
UMZ1NT1G	SC-88 (Pb-Free)	3000 / Tape & Reel

*The "T1" suffix refers to a 7 inch 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.

UMZ1NT1

Q1: NPN

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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage ($I_C = 2.0 \text{ mA}_\text{dc}$, $I_B = 0$)	$V_{(\text{BR})\text{CEO}}$	50	—	—	V_dc
Collector-Base Breakdown Voltage ($I_C = 10 \mu\text{A}_\text{dc}$, $I_E = 0$)	$V_{(\text{BR})\text{CBO}}$	60	—	—	V_dc
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{A}_\text{dc}$, $I_C = 0$)	$V_{(\text{BR})\text{EBO}}$	7.0	—	—	V_dc
Collector-Base Cutoff Current ($V_{CB} = 45 \text{ V}_\text{dc}$, $I_E = 0$)	I_{CBO}	—	—	0.1	μA_dc
Collector-Emitter Cutoff Current ($V_{CE} = 10 \text{ V}_\text{dc}$, $I_B = 0$) ($V_{CE} = 30 \text{ V}_\text{dc}$, $I_B = 0$) ($V_{CE} = 30 \text{ V}_\text{dc}$, $I_B = 0$, $T_A = 80^\circ\text{C}$)	I_{CEO}	— — —	— — —	0.1 2.0 1.0	μA_dc μA_dc mA_dc
DC Current Gain (Note 3) ($V_{CE} = 6.0 \text{ V}_\text{dc}$, $I_C = 2.0 \text{ mA}_\text{dc}$)	h_{FE}	200	—	400	—
Collector-Emitter Saturation Voltage ($I_C = 100 \text{ mA}_\text{dc}$, $I_B = 10 \text{ mA}_\text{dc}$)	$V_{\text{CE}(\text{sat})}$	0.15	—	0.25	V_dc
Transistor Frequency	f_T	—	114	—	MHz

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

Q2: PNP

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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage ($I_C = 2.0 \text{ mA}_\text{dc}$, $I_B = 0$)	$V_{(\text{BR})\text{CEO}}$	-50	—	—	V_dc
Collector-Base Breakdown Voltage ($I_C = 10 \mu\text{A}_\text{dc}$, $I_E = 0$)	$V_{(\text{BR})\text{CBO}}$	-60	—	—	V_dc
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{A}_\text{dc}$, $I_C = 0$)	$V_{(\text{BR})\text{EBO}}$	-7.0	—	—	V_dc
Collector-Base Cutoff Current ($V_{CB} = 45 \text{ V}_\text{dc}$, $I_E = 0$)	I_{CBO}	—	—	-0.1	μA_dc
Collector-Emitter Cutoff Current ($V_{CE} = 10 \text{ V}_\text{dc}$, $I_B = 0$) ($V_{CE} = 30 \text{ V}_\text{dc}$, $I_B = 0$) ($V_{CE} = 30 \text{ V}_\text{dc}$, $I_B = 0$, $T_A = 80^\circ\text{C}$)	I_{CEO}	— — —	— — —	-0.1 -2.0 -1.0	μA_dc μA_dc mA_dc
DC Current Gain (Note 3) ($V_{CE} = 6.0 \text{ V}_\text{dc}$, $I_C = 2.0 \text{ mA}_\text{dc}$)	h_{FE}	-200	—	-400	—
Collector-Emitter Saturation Voltage ($I_C = 100 \text{ mA}_\text{dc}$, $I_B = 10 \text{ mA}_\text{dc}$)	$V_{\text{CE}(\text{sat})}$	-0.15	—	-0.3	V_dc
Transistor Frequency	f_T	—	142	—	MHz

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Typical Electrical Characteristics: PNP Transistor

