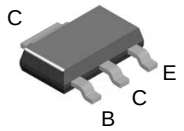
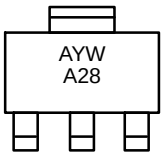
NPN Darlington Transistor

PZTA28, MMBTA28



SOT−223
CASE 318H

MARKING DIAGRAM



A = Assembly Location
YW = Date Code
A28 = Specific Device Code

Description

This device is designed for applications requiring extremely high current gain at collector currents to 500 mA. Sourced from process 03.

Features

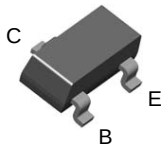
- These are Pb−Free Devices

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted) (Note 1, Note 2)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector−Emitter Voltage	80	V
V_{CBO}	Collector−Base Voltage	80	V
V_{EBO}	Emitter−Base Voltage	12	V
I_C	Collector Current − Continuous	800	mA
T_J, T_{STG}	Operating and Storage Junction Temperature Range	−55 to + 150	°C

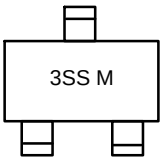
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady−state limits. **onsemi** should be consulted on applications involving pulsed or low−duty−cycle operations.



SOT−23/SUPERSOT−23
CASE 527AG

MARKING DIAGRAM



3SS = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
PZTA28	SOT−223	4000 / Tape & Reel
MMBTA28	SOT−23	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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

Symbol	Parameter	Max		Unit
		PZTA28 (Note 3)	**MMBTA28** (Note 4)	
P_D	Total Device Dissipation	1000	350	mW
	Derate Above 25°C	8.0	2.8	mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction−to−Ambient	125	357	°C/W

3. PCB size: FR−4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.
4. Device mounted on FR−4 PCB 36 mm x 18 mm x 1.5 mm; mounting pad for the collector lead minimum 6cm^2.

ELECTRICAL CHARACTERISTICS (Note 5) (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Max	Unit
$V_{(BR)CES}$	Collector−Emitter Breakdown Voltage	I_C = 100 μA, V_{BE} = 0	80		V
$V_{(BR)CBO}$	Collector−Base Breakdown Voltage	I_C = 100 μA, I_E = 0	80		V
$V_{(BR)EBO}$	Emitter−Base Breakdown Voltage	I_E = 10 μA, I_C = 0	12		V
I_{CBO}	Collector Cut−Off Current	V_{CB} = 60 V, I_E = 0		100	nA
I_{CES}	Collector Cut−Off Current	V_{CE} = 60 V, V_{BE} = 0		500	nA
I_{EBO}	Emitter Cut−Off Current	V_{EB} = 10 V, I_C = 0		100	nA
h_{FE}	DC Current Gain	I_C = 10 mA, V_{CE} = 5.0 V	10000		
		I_C = 100 mA, V_{CE} = 5.0 V	10000		
V_{CE}(sat)	Collector−Emitter Saturation Voltage	I_C = 10 mA, I_B = 0.01 mA		1.2	V
		I_C = 100 mA, I_B = 0.1 mA		1.5	
$V_{BE(on)}$	Base−Emitter On Voltage	I_C = 100 mA, V_{CE} = 5.0 V		2.0	V
f_T	Current Gain − Bandwidth Product	I_C = 15 mA, V_{CE} = 5.0 V, f = 100 MHz	125		MHz
C_{obo}	Output Capacitance	V_{CB} = 1.0 V, I_E = 0, f = 1.0 MHz		8.0	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. Pulse test: pulse width ≤ 300 μs, duty cycle ≤ 2.0%.

