

## 2N5138

### PNP LOW LEVEL AMPLIFIER

#### DIFFUSED SILICON PLANAR II TRANSISTOR

- **LOW NOISE FIGURE** . . . . 0.7 dB (TYP) AT  $f = 1$  kHz
- **HIGH CURRENT GAIN** . . .  $h_{FE} = 100$  (TYP) AT  $I_C = 100 \mu A$
- **HIGH BREAKDOWN** . . . .  $V_{CEO} = 30$  V (MIN)
- **EXCELLENT BETA LINEARITY** FROM  $1 \mu A$  TO 50 mA

**ABSOLUTE MAXIMUM RATINGS** (Note 1)

**Maximum Temperatures**

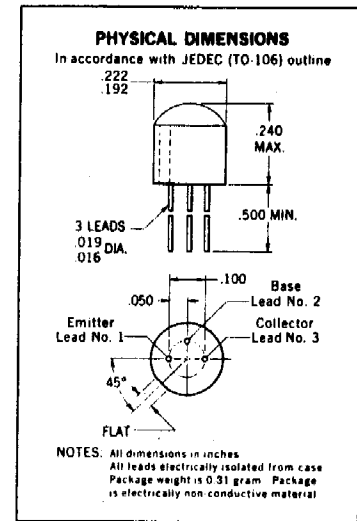
- Storage Temperatures -55° to +125°C
- Operating Junction Temperatures +125°C
- Lead Temperature (Soldering, 10 second time limit) +260°C

**Maximum Power Dissipation** (Notes 2 and 3)

- Total Dissipation at 25°C Case Temperature 0.5 Watt
- at 25°C Ambient Temperature 0.2 Watt

**Maximum Voltages and Current**

- $V_{CBO}$  Collector to Base Voltage -30 Volts
- $V_{CEO}$  Collector to Emitter Voltage -30 Volts
- $V_{EBO}$  Emitter to Base Voltage -5.0 Volts



**ELECTRICAL CHARACTERISTICS** (25°C Free Air Temperature unless otherwise noted)

SYMBOL	CHARACTERISTICS	2N5138			UNITS	TEST CONDITIONS
		MIN.	TYP.	MAX.		
NF	Narrow Band Noise Figure ( $f = 1.0$ kHz) (Note 6)		0.7		dB	$I_C = 20 \mu A$ $V_{CE} = -5.0$ V
NF	Wide Band Noise Figure (Note 7)		1.0		dB	$I_C = 20 \mu A$ $V_{CE} = -5.0$ V
NF	Narrow Band Noise Figure ( $f = 1.0$ kHz) (Note 8)		0.8		dB	$I_C = 250 \mu A$ $V_{CE} = -5.0$ V
$h_{FE}$	DC Current Gain	50	100	800		$I_C = 100 \mu A$ $V_{CE} = -10$ V
$h_{FE}$	DC Current Gain	50	110			$I_C = 1.0$ mA $V_{CE} = -10$ V
$h_{FE}$	DC Pulse Current Gain (Note 5)	50	120			$I_C = 10$ mA $V_{CE} = -10$ V
$BV_{CBO}$	Collector to Base Breakdown Voltage	-30			Volts	$I_C = 100 \mu A$ $I_E = 0$
$V_{CEO}$ (sust)	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	-30			Volts	$I_C = 10$ mA (pulsed) $I_B = 0$
$BV_{EBO}$	Emitter to Base Breakdown Voltage	-5.0			Volts	$I_C = 0$ $I_E = 100 \mu A$
$I_{CBO}$	Collector Cutoff Current			10	nA	$I_E = 0$ $V_{CB} = -20$ V
$I_{CBO}$ (65°C)	Collector Cutoff Current			3.0	$\mu A$	$I_E = 0$ $V_{CB} = -20$ V
$V_{CE}$ (sat)	Pulsed Collector Saturation Voltage (Note 5)			-0.3	Volts	$I_C = 10$ mA $I_B = 0.5$ mA
$V_{BE}$ (sat)	Pulsed Base Saturation Voltage (Note 5)			-1.0	Volts	$I_C = 10$ mA $I_B = 0.5$ mA
$V_{BE}$ (on)	Pulsed Base to Emitter "On" Voltage (Note 5)		-0.74	-1.0	Volts	$I_C = 10$ mA $V_{CE} = -10$ V
$h_{fe}$	Small Signal Current Gain ( $f = 1.0$ kHz)	40		1000		$I_C = 1.0$ mA $V_{CE} = -10$ V
$h_{fe}$	High Frequency Current Gain ( $f = 20$ MHz)	1.5				$I_C = 0.5$ mA $V_{CE} = -5.0$ V
$C_{cb}$	Collector to Base Capacitance			7.0	pF	$I_E = 0$ $V_{CB} = -5.0$ V
$C_{ob}$	Emitter to Base Capacitance			30	pF	$I_C = 0$ $V_{EB} = -0.5$ V

