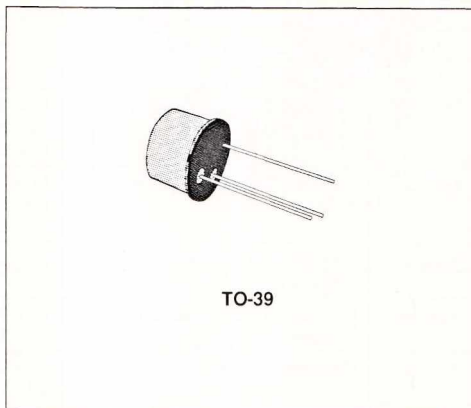


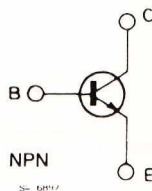
GENERAL PURPOSE AMPLIFIERS AND SWITCHES

DESCRIPTION

The 2N3107, 2N3108, 2N3109 and 2N3110 are silicon planar epitaxial NPN transistors in Jedec TO-39 metal case primarily intended for large signal, low noise industrial applications.



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		2N 3109 2N 3110	2N 3107 2N 3108	
V_{CBO}	Collector-base Voltage ($I_E = 0$)	80	100	V
V_{CEO}	Collector-emitter Voltage ($I_B = 0$)	40	60	V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	7		V
I_C	Collector Current	1		A
P_{Tot}	Total Power Dissipation at $T_{amb} \leq 25^\circ C$ at $T_{case} \leq 25^\circ C$	0.8		W
		5		W
T_{stg}, T_J	Storage and Junction Temperature	- 65 to 200		$^\circ C$

THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	35	$^{\circ}C/W$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	219	$^{\circ}C/W$

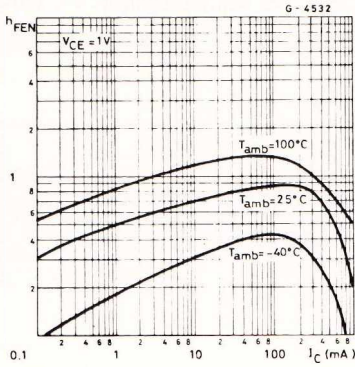
ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	$V_{CB} = 60\ V$ $T_{amb} = 150^{\circ}C$			10	μA
I_{CES}	Collector Cutoff Current ($V_{BE} = 0$)	$V_{CE} = 60\ V$			10	nA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5\ V$			10	nA
$V_{(BR)CBO}$	Collector-base Breakdown Voltage ($I_E = 0$)	$I_C = 100\ \mu A$ For 2N 3109 and 2N 3110 For 2N 3107 and 2N 3108	80 100			V V
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ($I_B = 0$)	$I_C = 30\ mA$ For 2N 3109 and 2N 3110 For 2N 3107 and 2N 3108	40 60			V V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage ($I_C = 0$)	$I_E = 100\ \mu A$	7			V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 150\ mA$ $I_B = 15\ mA$ $I_C = 1\ A$ $I_B = 100\ mA$			0.25 1	V V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 150\ mA$ $I_B = 15\ mA$ $I_C = 1\ A$ $I_B = 100\ mA$			1.1 2	V V
h_{FE}^*	DC Current Gain	For 2N 3107 and 2N 3109 $I_C = 150\ mA$ $V_{CE} = 1\ V$ $I_C = 0.1\ mA$ $V_{CE} = 10\ V$ $I_C = 500\ mA$ $V_{CE} = 10\ V$ For 2N 3108 and 2N 3110 $I_C = 150\ mA$ $V_{CE} = 10\ V$ $T_{amb} = -55^{\circ}C$ $I_C = 150\ mA$ $V_{CE} = 1\ V$ $I_C = 0.1\ mA$ $V_{CE} = 10\ V$ $I_C = 500\ mA$ $V_{CE} = 10\ V$ $I_C = 150\ mA$ $V_{CE} = 10\ V$ $T_{amb} = -55^{\circ}C$	100 35 40 30 40 20 25 15		300 120	
f_T	Transition Frequency	$I_C = 50\ mA$ $V_{CE} = 10\ V$ $f = 20\ MHz$ For 2N 3107 and 2N 3109 For 2N 3108 and 2N 3110	70 60			MHz MHz
C_{EBO}	Emitter-base Capacitance	$I_C = 0$ $V_{EB} = 0.5\ V$ $f = 1\ MHz$			80	pF
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 10\ V$ $f = 1\ MHz$ For 2N 3107 and 2N 3108 For 2N 3109 and 2N 3110			20 25	pF pF
NF	Noise Figure	$I_C = 30\ \mu A$ $V_{CE} = 10\ V$ $f = 1\ kHz$ $R_g = 1\ K\Omega$			8	dB
t_{on}^{**}	Turn-on Time	$I_C = 150\ mA$ $V_{CC} = 20\ V$ $I_{B1} = 7.5\ mA$			200	ns
t_{off}^{**}	Turn-off Time	$I_C = 150\ mA$ $V_{CC} = 20\ V$ $I_{B1} = -I_{B2} = 7.5\ mA$			1000	ns

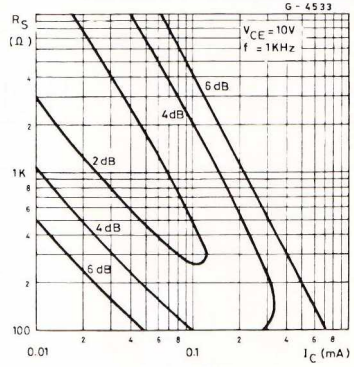
* Pulsed : pulse duration = 300 μs , duty cycle = 1 %.

** See test circuit.

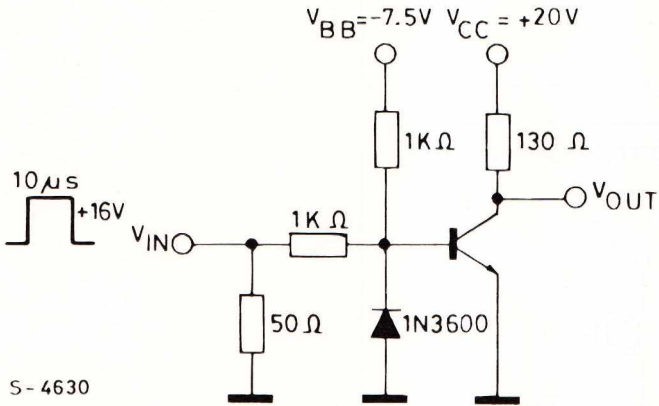
Normalized DC Current Gain.



Contours of Constant Narrow Band Noise Figure.



Test Circuit for t_{on} , t_{off} .



PULSE GENERATOR :
 t_r of input pulse < 15 ns
 t_f of input pulse < 15 ns

TO OSCILLOSCOPE :
 $t_r > 15$ ns
 $Z_N = 100 K\Omega$