TYPICAL PERFORMANCE CHARACTERISTICS

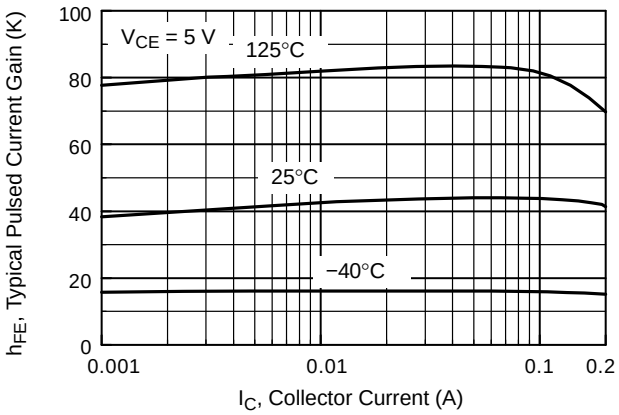


Figure 1. Typical Pulsed Current Gain vs. Collector Current

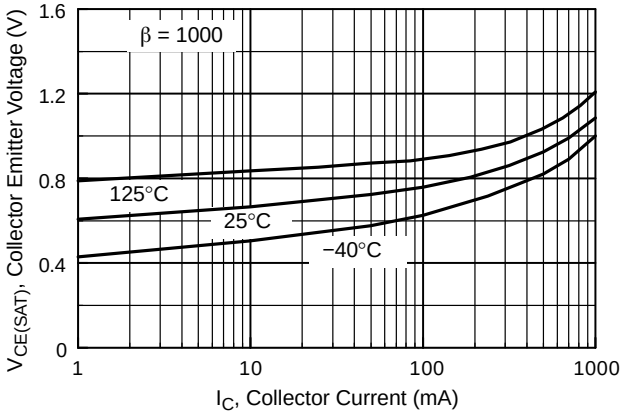


Figure 2. Collector− Emitter Saturation Voltage vs. Collector Current

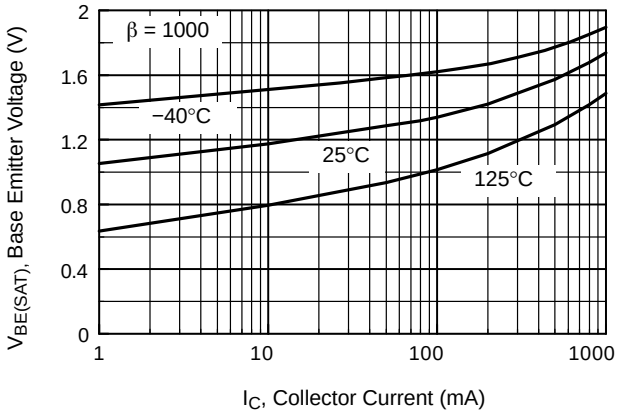


Figure 3. Base−Emitter Saturation Voltage vs. Collector Current

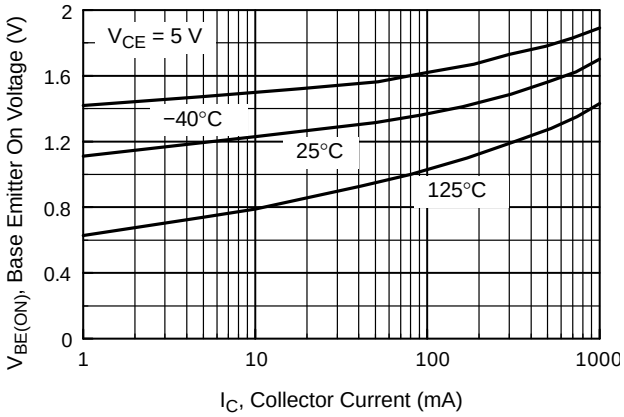


Figure 4. Base−Emitter On Voltage vs. Collector Current

