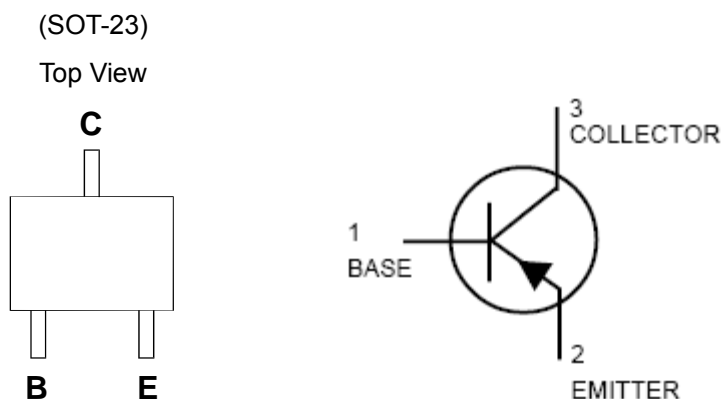


General Purpose Transistor (PNP)

FEATURES

- PNP silicon epitaxial planar transistor for switching and amplifier applications.
- As complementary type, the NPN transistor METR3904 is recommended.

PIN CONFIGURATION



Maximum Ratings & Thermal Characteristics

Parameter	Symbol	Limit	Unit
Collector-Emitter Voltage	V_{CEO}	-40	V
Collector-Base Voltage	V_{CBO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current-Continuous	I_C	-200	mA
Total Device Dissipation FR-5 Board, (1) $T_A=25^\circ\text{C}$	P_D	225	mW
Derate above 25°C		1.8	mW/ $^\circ\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (2) $T_A=25^\circ\text{C}$	P_D	300	mW
Derate above 25°C		2.4	mW/ $^\circ\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to 150	$^\circ\text{C}$

Note :

- (1) FR-5 = 1.0 x 0.75 x 0.062 in.
- (2) Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

General Purpose Transistor (PNP)

Electrical Characteristics (TA=25°C Unless Otherwise Specified)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
OFF CHARACTERISTICS(2)						
V _{(BR)CEO}	Collector-Emitter Breakdown Voltage(3)	I _C = -1.0mA, I _B = 0	-40	-	-	V
V _{(BR)CBO}	Collector-Base Breakdown Voltage	I _C = -10μA, I _E = 0	-40	-	-	V
V _{(BR)EBO}	Emitter-Base Breakdown Voltage	I _E = -10μA, I _C = 0	-5.0	-	-	V
I _{BL}	Base Cutoff Current	V _{CE} = -30V, V _{EB} = -3.0V	-	-	-50	nA
I _C EX	Collector Cutoff Current	V _{CE} = -30V, V _{EB} = -3.0V	-	-	-50	nA
ON CHARACTERISTICS(3)						
h _{FE}	DC Current Gain	I _C = -0.1mA, V _{CE} = -1.0V	60	-	-	-
		I _C = -1.0mA, V _{CE} = -1.0V	80	-	-	
		I _C = -10mA, V _{CE} = -1.0V	100	-	300	
		I _C = -50mA, V _{CE} = -1.0V	60	-	-	
		I _C = -100mA, V _{CE} = -1.0V	30	-	-	
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = -10mA, I _B = -1.0mA	-	-	-0.25	V
		I _C = -50mA, I _B = -5.0mA	-	-	-0.4	
V _{BE(sat)}	Base-Emitter Saturation Voltage	I _C = -10mA, I _B = -1.0mA	-0.65	-	-0.85	V
		I _C = -50mA, I _B = -5.0mA	-	-	-0.95	
SMALL-SIGNAL CHARACTERISTICS						
f _T	Current-Gain-Bandwidth Product	I _C = -10mA, V _{CE} = -20V, f=100MHz	250	-	-	MHz
C _{obo}	Output Capacitance	V _{CB} = -5.0V, I _E =0, f=1.0MHz	-	-	4.5	pF
C _{ibo}	Input Capacitance	V _{EB} = -0.5V, I _C =0, f=1.0MHz	-	-	10	pF
h _{ie}	Input Impedance	V _{CE} = -10V, I _C = -1.0mA, f=1.0KHz	2.0	-	12	kΩ
h _{re}	Voltage Feedback Ratio	V _{CE} = -10V, I _C = -1.0mA, f=1.0KHz	0.1	-	10	X10 ⁻⁴
h _{fe}	Small-Signal Current Gain	V _{CE} = -10V, I _C = -1.0mA, f=1.0KHz	100	-	400	-
h _{oe}	Output Admittance	V _{CE} = -10V, I _C = -1.0mA, f=1.0KHz	3.0	-	60	μmhos
NF	Noise Figure	V _{CE} = -5.0V, I _C = -100μA, R _s =1.0 kΩ, f=1.0KHz	-	-	4.0	dB
SWITCHING CHARACTERISTICS						
t _d	Delay Time	V _{CC} = -3.0V, V _{BE} =0.5V,	-	-	35	ns
t _r	Rise Time	I _C = -10mA, I _{B1} = -1.0mA	-	-	35	
t _s	Storage Time	V _{CC} = -3.0V,	-	-	225	ns
t _f	Fall Time	I _C = -10mA, I _{B1} = I _{B2} = -1.0mA	-	-	75	

