



DESCRIPTION

These transistors are designed for general purpose amplifier applications. They are housed in the SC-70 which is designed for low power surface mount applications.

The MBT3906W is available in SC-70 package.

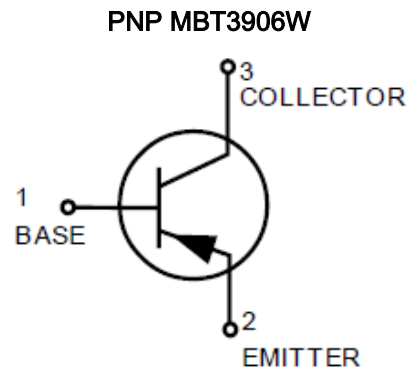
ORDERING INFORMATION

Package Type	Part Number
SC-70	MBT3906W
Note	3,000pcs/ Reel
AiT provides all RoHS Compliant Products	

FEATURES

- ROHS compliance
- Available in SC-70 package

PIN DESCRIPTION





ABSOLUTE MAXIMUM RATINGS

V _{CEO} , Collector-Emitter Voltage	-40Vdc
V _{CBO} , Collector-Base Voltage	-40Vdc
V _{EBO} , Emitter-Base Voltage	- 5.0Vdc
I _C , Collector Current-Continuous	-200mAdc

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

THERMAL CHARACTERISTICS

Parameter	Symbol	Max	Unit
Total Package Dissipation ^{NOTE1} T _A = 25°C	P _D	150	mW
Thermal Resistance, Junction to Ambient	R _{θJA}	833	°C/W
Junction and Storage Temperature	T _J , T _{STG}	-55 to +150	°C

NOTE1: Device mounted on FR4 glass epoxy printed circuit board using the minimum recommended footprint



ELECTRICAL CHARACTERISTICS

T_A = 25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Max	Unit
OFFCHARACTERISTICS					
Collector–Emitter Breakdown Voltage ^{NOTE1}	V _{(BR)CEO}	I _C = -1.0mA, I _B = 0	-40	-	Vdc
Collector–Base Breakdown Voltage	V _{(BR)CBO}	I _C = -10μA, I _E = 0	-40	-	Vdc
Emitter–Base Breakdown Voltage	V _{(BR)EBO}	I _E = -10μA, I _C = 0	-5.0	-	Vdc
Base Cutoff Current	I _{BL}	V _{CE} = -30Vdc, V _{EB} = -3.0Vdc	-	-50	nAdc
Collector Cutoff Current	I _{CEX}	V _{CE} = -30Vdc, V _{EB} = -3.0Vdc	-	-50	nAdc
ONCHARACTERISTICS^{NOTE2}					
DC Current Gain	h _{FE}	I _C = -0.1mA, V _{CE} = -1.0Vdc	60	-	-
		I _C = -1.0mA, V _{CE} = -1.0Vdc	80	-	
		I _C = -10mA, V _{CE} = -1.0Vdc	100	300	
		I _C = -50mA, V _{CE} = -1.0Vdc	60	-	
		I _C = -100mA, V _{CE} = -1.0Vdc	30	-	
Collector–Emitter Saturation Voltage	V _{CE(SAT)}	I _C = -10mA, I _B = -1.0mA	-	-0.25	Vdc
		I _C = -50mA, I _B = -5.0mA	-	-0.4	
Base–Emitter Saturation Voltage	V _{BE(SAT)}	I _C = -10mA, I _B = -1.0mA	-0.65	-0.85	Vdc
		I _C = -50mA, I _B = -5.0mA	-	-0.95	

NOTE2: Pulse Test: Pulse Width ≤ 300μs; Duty Cycle ≤ 2.0%.



