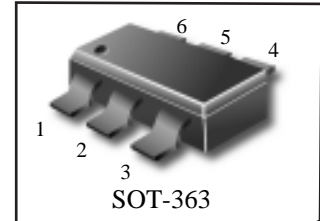
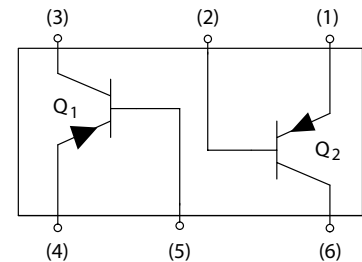


Dual General Purpose PNP Transistor

The FFB3906D device is spin-off of our popular SOT-23/SOT-323 three-lead device. It is designed for general purpose amplifier applications and is housed in the SOT-363 six-lead surface mount package. By putting two discrete devices in one package, this device is ideal for low-power surface mount applications where board space is at a premium.



- h_{FE} , 100–300
- Low $V_{CE(sat)}$, ≤ 0.4 V
- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Available in 8 mm, 7-inch/3,000 Unit Tape and Reel



Features

- We declare that the material of product compliance with RoHS requirements.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	–40	Vdc
Collector–Base Voltage	V_{CBO}	–40	Vdc
Emitter–Base Voltage	V_{EBO}	–5.0	Vdc
Collector Current – Continuous	I_C	–200	mAdc
Electrostatic Discharge	ESD	HBM>16000, MM>2000	V

ORDERING INFORMATION

Device	Marking	Shipping
FFB3906D	A2 or K3N	3000 Units/Reel

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Package Dissipation (1) $T_A = 25^\circ\text{C}$	P_D	150	mW
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

1. Device mounted on FR4 glass epoxy printed circuit board using the minimum recommended footprint.

**ELECTRICAL CHARACTERISTICS (Ta = 25° C unless otherwise noted)**

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (2)	$V_{(BR)CEO}$	-40	-	Vdc
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	-40	-	Vdc
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	-5.0	-	Vdc
Base Cutoff Current	I_{BL}	-	-50	nAdc
Collector Cutoff Current	I_{CEX}	-	-50	nAdc

ON CHARACTERISTICS (2)

DC Current Gain ($I_C = -0.1$ mAdc, $V_{CE} = -1.0$ Vdc) ($I_C = -1.0$ mAdc, $V_{CE} = -1.0$ Vdc) ($I_C = -10$ mAdc, $V_{CE} = -1.0$ Vdc) ($I_C = -50$ mAdc, $V_{CE} = -1.0$ Vdc) ($I_C = -100$ mAdc, $V_{CE} = -1.0$ Vdc)	h_{FE}	60 80 100 60 30	- - 300 - -	-
Collector–Emitter Saturation Voltage ($I_C = -10$ mAdc, $I_B = -1.0$ mAdc) ($I_C = -50$ mAdc, $I_B = -5.0$ mAdc)	$V_{CE(sat)}$	- -	-0.25 -0.4	Vdc
Base–Emitter Saturation Voltage ($I_C = -10$ mAdc, $I_B = -1.0$ mAdc) ($I_C = -50$ mAdc, $I_B = -5.0$ mAdc)	$V_{BE(sat)}$	-0.65 -	-0.85 -0.95	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product	f_T	250	-	MHz
Output Capacitance	C_{obo}	-	4.5	pF
Input Capacitance	C_{ibo}	-	10.0	pF

2. Pulse Test: Pulse Width ≤ 300 μ s; Duty Cycle $\leq 2.0\%$.

ELECTRICAL CHARACTERISTICS (Ta=25° C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
Input Impedance ($V_{CE} = -10$ Vdc, $I_C = -1.0$ mAdc, $f = 1.0$ kHz)	h_{ie}	2.0	12	k Ω
Voltage Feedback Ratio ($V_{CE} = -10$ Vdc, $I_C = -1.0$ mAdc, $f = 1.0$ kHz)	h_{re}	0.1	10	$\times 10^{-4}$
Small–Signal Current Gain ($V_{CE} = -10$ Vdc, $I_C = -1.0$ mAdc, $f = 1.0$ kHz)	h_{fe}	100	400	-
Output Admittance ($V_{CE} = -10$ Vdc, $I_C = -1.0$ mAdc, $f = 1.0$ kHz)	h_{oe}	3.0	60	μ mhos
Noise Figure ($V_{CE} = -5.0$ Vdc, $I_C = -100$ Adc, $R_S = 1.0$ k Ω , $f = 1.0$ kHz)	NF	-	4.0	dB

