2N4260
2N4261

2N4261 JAN, JTX AVAILABLE
CASE 20, STYLE 10
TO-72

SWITCHING TRANSISTOR

PNP SILICON

4

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	15	Vdc
Collector-Base Voltage	V_{CBO}	15	Vdc
Emitter-Base Voltage	V_{EBO}	4.5	Vdc
Collector Current — Continuous	I_C	30	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	200 1.14	mW mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200	°C

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_E = 0)		$V_{(BR)CEO}$	15	—	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)		$V_{(BR)CBO}$	15	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		$V_{(BR)EBO}$	4.5	—	Vdc
Collector Cutoff Current (V_{CE} = 10 Vdc, $V_{BE(off)}$ = 2.0 Vdc) (V_{CE} = 10 Vdc, $V_{BE(off)}$ = 2.0 Vdc, T_A = 150°C) (V_{CE} = 10 Vdc, $V_{EB(on)}$ = 0.4 Vdc)		I_{CEX}	— — —	0.005 5.0 0.05	μAdc
Base Cutoff Current (V_{CE} = 10 Vdc, $V_{BE(off)}$ = 2.0 Vdc)		I_{BL}	—	0.005	μAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 1.0 mAdc, V_{CE} = 1.0 Vdc) (I_C = 10 mAdc, V_{CE} = 1.0 Vdc) (I_C = 30 mAdc, V_{CE} = 2.0 Vdc)		h_{FE}	25 30 20	— 150 —	—
Collector-Emitter Saturation Voltage (I_C = 1.0 mAdc, I_B = 0.1 mAdc) (I_C = 10 mAdc, I_B = 1.0 mAdc)		$V_{CE(sat)}$	— —	0.15 0.35	Vdc
Base-Emitter On Voltage (I_C = 1.0 mAdc, V_{CE} = 1.0 Vdc) (I_C = 10 mAdc, V_{CE} = 1.0 Vdc)		$V_{BE(on)}$	— —	0.8 1.0	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 5.0 mAdc, V_{CE} = 4.0 Vdc, f = 100 MHz) (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	2N4260 2N4261 2N4260 2N4261	f_T	1200 1500 1600 2000	— — — —	MHz
Output Capacitance (V_{CB} = 4.0 Vdc, I_E = 0, f = 100 kHz)		C_{obo}	—	2.5	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 100 kHz)		C_{ibo}	—	2.5	pF
Current Gain — High Frequency (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	2N4260 2N4261	$\|h_{fe}\|$	16 20	— —	—

ELECTRICAL CHARACTERISTICS (continued) (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
Collector Base Time Constant		$rb'C_c$			ps
(I_C = 5.0 mAdc, V_{CE} = 4.0 Vdc, f = 31.8 MHz)	2N4260		—	35	
	2N4261		—	60	
(I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 31.8 MHz)	2N4260		—	30	
	2N4261		—	50	

SWITCHING CHARACTERISTICS		Typical Performance (v_{out} = 1.0 V) @ 10 mA	@ 30 mA	Unit
Rise Time	t_r	0.5	0.9	ns
Fall Time	t_f	1.0	1.2	ns
Turn-On Time	$t_{on(delay)}$	1.0	1.2	ns
Turn-Off Delay Time	$t_{off(delay)}$	1.0	1.2	ns

4

FIGURE 1 — DC CURRENT GAIN

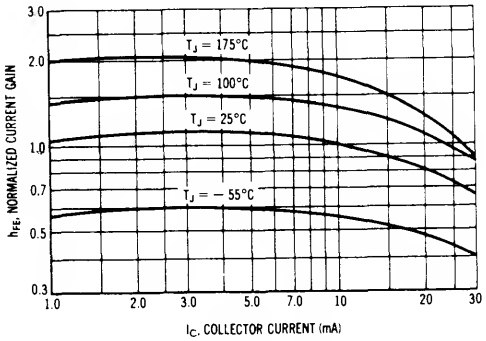
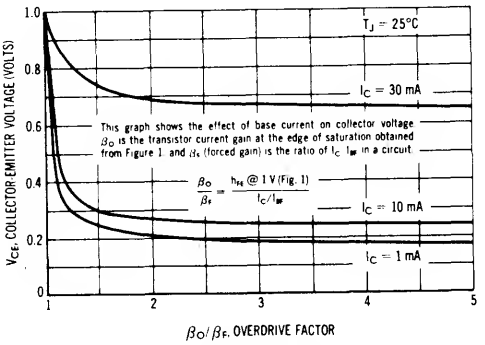