T_A = 25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Max	Unit
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain-Bandwidth Product	f _T	I _C =-10mA _{dc} , V _{CE} =-20V _{dc} , f = 100MHz	250	-	MHz
Output Capacitance	C _{OBO}	V _{CB} = -5.0V _{dc} , I _E = 0, f = 1.0MHz	-	4.5	pF
Input Capacitance	C _{IBO}	V _{EB} = -0.5V _{dc} , I _C = 0, f = 1.0MHz	-	10.0	pF
Input Impedance	h _{IE}	V _{CE} = -10V _{dc} , I _C = -1.0mA _{dc} , f = 1.0kHz	2.0	12	KΩ
Voltage Feedback Ratio	h _{RE}	V _{CE} = -10V _{dc} , I _C = -1.0mA _{dc} , f = 1.0kHz	0.1	10	X 10 ⁻⁴
Small-Signal Current Gain	h _{FE}	V _{CE} = -10V _{dc} , I _C = -1.0mA _{dc} , f = 1.0kHz	100	400	-
Output Admittance	h _{OE}	V _{CE} = -10V _{dc} , I _C = -1.0mA _{dc} , f = 1.0kHz	3.0	60	μΩ
Noise Figure	NF	V _{CE} = -5.0V _{dc} , I _C = -100μA _{dc} , R _S = 1.0kΩ, f = 1.0kHz	-	4.0	dB
SWITCHING CHARACTERISTICS					
Delay Time	t _D	V _{CC} = -3.0V _{dc} , V _{BE} = 0.5V _{dc}	-	35	ns
Rise Time	t _R	I _C = -10mA _{dc} , I _{B1} = -1.0mA _{dc}	-	35	ns
Storage Time	t _S	V _{CC} = -3.0V _{dc} , I _C = -10mA _{dc}	-	225	ns
Fall Time	t _F	I _{B1} = I _{B2} = -1.0mA _{dc}	-	75	ns



TYPICAL CHARACTERISTICS

Equivalent Test Circuit

Figure 1. Delay and Rise Time

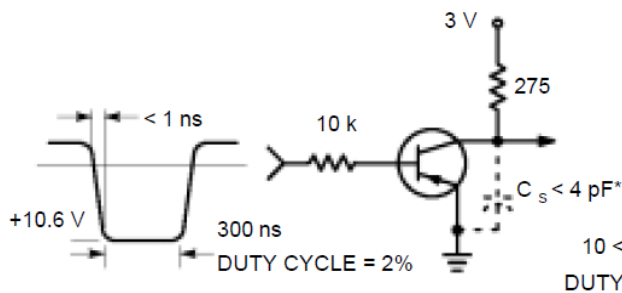
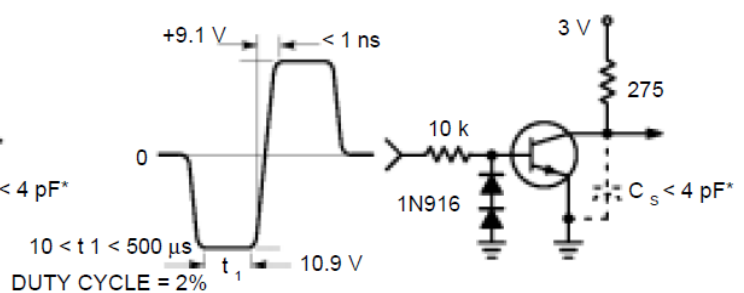


