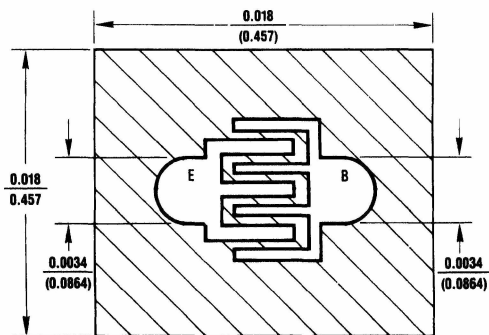




TL/G/10034-47

DESCRIPTION

Process 23 is an overlay, double-diffused, gold doped, silicon epitaxial device. Complement to Process 66.

APPLICATION

This device is designed as a general purpose amplifier and switch. The useful dynamic range extends to 100 mA as a switch and to 100 MHz as an amplifier.

PRINCIPAL DEVICE TYPES

TO-92 EBC: 2N3904, 2N4124

TO-236: MMBT3904, MMBT4124

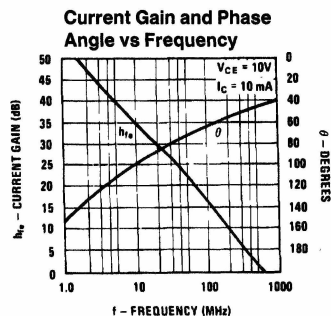
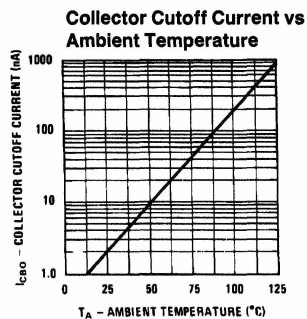
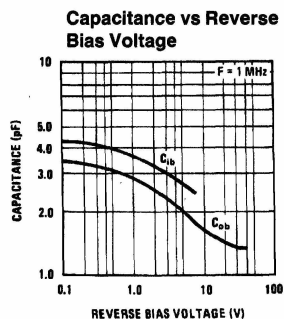
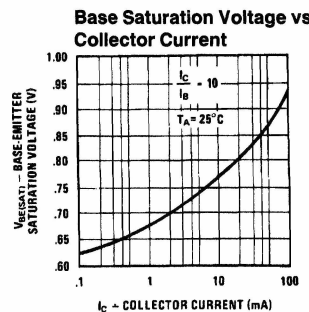
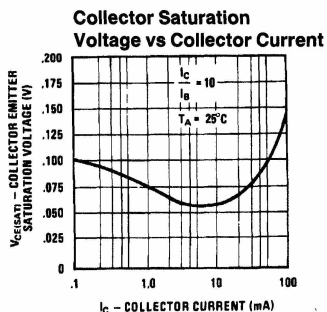
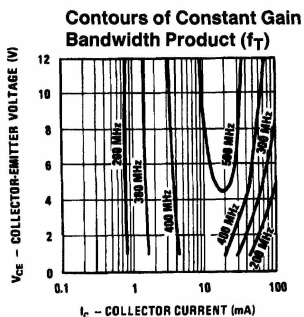
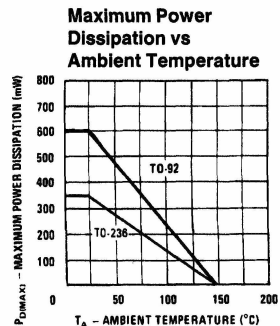
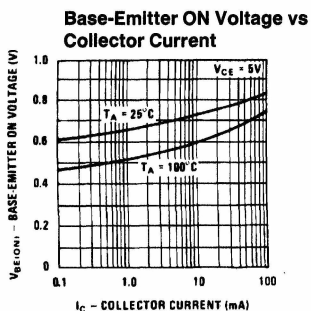
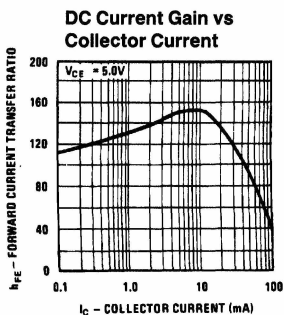
TO-116: MPQ3904