Note :

(3) Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

Typical Characteristics (T_J = 25°C Noted)

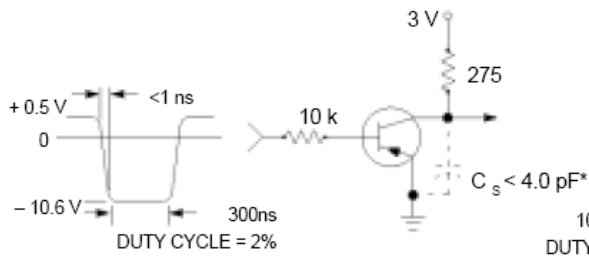


Figure 1. Delay and Rise Time
Equivalent Test Circuit

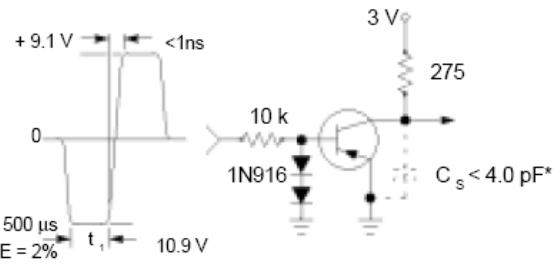


Figure 2. Storage and Fall Time
Equivalent Test Circuit

*Total shunt capacitance of test jig and connectors

Figure 3. Capacitance

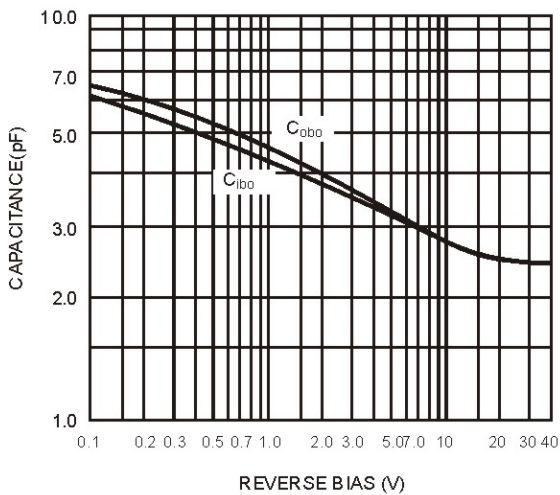