Figure 2. Storage and Fall Time



* Total shunt capacitance of test jig and connectors

————— $T_J = 25^\circ\text{C}$
- - - - - $T_J = 125^\circ\text{C}$

Figure 3. Capacitance

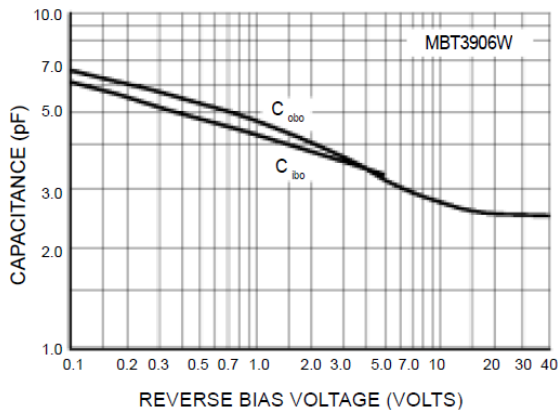


Figure 4. Charge Data

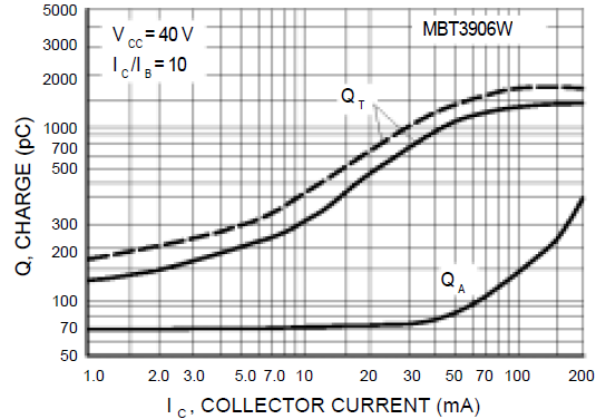


Figure 5. Turn-On Time

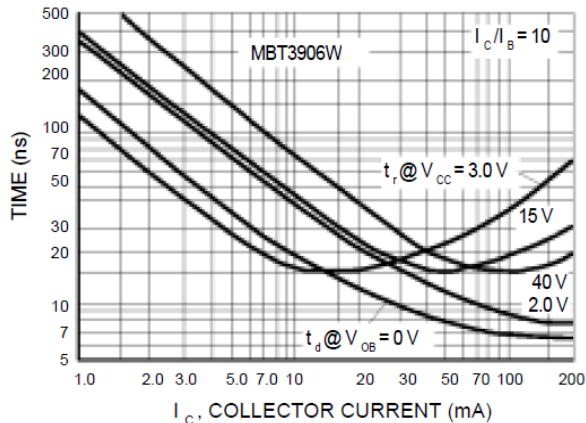
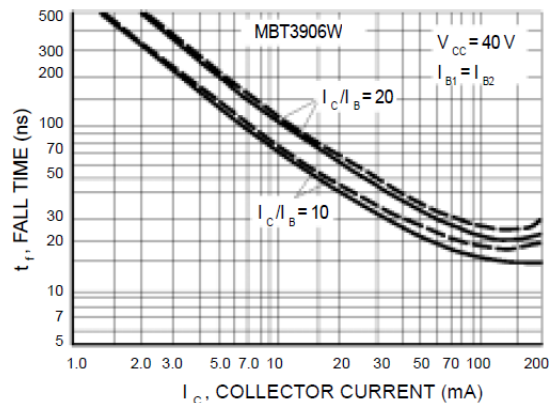


Figure 6. Fall Time





TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS NOISE FIGURE VARIATIONS

$V_{CE} = -5.0Vdc$, $T_A = 25^\circ C$, Bandwidth = 1.0 Hz

Figure 7

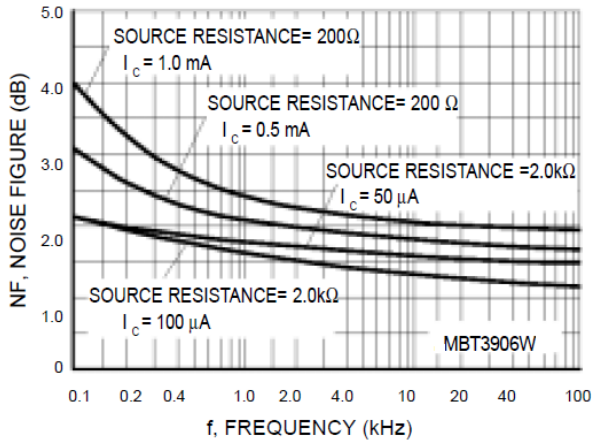
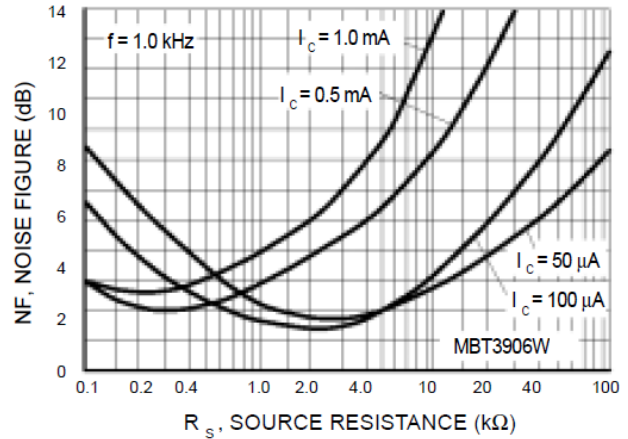