16-SOIC: MMPQ3904

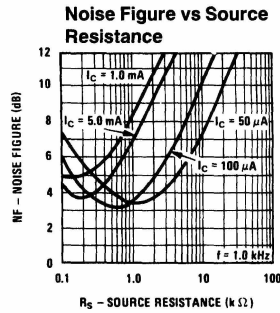
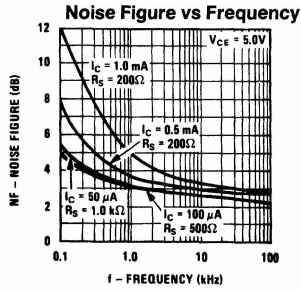
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Symbol	Conditions	Min	Typ	Max	Units
t_{ON}	$I_C = 10\text{ mA}$, $I_{B1} = 1\text{ mA}$ (Figure 1)		30	70	ns
t_{OFF}	$I_C = 10\text{ mA}$, $I_{B2} = 1\text{ mA}$ (Figure 2)		150	250	ns
C_{ob}	$V_{CB} = 5\text{ V}$, $f = 1\text{ MHz}$		2.7	4.0	pF
C_{ib}	$V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$			8.0	pF
NF	$V_{CE} = 5\text{ V}$, $I_C = 100\text{ }\mu\text{A}$, $R_S = 1\text{ k}\Omega$, $P_{BW} = 15.7\text{ kHz}$		2.0		dB
h_{fe}	$I_C = 10\text{ mA}$, $V_{CE} = 20\text{ V}$, $f = 100\text{ MHz}$	2.5	4.5		
h_{FE}	$I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ $I_C = 1\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 50\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 100\text{ mA}$, $V_{CE} = 5\text{ V}$	40 90 60 40 20	150	360	
$V_{CE(SAT)}$	$I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$			0.15	V
$V_{BE(SAT)}$	$I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$			0.80	V
$V_{CE(SAT)}$	$I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$			0.25	V
$V_{BE(SAT)}$	$I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$			0.85	V
BV_{CBO}	$I_C = 10\text{ }\mu\text{A}$	60			V
BV_{CEO}	$I_C = 1\text{ mA}$	30			V
BV_{EBO}	$I_E = 10\text{ }\mu\text{A}$	6.0			V
I_{CBO}	$V_{CB} = 30\text{ V}$			100	nA
I_{EBO}	$V_{EB} = 4\text{ V}$			100	nA

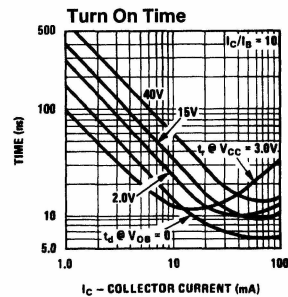
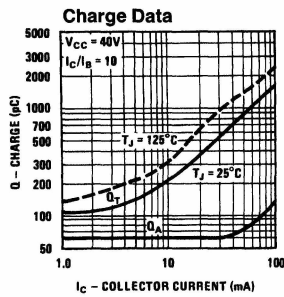
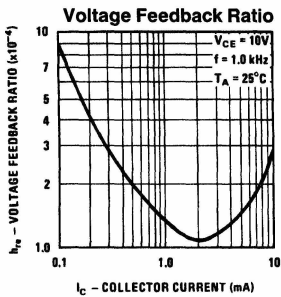
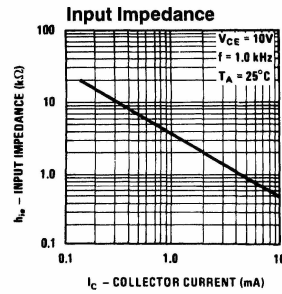
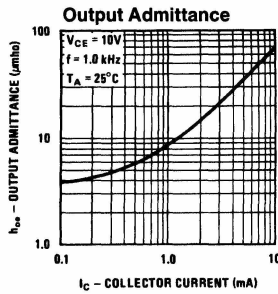
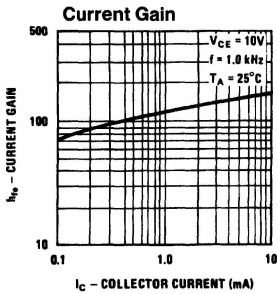
Symbol	Conditions	Min	Typ	Max	Units
$P_{D(max)}$					
TO-92	$T_A = 25^\circ\text{C}$	600			mW
TO-116	$T_A = 25^\circ\text{C}$				
	(Total)	900			mW
	(Each Transistor)	500			mW
TO-236	$T_C = 25^\circ\text{C}$	350			mW
$T_{j(max)}$	All Plastic Parts	150			$^\circ\text{C}$