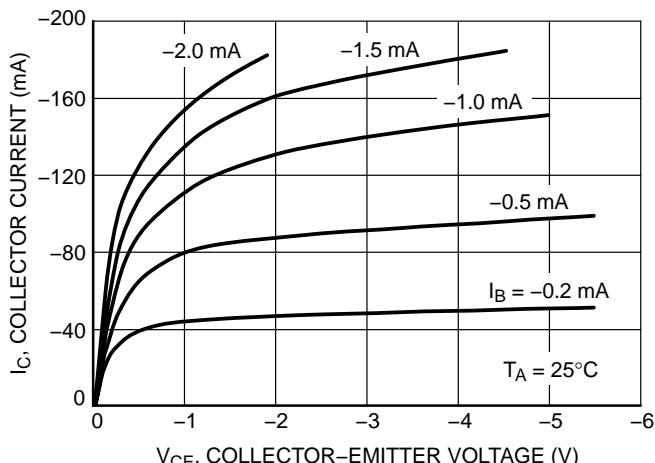


Figure 1. Collector Saturation Region

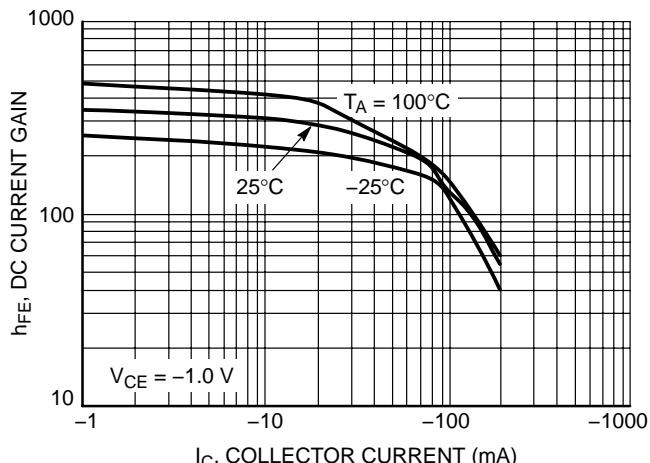


Figure 2. DC Current Gain

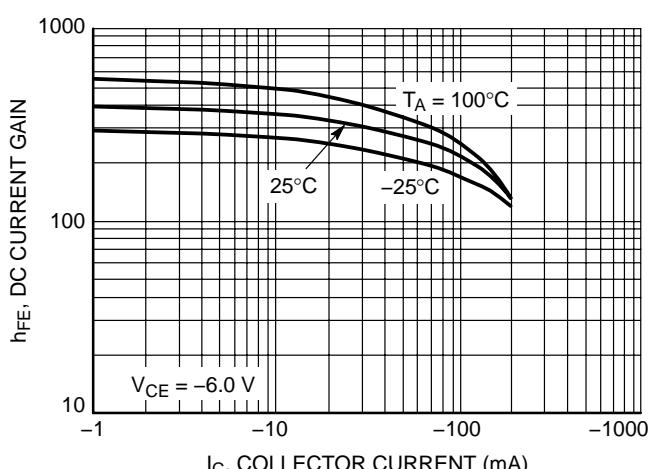


Figure 3. DC Current Gain

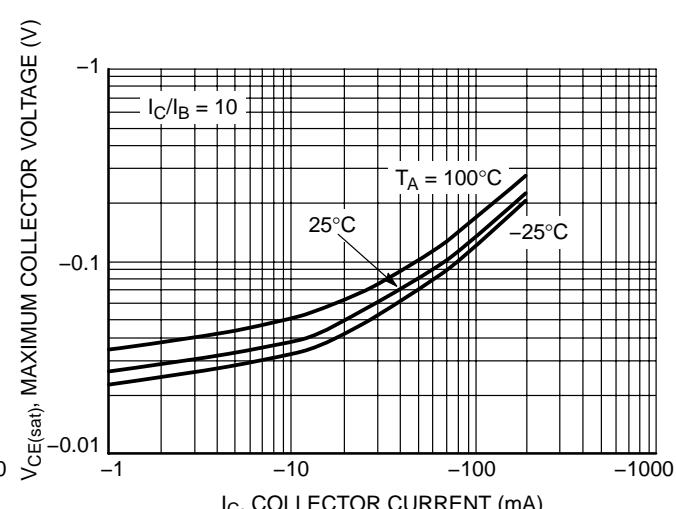