FIGURE 2 — COLLECTOR SATURATION REGION



This graph shows the effect of base current on collector voltage. β_O is the transistor current gain at the edge of saturation obtained from Figure 1 and β_F (forced gain) is the ratio of I_C / I_B in a circuit.

$$\frac{\beta_O}{\beta_F} = \frac{h_{FE} @ 1\ V\ (Fig.\ 1)}{I_C / I_B}$$

FIGURE 3 — "ON" VOLTAGES

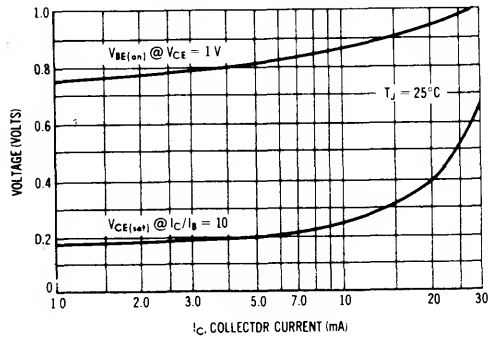
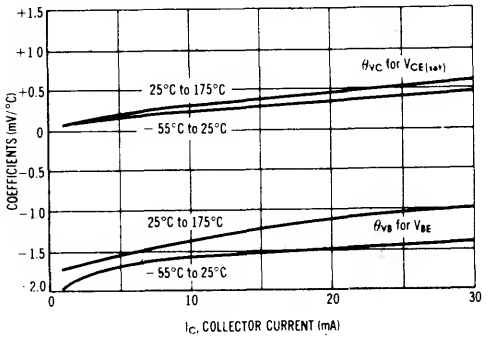