SWITCHING CHARACTERISTICS

Delay Time	($V_{CC} = -3.0$ Vdc, $V_{BE} = 0.5$ Vdc)	t_d	-	35	ns
Rise Time	($I_C = -10$ mAdc, $I_{B1} = -1.0$ mAdc)	t_r	-	35	
Storage Time	($V_{CC} = -3.0$ Vdc, $I_C = -10$ mAdc)	t_s	-	225	ns
Fall Time	($I_{B1} = I_{B2} = -1.0$ mAdc)	t_f	-	75	

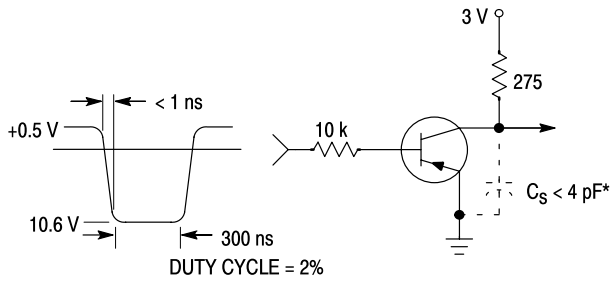


Figure 1. Delay and Rise Time Equivalent Test Circuit

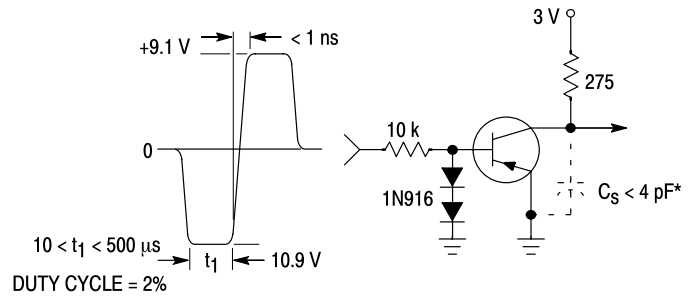


Figure 2. Storage and Fall Time Equivalent Test Circuit

* Total shunt capacitance of test jig and connectors