Figure 4. $V_{CE(sat)}$ versus I_C

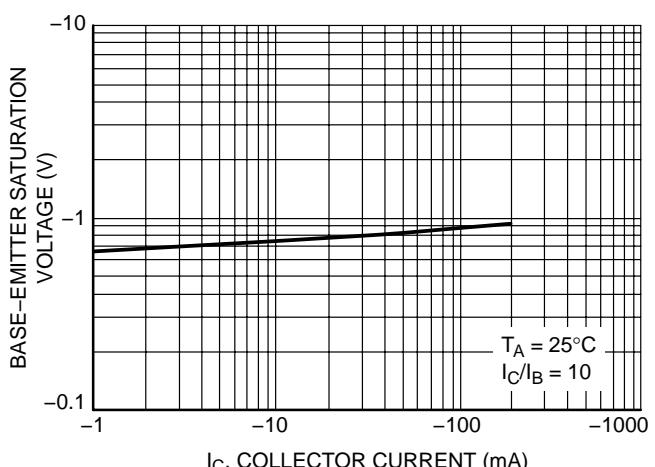


Figure 5. $V_{BE(sat)}$ versus I_C

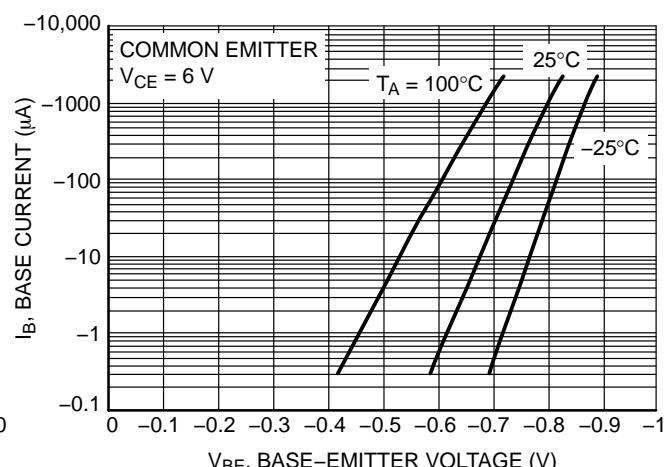


Figure 6. Base-Emitter Voltage

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Typical Electrical Characteristics: NPN Transistor