Figure 4. Charge Date

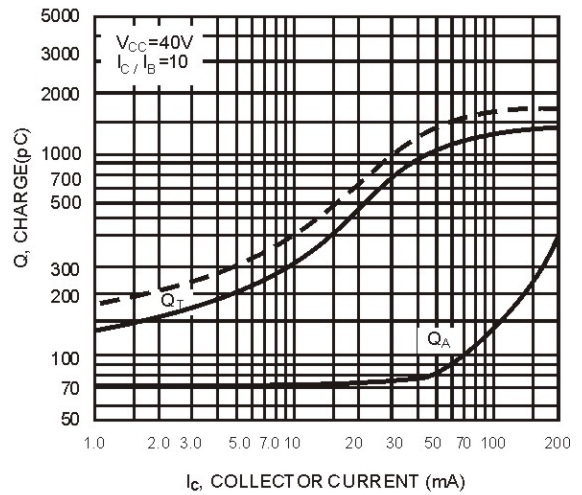


Figure 5. Turn-On Time

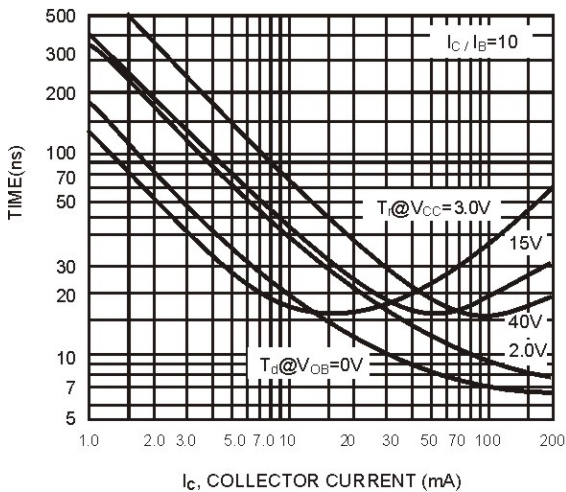
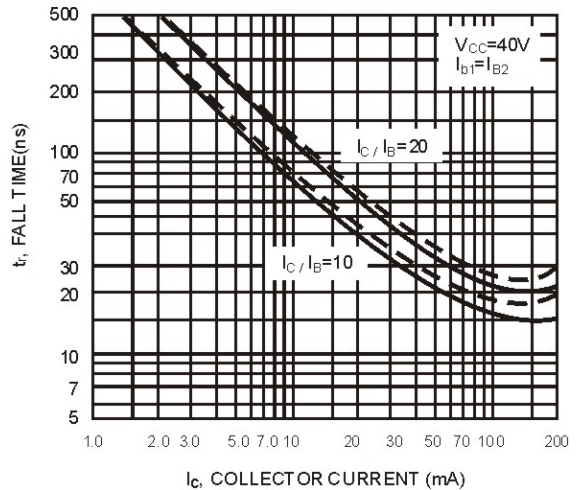


Figure 6. Fall Time



TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS NOISE FIGURE VARIATIONS

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

Figure 7. Noise Figure

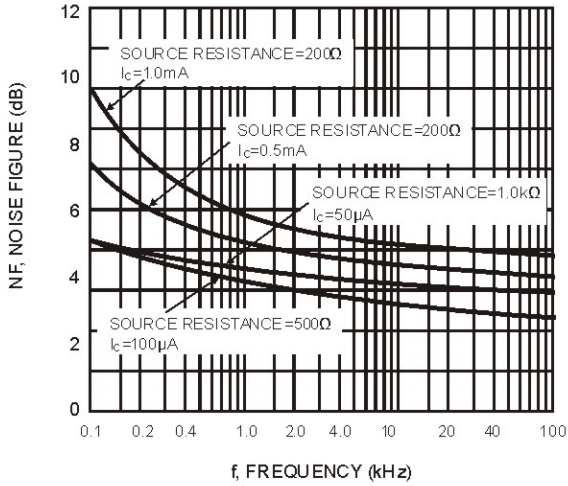
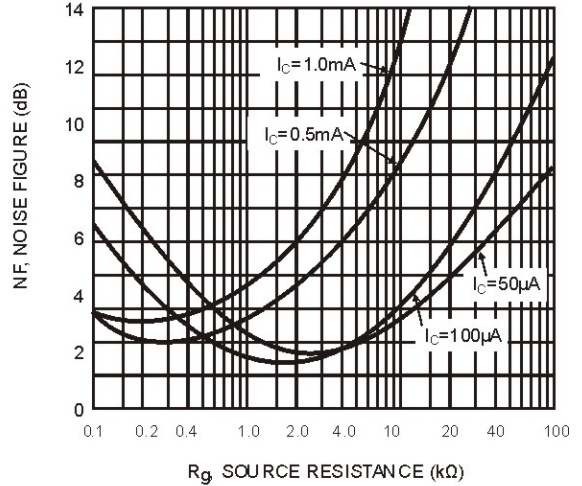