TYPICAL TRANSIENT CHARACTERISTICS

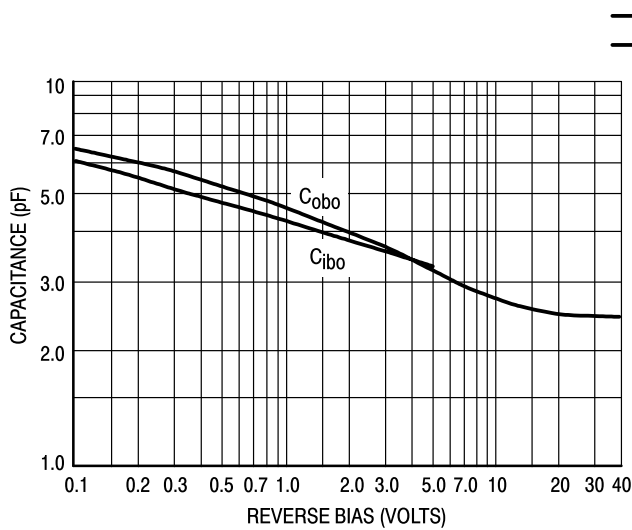


Figure 3. Capacitance

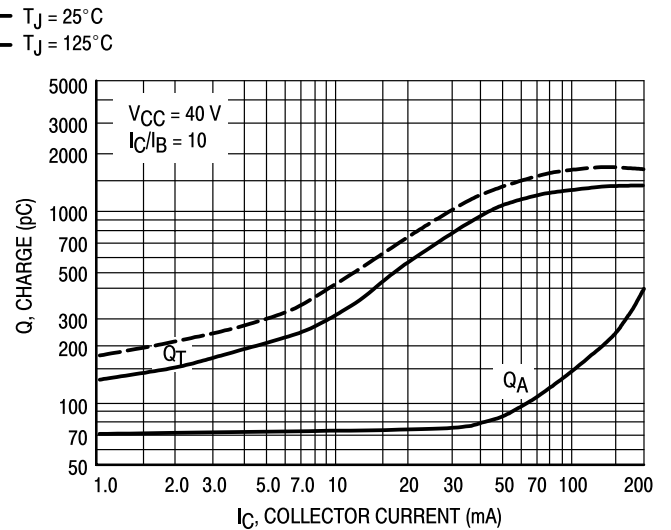


Figure 4. Charge Data

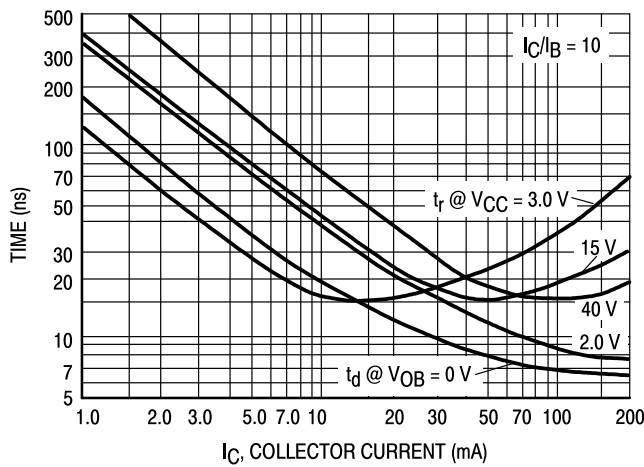


Figure 5. Turn-On Time

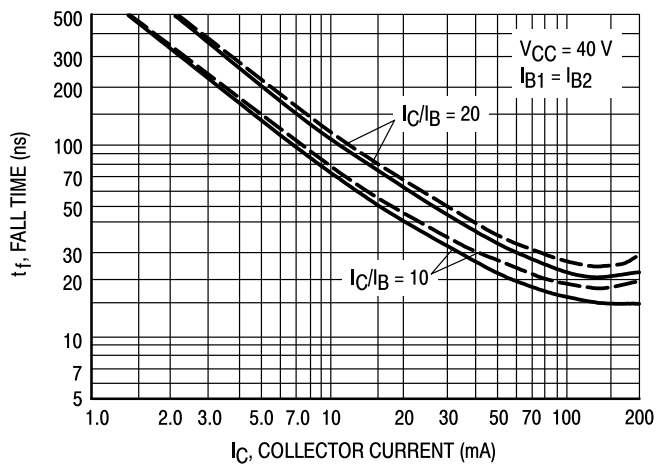


Figure 6. Fall Time

TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS NOISE FIGURE VARIATIONS

(VCE = -5.0 Vdc, TA = 25°C, Bandwidth = 1.0 Hz)

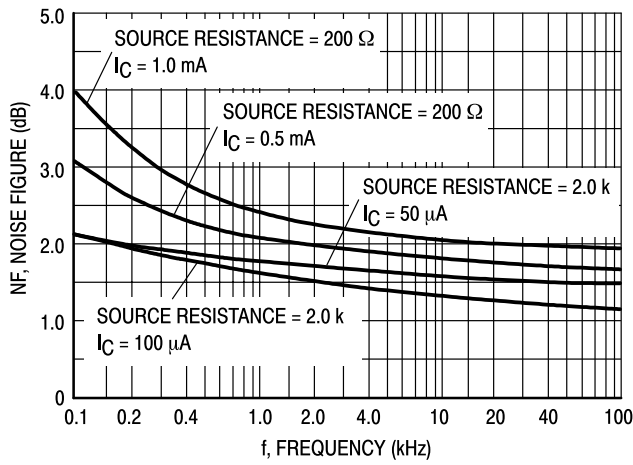


Figure 7.