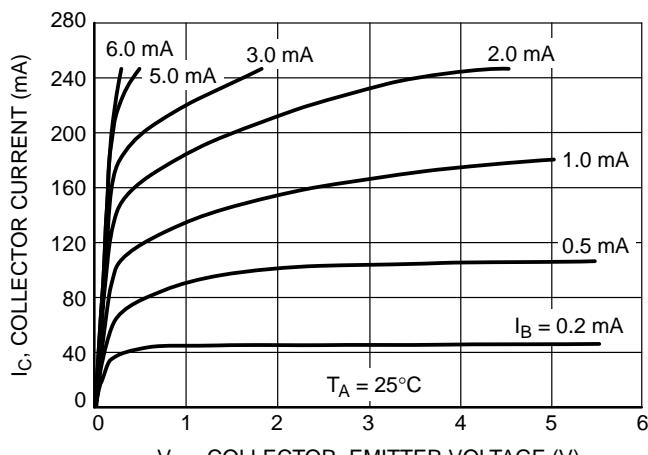


Figure 7. Collector Saturation Voltage

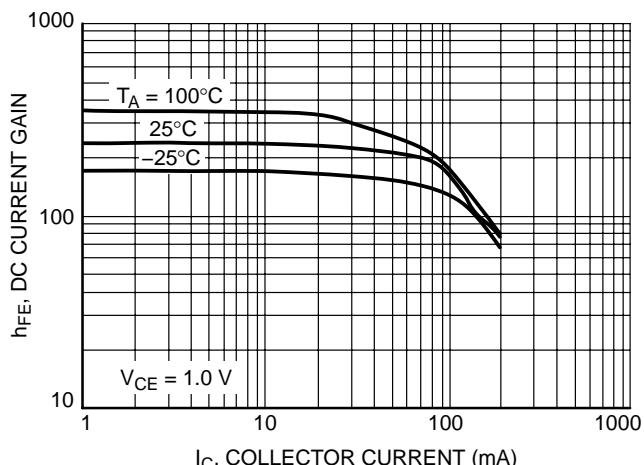


Figure 8. DC Current Gain

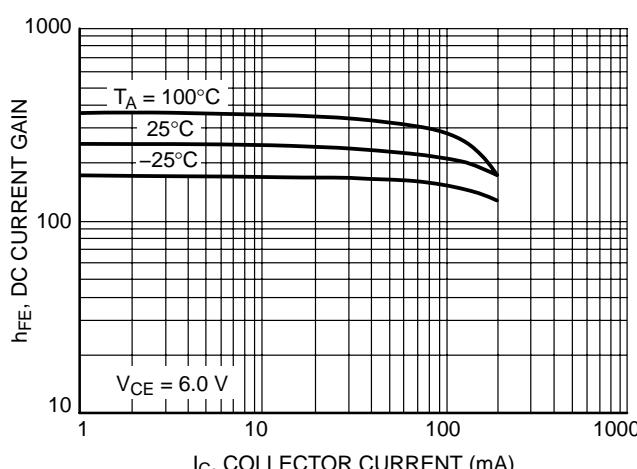


Figure 9. DC Current Gain

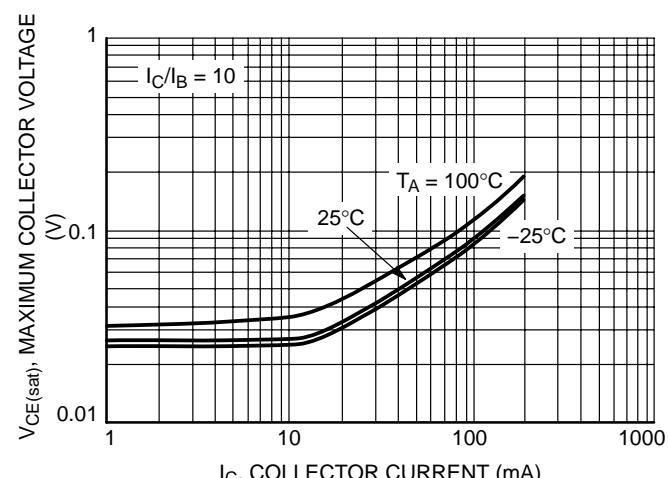


Figure 10. $V_{CE(sat)}$ versus I_C

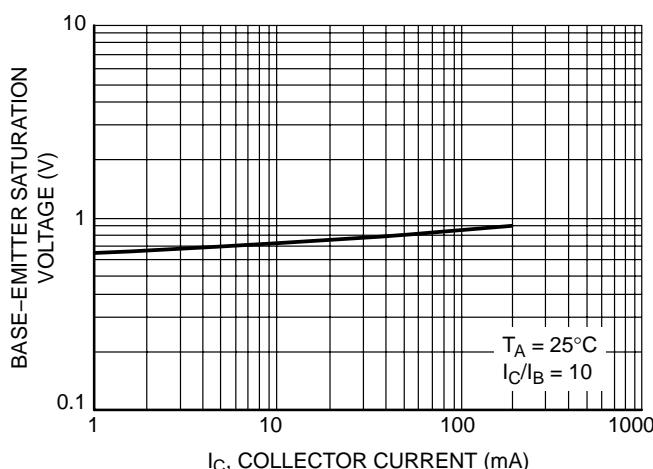


Figure 11. $V_{BE(sat)}$ versus I_C

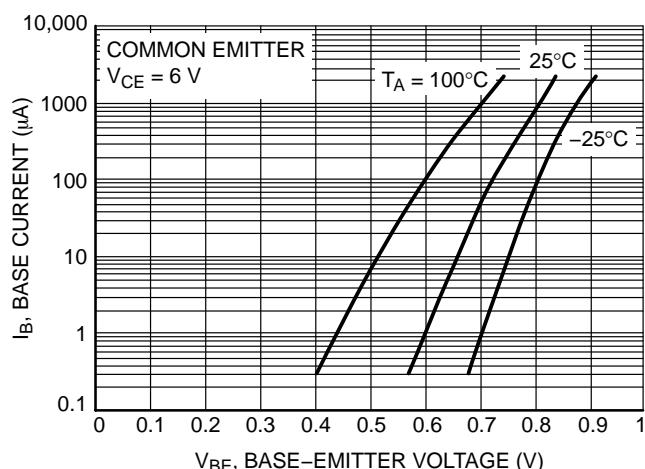
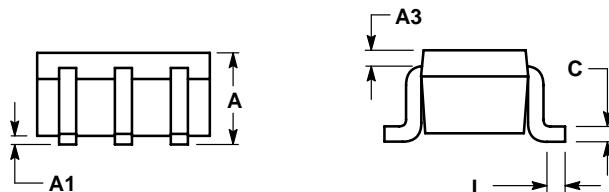
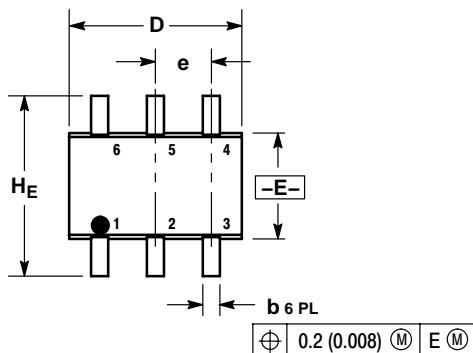


Figure 12. Base-Emitter Voltage

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PACKAGE DIMENSIONS

SC-88/SC70-6/SOT-363