Figure 8



h PARAMETERS $V_{CE} = 10Vdc$, $f = 1.0kHz$, $T_A = 25^\circ C$

Figure 9. Current Gain

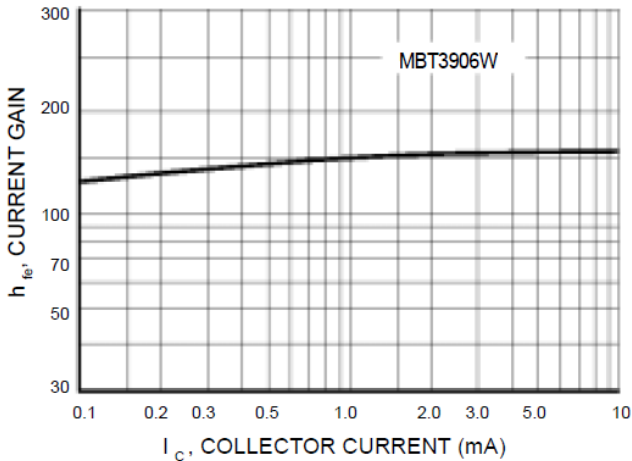


Figure 10. Output Admittance

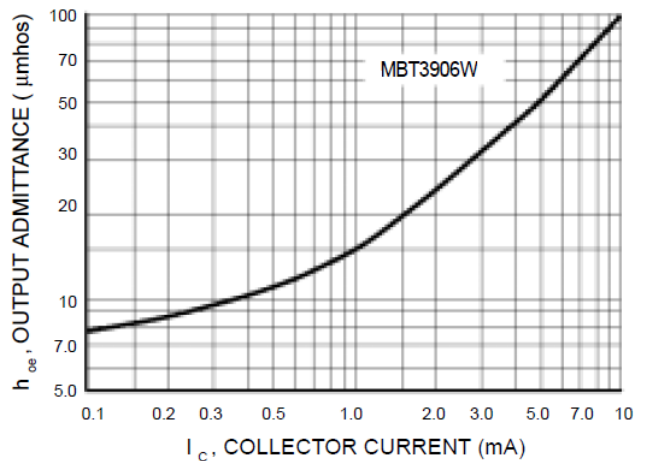


Figure 11. Input Impedance

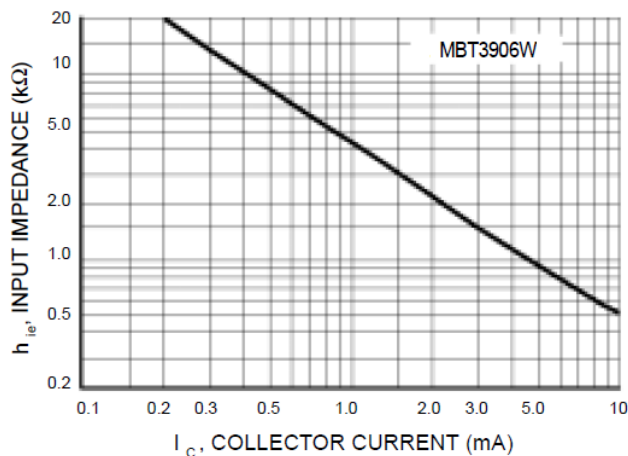
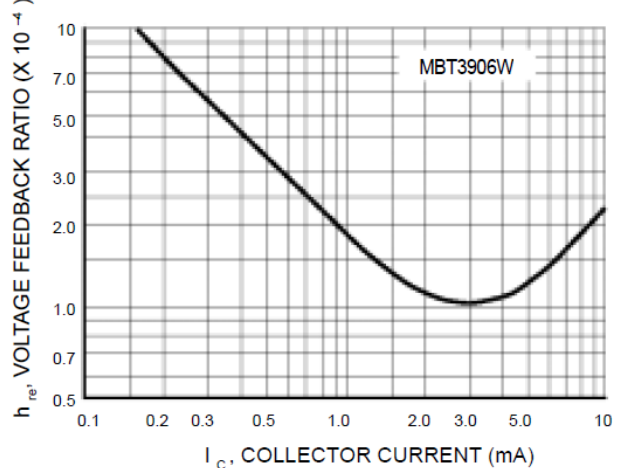