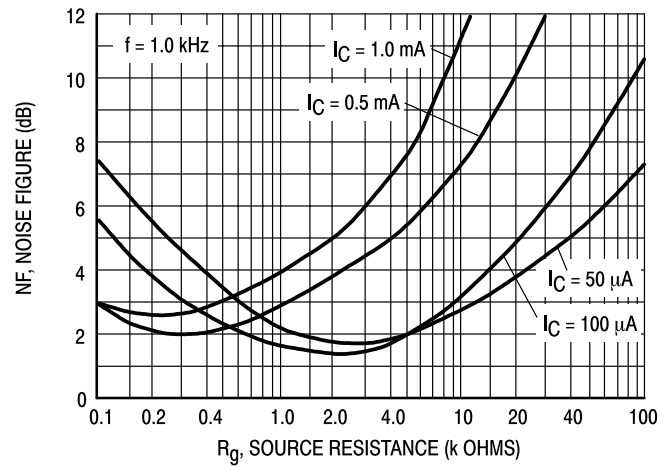


Figure 8.

h PARAMETERS

(VCE = -10 Vdc, f = 1.0 kHz, TA = 25°C)

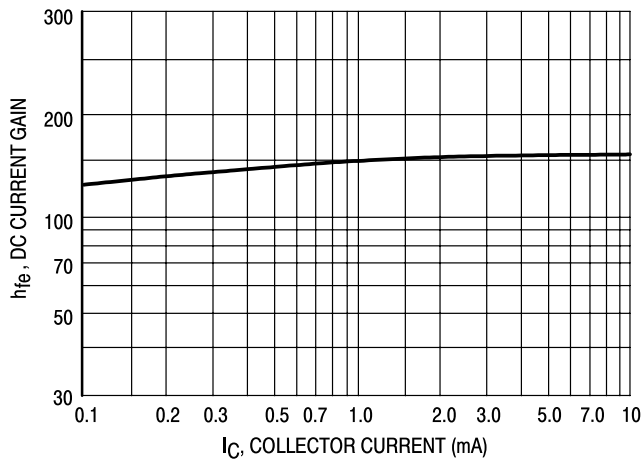


Figure 9. Current Gain

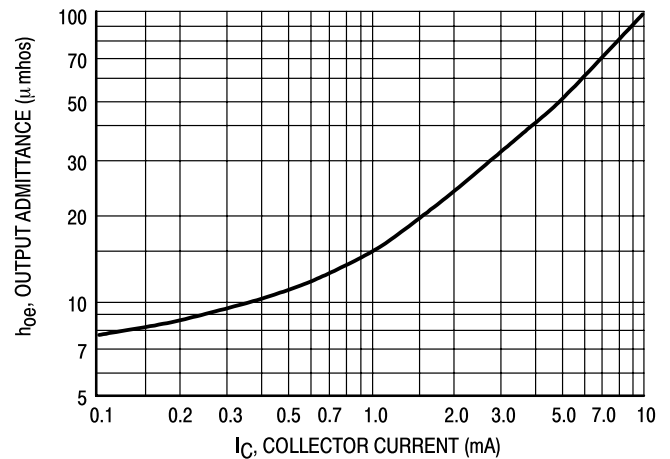


Figure 10. Output Admittance

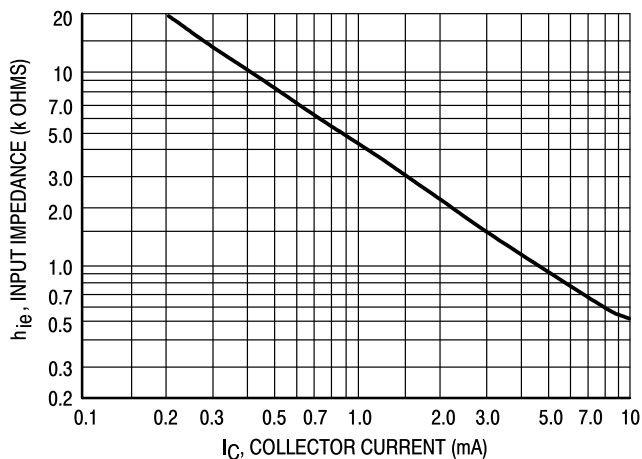


Figure 11. Input Impedance