CASE 419B-02
ISSUE W

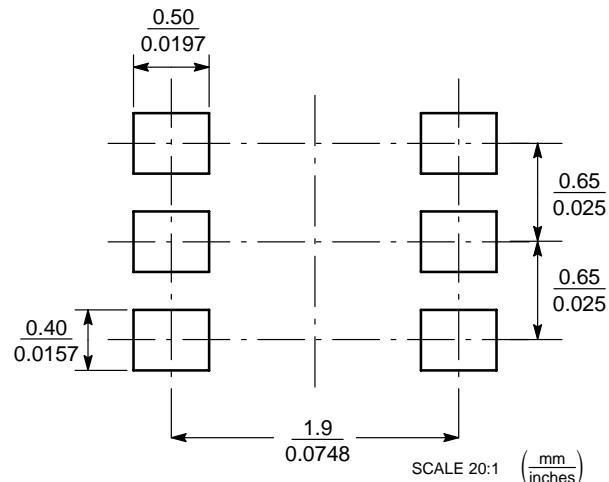


NOTES:

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

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.95	1.10	0.031	0.037	0.043
A1	0.00	0.05	0.10	0.000	0.002	0.004
A3	0.20	REF		0.008	REF	
b	0.10	0.21	0.30	0.004	0.008	0.012
C	0.10	0.14	0.25	0.004	0.005	0.010
D	1.80	2.00	2.20	0.070	0.078	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65	BSC		0.026	BSC	
L	0.10	0.20	0.30	0.004	0.008	0.012
H_E	2.00	2.10	2.20	0.078	0.082	0.086

SOLDERING FOOTPRINT*



*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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