Figure 8. Noise Figure



h PARAMETERS

($V_{CE}=10$ Vdc, $f = 1.0$ kHz, $T_A=25^\circ\text{C}$)

Figure 9. Current Gain

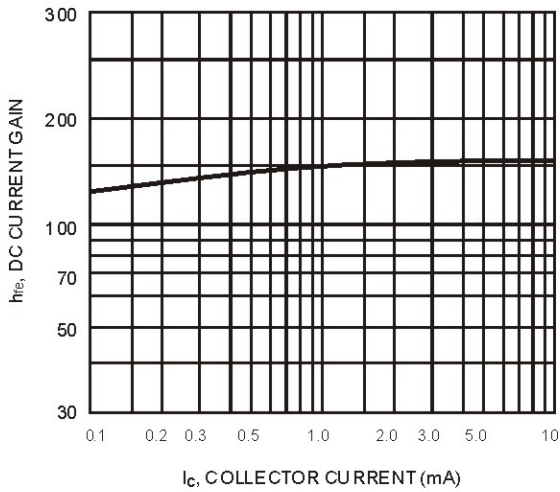


Figure 10. Output Admittance

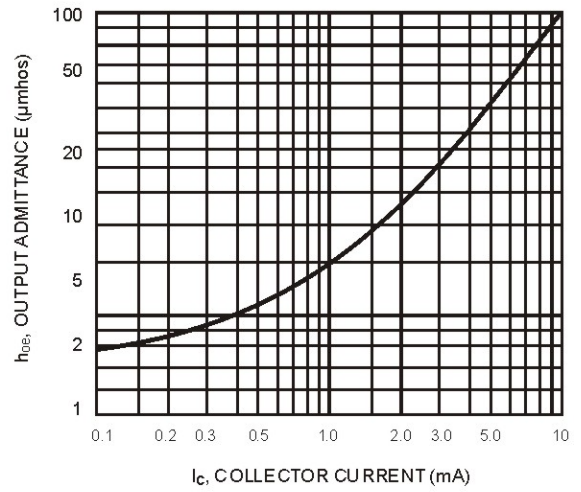


Figure 11. Input Impedance

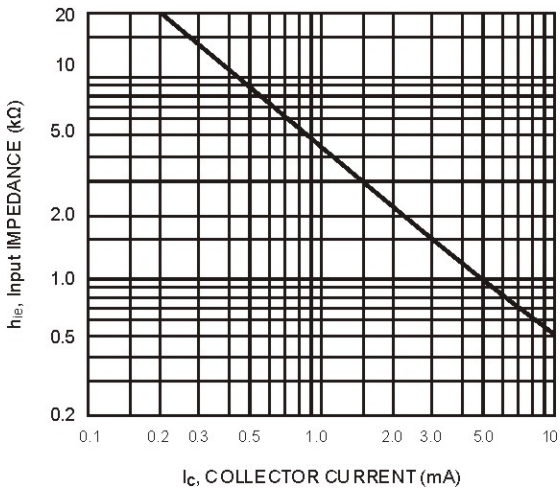


Figure 12. Voltage Feedback Ratio

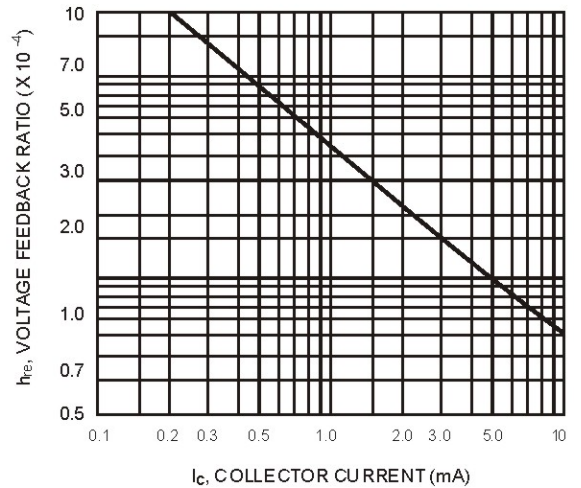


Figure 13. DC Current Gain