Figure 12. Voltage Feedback Ratio





STATIC CHARACTERISTICS

Figure 13. DC Current Gain

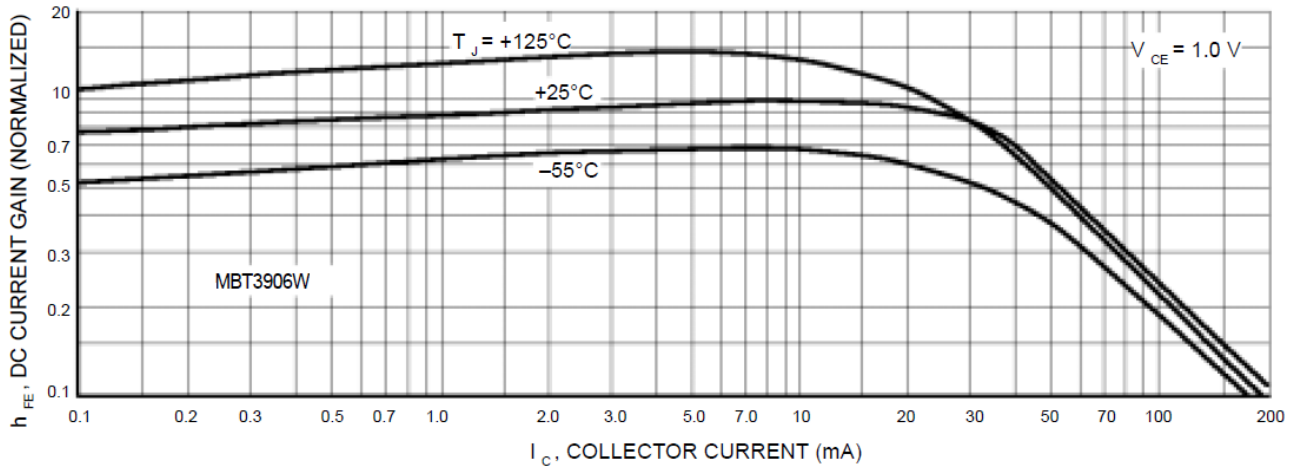


Figure 14. Collector Saturation Region

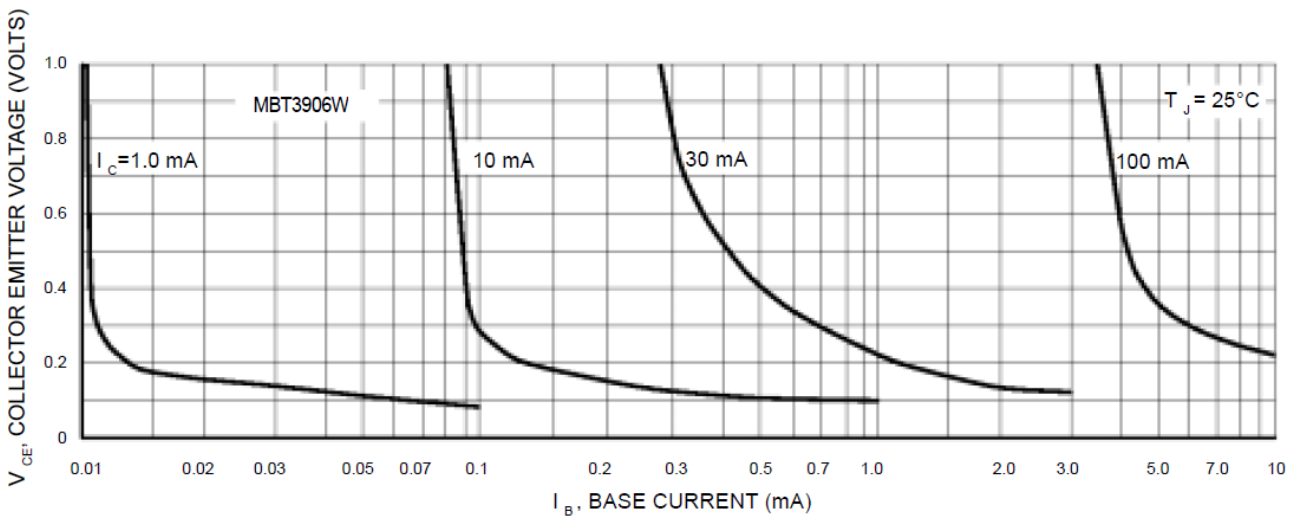


Figure 15. "ON" Voltages

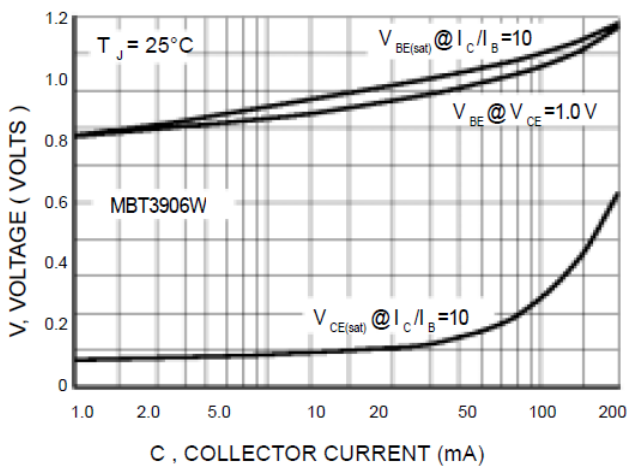
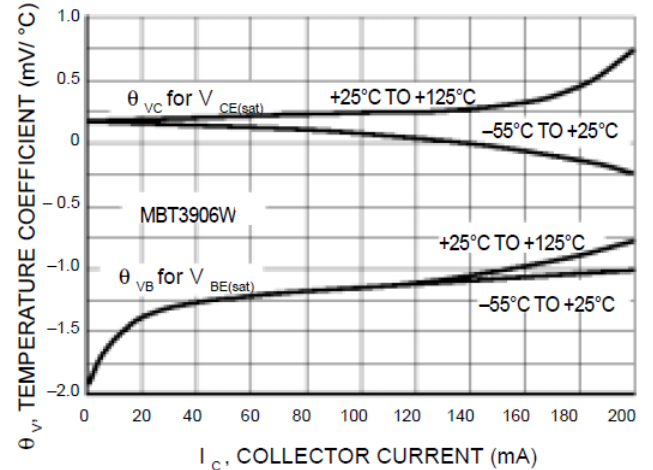


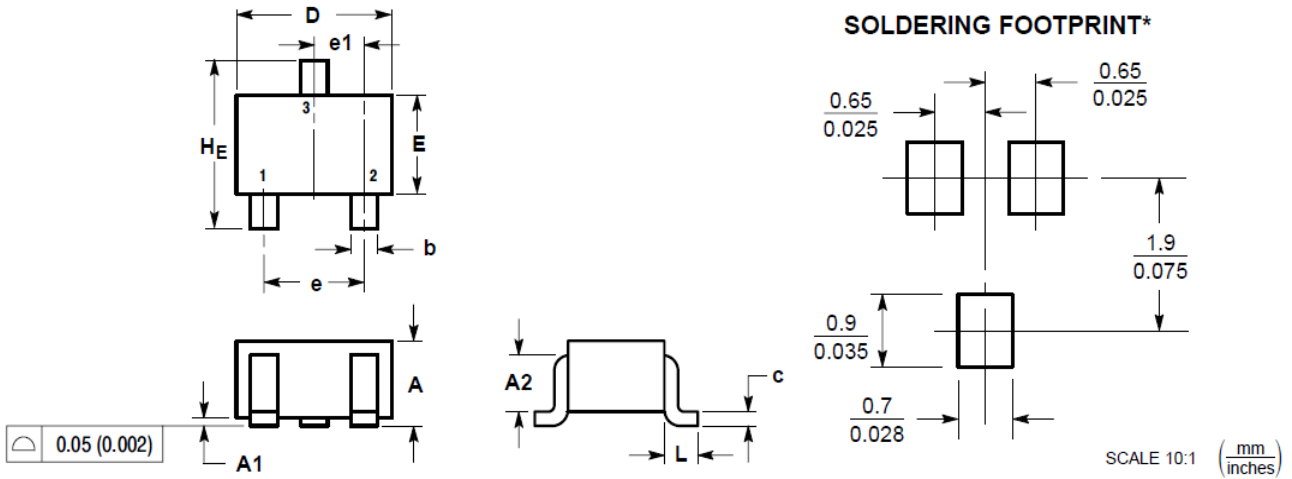
Figure 16. Temperature Coefficients





PACKAGE INFORMATION

Dimension in SC-70 Package (Unit: mm)



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.00	0.032	0.040
A1	0.00	0.10	0.000	0.004
A2	0.7 REF		0.028 REF	
b	0.30	0.40	0.012	0.016
c	0.10	0.25	0.004	0.010
D	1.80	2.20	0.071	0.087
E	1.15	1.35	0.045	0.053
e	1.20	1.40	0.047	0.055
e1	0.65 BSC		0.026 BSC	
L	0.425 REF		0.017 REF	
HE	2.00	2.40	0.079	0.095



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