FIGURE 4 — TEMPERATURE COEFFICIENTS



4

FIGURE 5 — CURRENT-GAIN — BANDWIDTH PRODUCT

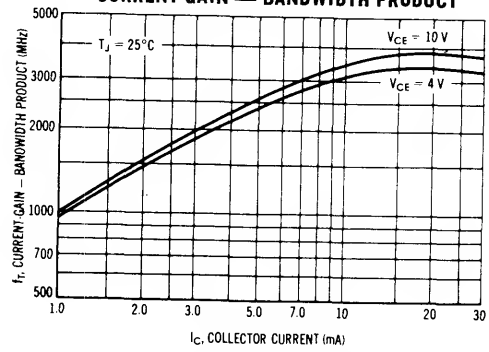


FIGURE 6 — COLLECTOR-BASE TIME CONSTANT

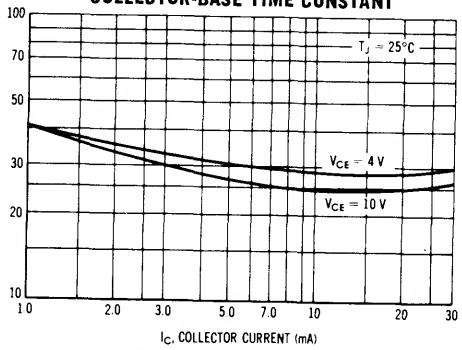


FIGURE 7 — SWITCHING TIMES

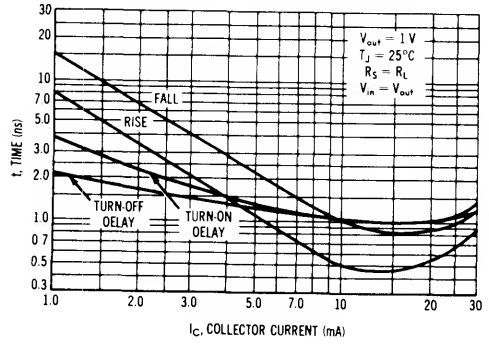
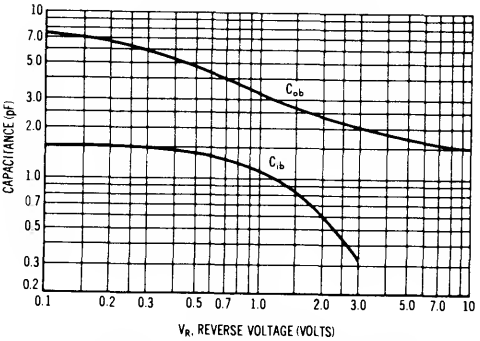


FIGURE 8 — CAPACITANCE



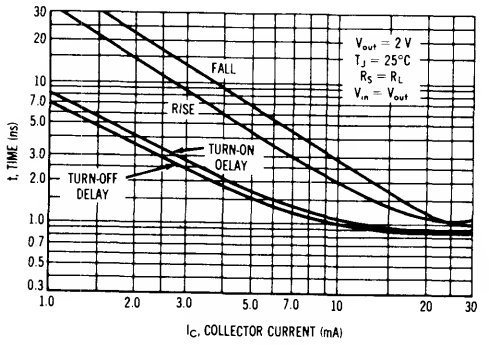
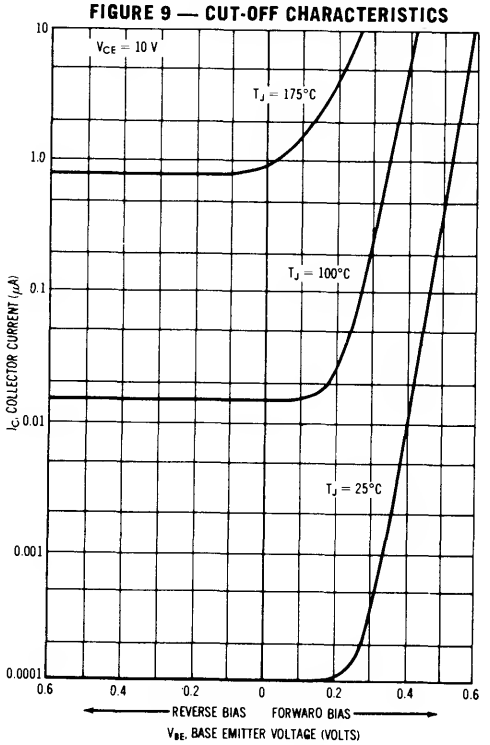
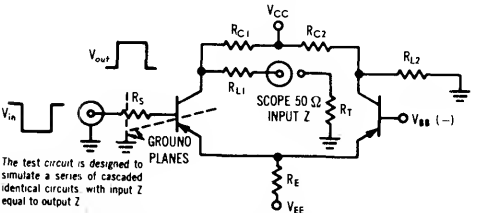


FIGURE 9 — CUT-OFF CHARACTERISTICS





The test circuit is designed to simulate a series of cascaded identical circuits with input Z equal to output Z

	$V_{in} = V_{out} = 2$ V $V_{BB} = 1$ V $R_{C_1} = R_{C_2}$								$V_{in} = V_{out} = 1$ V $V_{BB} = 0.5$ V $R_{C_1} = R_{C_2}$						
I_C mA	R_S ohms	R_C ohms	R_{L_1} ohms	R_{L_2} ohms	R_E ohms	V_{EE} volts	V_{CC} volts		R_S ohms	R_C ohms	R_{L_1} ohms	R_{L_2} ohms	R_E ohms	V_{EE} volts	V_{CC} volts
1	2 k	6 k	3 k	3 k	10 k	10	16		1 k	6 k	1.2 k	1 2 k	24 k	24	32
5	360	3.56 k	400	450	2 k	10	47		175	1 k	200	250	3 k	15	27
10	160	1 k	200	250	3 k	30	26 3		75	300	100	150	3 k	30	17
20	62	300	100	150	1 k	20	16		25	150	25	75	1 k	20	11
30	28	157	66	116	1 k	30	13		8	77	0	50	1 k	30	9