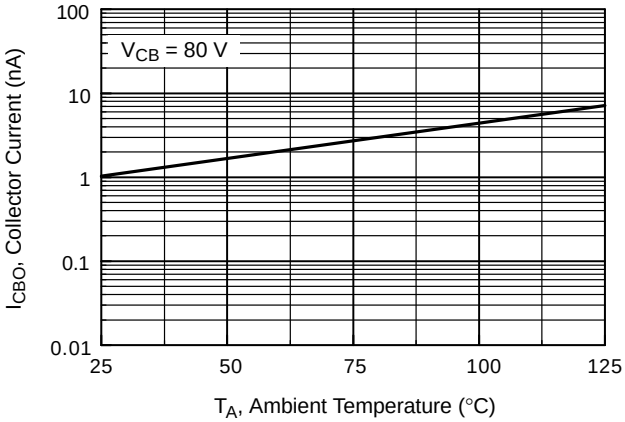


Figure 5. Collector Cut−Off Current vs. Ambient Temperature

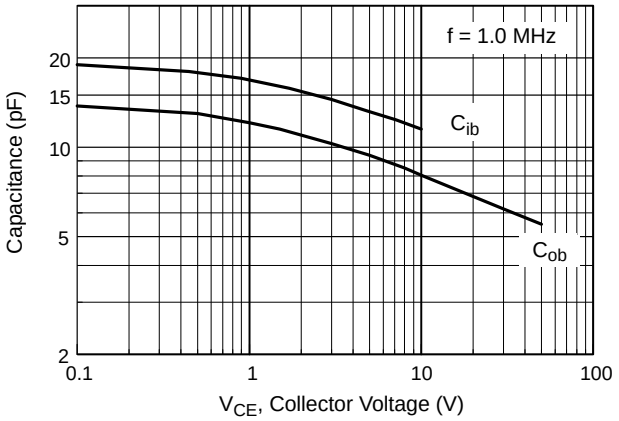


Figure 6. Input and Output Capacitance vs. Reverse Voltage

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

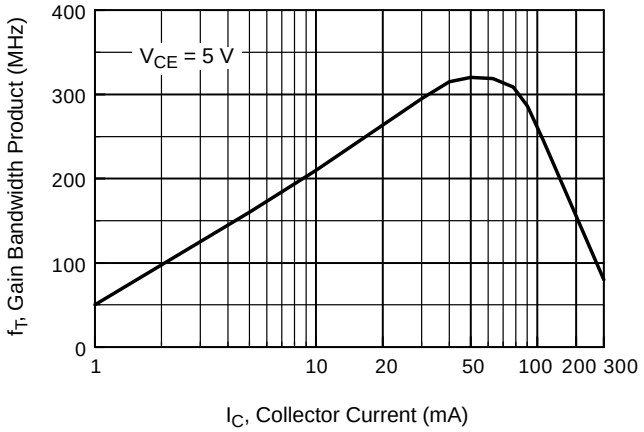


Figure 7. Gain Bandwidth Product vs. Collector Current

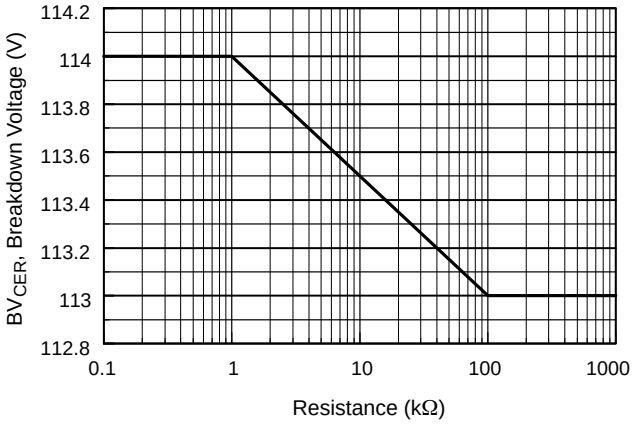


Figure 8. Collector−Emitter Breakdown Voltage with Resistance Between Emitter−Base