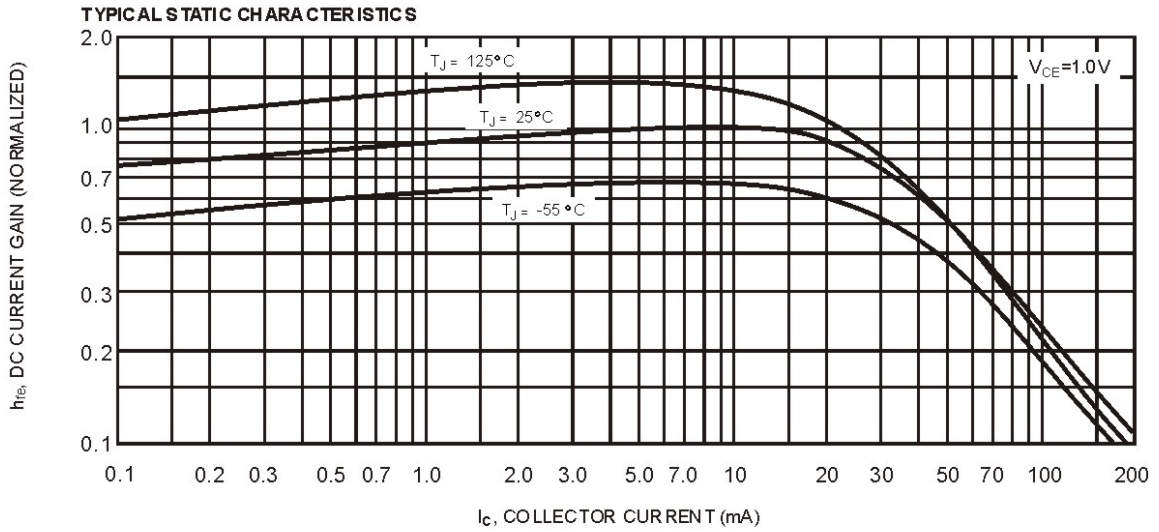


Figure 14. Collector Saturation Region

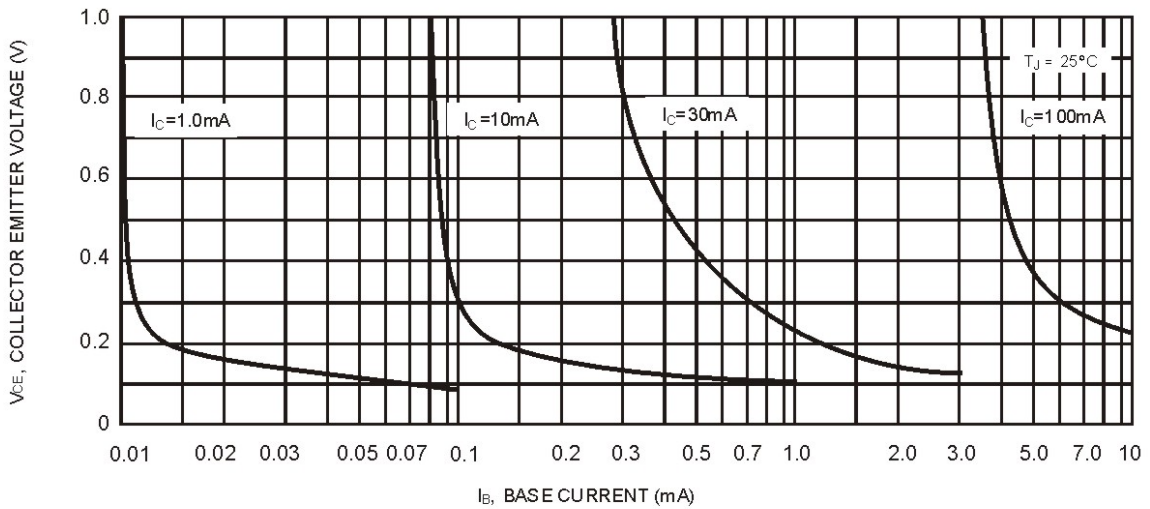


Figure 15. "On" Voltages

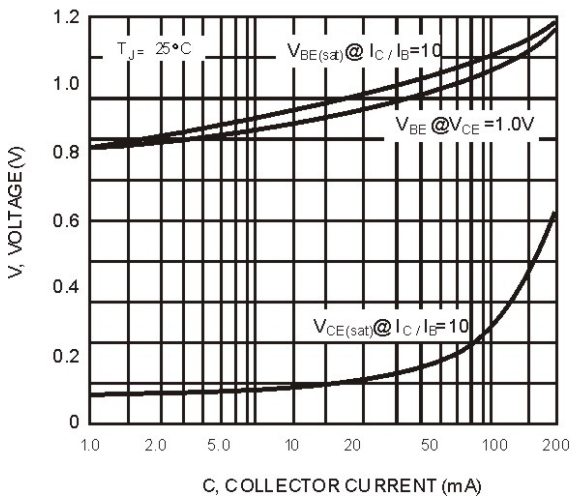
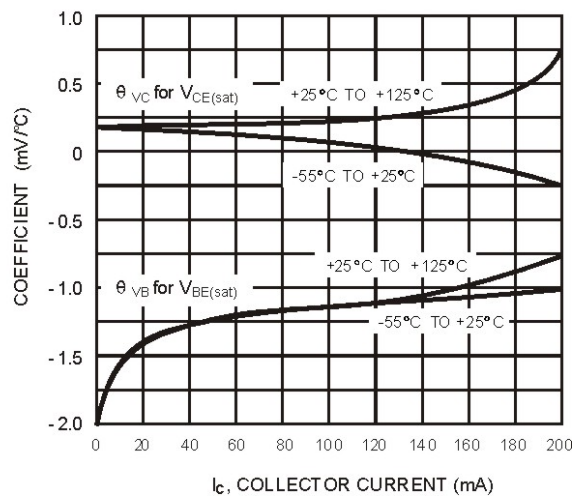


Figure 16. Temperature Coefficients

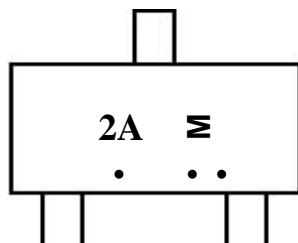


General Purpose Transistor (PNP)

Device name:METR3906

Package:SOT-23

Marking Code:



2A: Device Marking Code

M: Date Code