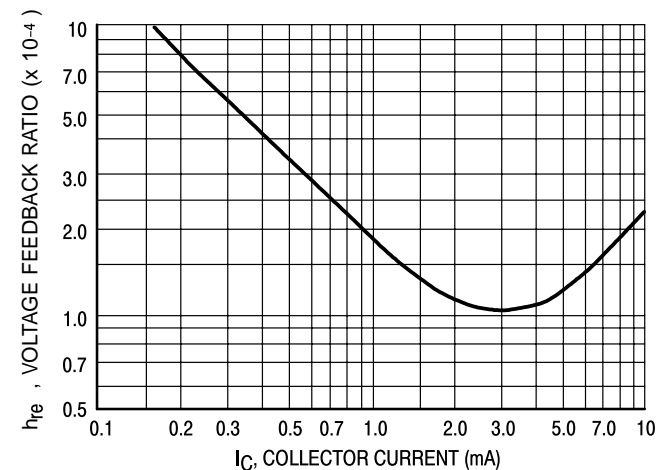


Figure 12. Voltage Feedback Ratio

TYPICAL STATIC CHARACTERISTICS

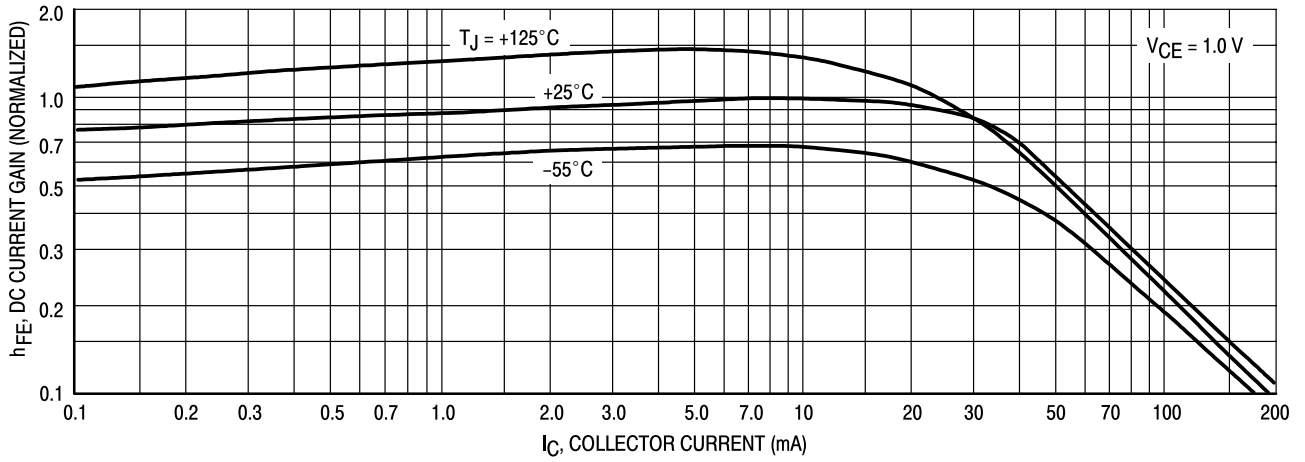


Figure 13. DC Current Gain

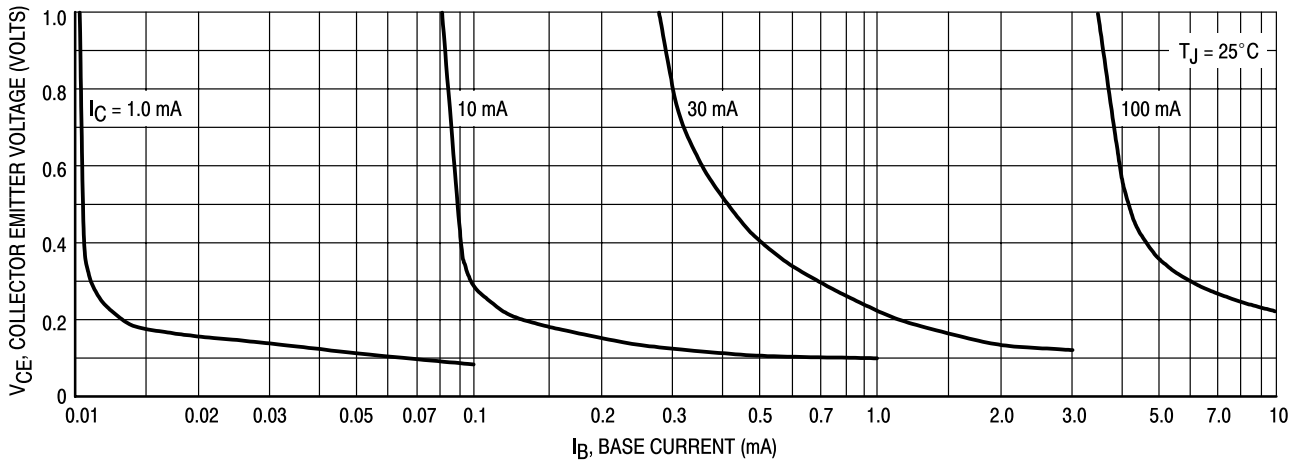


Figure 14. Collector Saturation Region

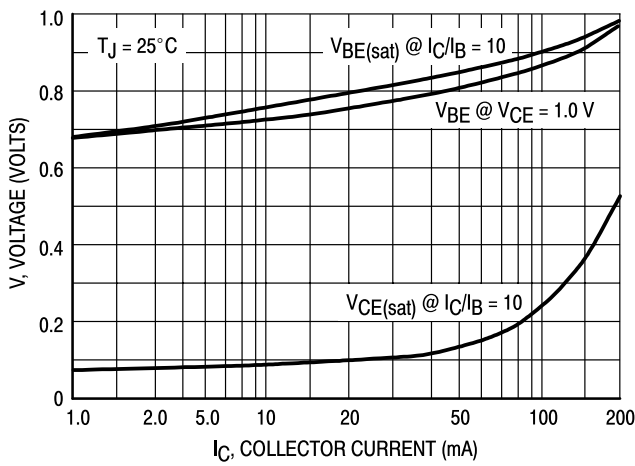


Figure 15. "ON" Voltages