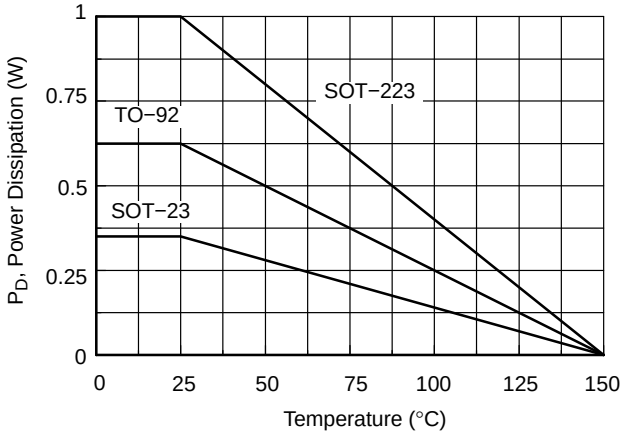
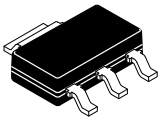


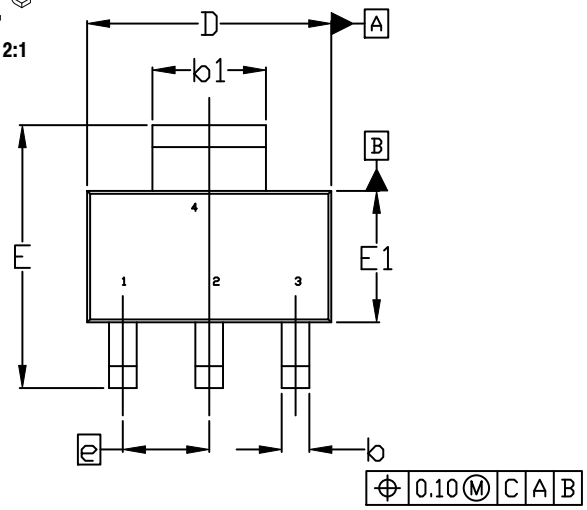
Figure 9. Power Dissipation vs. Ambient Temperature

SOT−223
CASE 318H
ISSUE B

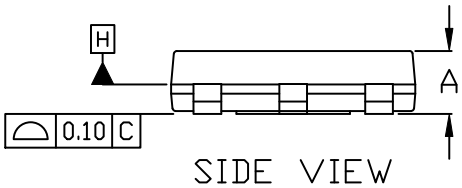
DATE 13 MAY 2020



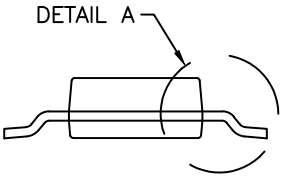
SCALE 2:1



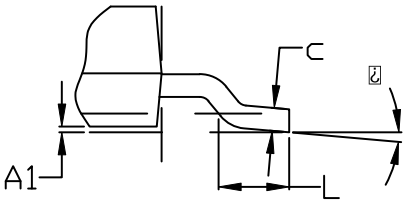
TOP VIEW



SIDE VIEW



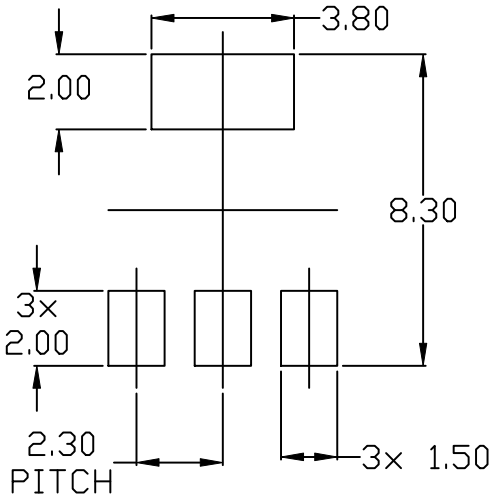
END VIEW



DETAIL A

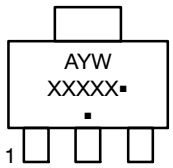
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D & E1 ARE DETERMINED AT DATUM H. DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. SHALL NOT EXCEED 0.23mm PER SIDE.
4. LEAD DIMENSIONS b AND b1 DO NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBBAR PROTRUSION IS 0.08mm PER SIDE.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
7. POSITIONAL TOLERANCE APPLIES TO DIMENSIONS b AND b1.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.80
A1	0.02	0.06	0.11
b	0.60	0.74	0.88
b1	2.90	3.00	3.10
c	0.24	---	0.35
D	6.30	6.50	6.70
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
e	2.30 BSC		
L	0.25	---	---
θ	0°	---	10°



RECOMMENDED MOUNTING FOOTPRINT

GENERIC MARKING DIAGRAM*



A	= Assembly Location
Y	= Year
W	= Work Week
XXXXX	= Specific Device 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. Some products may not follow the Generic Marking.