MONTH CODE

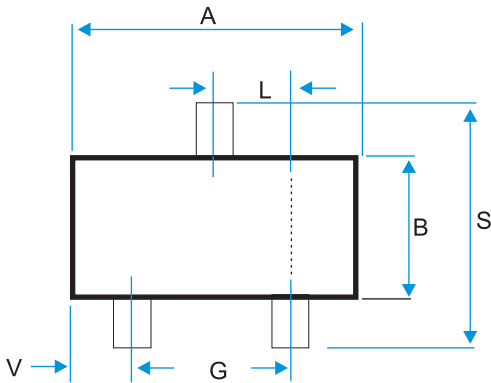
ODD YEARS(2007,2009)

Jan	1
Feb	2
Mar	3
Apr	4
May	5
Jun	6
Jul	7
Aug	8
Sep	9
Oct	T
Nov	V
Dec	C

EVEN YEARS(2006,2008)

Jan	E
Feb	F
Mar	H
Apr	J
May	K
Jun	L
Jul	N
Aug	P
Sep	U
Oct	X
Nov	Y
Dec	Z

SOT-23 Package Outline



DIM	MILLIMETERS	
	MIN	MAX
A	2.80	3.1
B	1.20	1.7
C	0.89	1.3
D	0.37	0.50
G	1.78	2.04
H	0.013	0.15
J	0.085	0.2
K	0.35	0.7
L	0.89	1.02
S	2.10	3.0
V	0.45	0.60