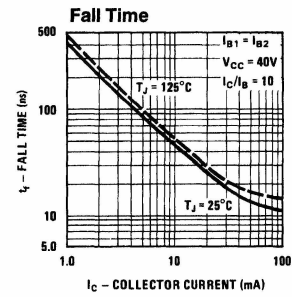
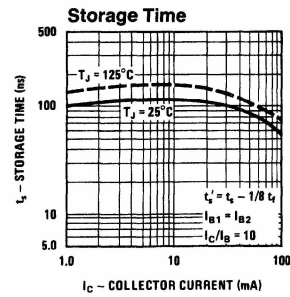
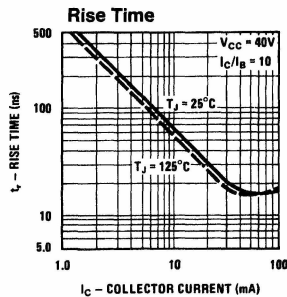
TL/G/10034-48



TL/G/10034-49



TL/G/10034-50



TL/G/10034-51

TRANSIENT CHARACTERISTICS

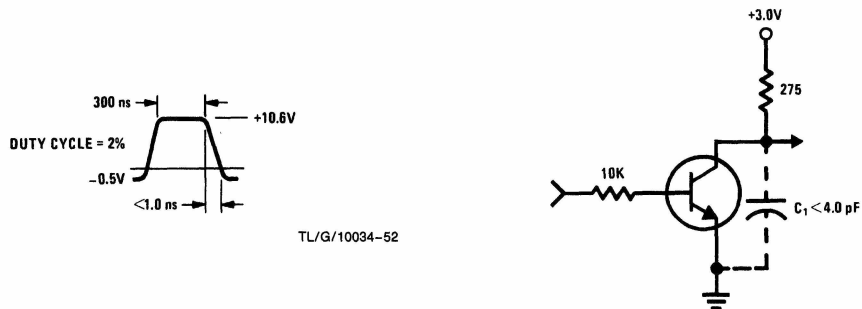


FIGURE 1. Delay and Rise Time Equivalent Test Circuit

TL/G/10034-53

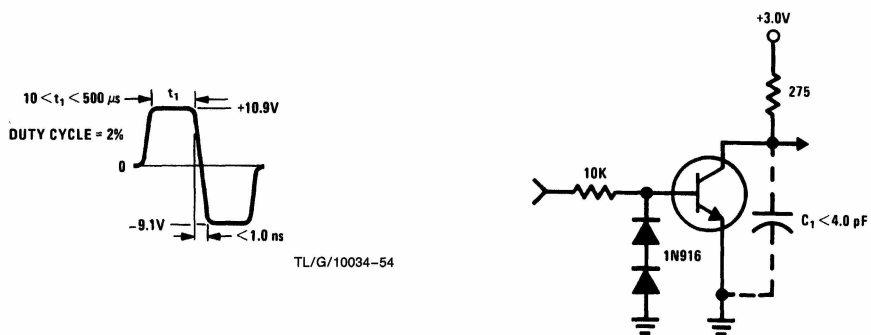


FIGURE 2. Storage and Fall Time Equivalent Test Circuit

TL/G/10034-55