* 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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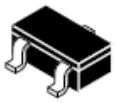
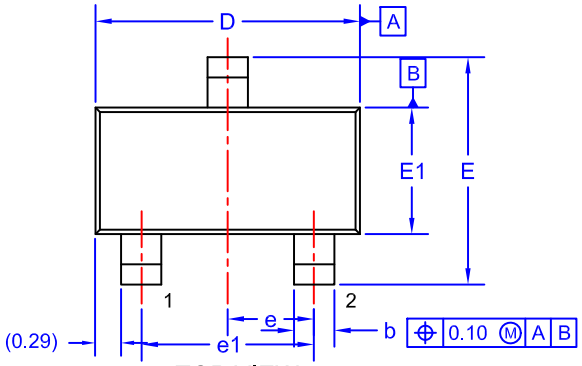


SOT−23/SUPERSOT™ −23, 3 LEAD, 1.4x2.9
CASE 527AG
ISSUE A

DATE 09 DEC 2019

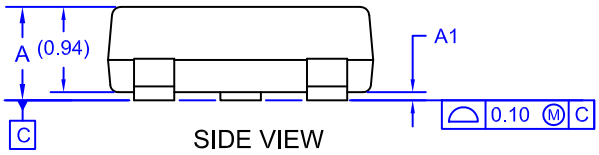


TOP VIEW

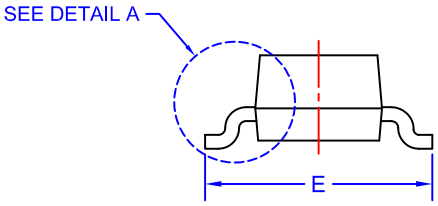
NOTES: UNLESS OTHERWISE SPECIFIED

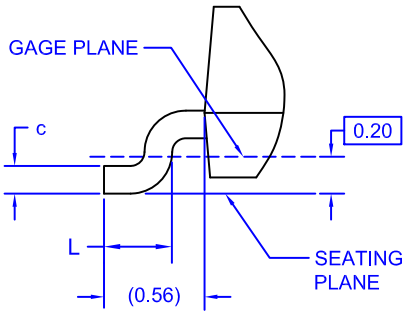
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.

DIM	MIN.	NOM.	MAX.
A	0.85	0.95	1.12
A1	0.00	0.05	0.10
b	0.370	0.435	0.508
c	0.085	0.150	0.180
D	2.80	2.92	3.04
E	2.31	2.51	2.71
E1	1.20	1.40	1.52
e	0.95 BSC		
e1	1.90 BSC		
L	0.33	0.38	0.43

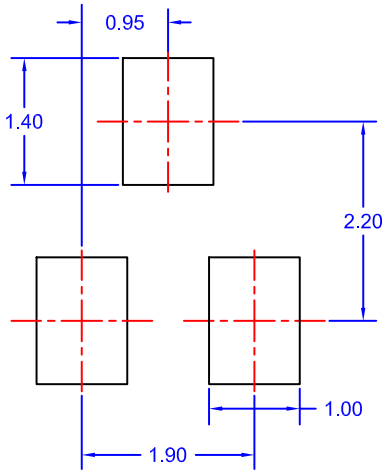


SIDE VIEW





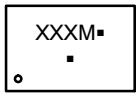
DETAIL A



LAND PATTERN RECOMMENDATION*

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

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Month 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. Some products may not follow the Generic Marking.

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