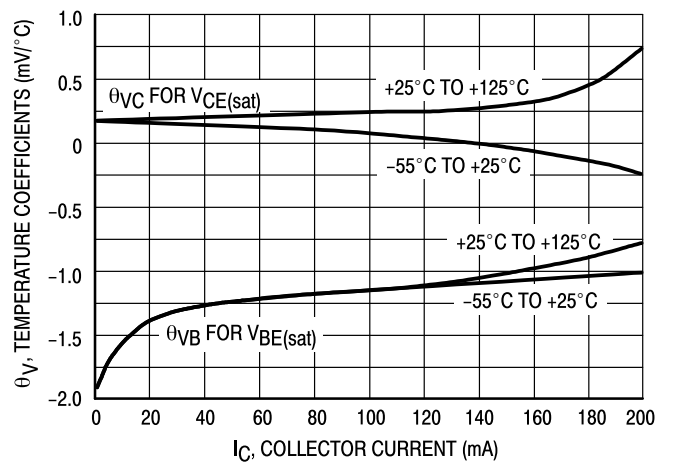
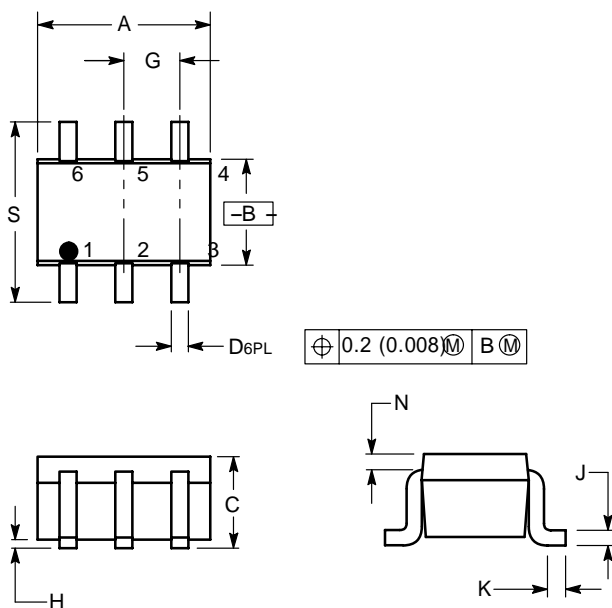


Figure 16. Temperature Coefficients

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NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

- PIN 1. EMITTER 2
 2. BASE 2
 3. COLLECTOR 1
 4. EMITTER 1
 5. BASE 1
 6. COLLECTOR 2

