

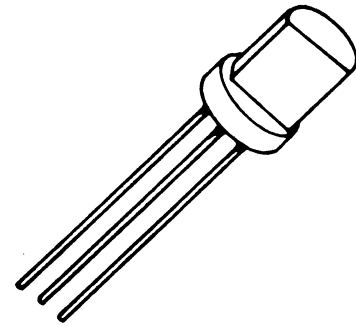
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# 2N3402 - 5 2N3414 - 7

## Silicon Transistors

The Types 2N3402-2N3405 and 2N3414-2N3417 are NPN silicon planar epitaxial passivated transistors intended for general purpose industrial circuits. These transistors are especially suited for high level linear amplifiers or medium speed switching circuits in industrial control applications.



absolute maximum ratings: (25°C) (unless otherwise specified)

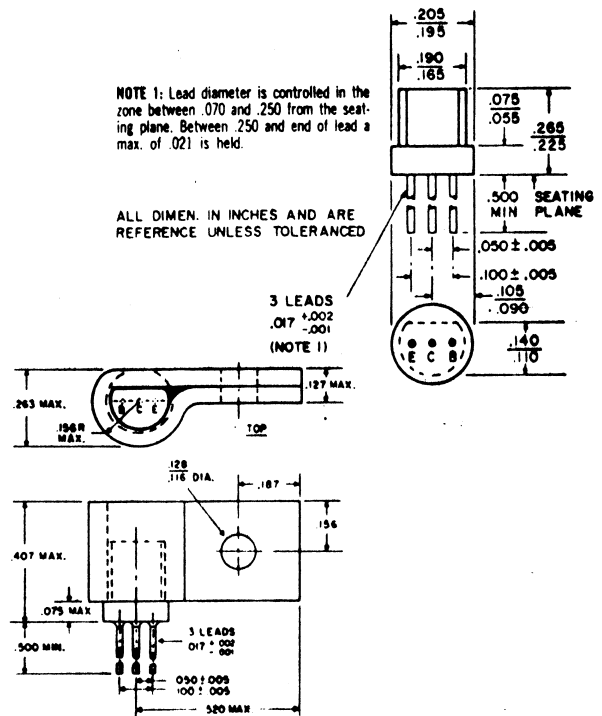
	2N3402,3 2N3414,15	2N3404,5 2N3416,17	
<b>Voltages</b>			
Collector to Emitter	$V_{CEO}$	25	50 V
Emitter to Base	$V_{EBO}$	5	5 V
Collector to Base	$V_{CBO}$	25	50 V
<b>Current</b>			
Collector (Steady State)*	$I_C$	500	500 ma
<b>Dissipation</b>			
Heatsink @ 25°C (2N3402-5)**	$P_T$	900	mw
Total Power (Free Air @ 25°C)† (2N3402-5)	$P_T$	560	mw
Total Power (Free Air @ 25°C)‡ (2N3414-17)	$P_T$	360	mw
Total Power (Free Air @ 65°C)‡ (2N3414-17)	$P_T$	260	mw
<b>Temperature</b>			
Storage	$T_{stg}$	-55 to +150	°C
Operating	$T_j$	+150	°C
Lead Soldering, 1/16" ± 1/32" from case for 10 seconds max.	$T_L$	+260	°C

\*Determined from power limitations due to saturation voltage at this current.

\*\*Derate 7.2 mw/°C increase in case temperature above 25°C.

†Derate 4.47 mw/°C increase in ambient temperature above 25°C.

‡Derate 2.67 mw/°C increase in ambient temperature above 25°C.



## electrical characteristics: (25°C)

(unless otherwise specified)

### DC CHARACTERISTICS

	2N3402,3 2N3414,5	2N3404,5 2N3416,7	
Collector Cutoff Current ( $V_{CB} = 25V$ ) ( $V_{CB} = 25V, T_A = 100°C$ )	$I_{CBO}$	0.1	µA
Collector Cutoff Current ( $V_{CB} = 50V$ ) ( $V_{CB} = 50V, T_A = 100°C$ )	$I_{CBO}$	15	µA
Emitter Cutoff Current ( $V_{EB} = 5V$ )	$I_{EBO}$	0.1	µA
Collector Saturation Voltage ( $I_B = 3$ ma, $I_C = 50$ ma)	$V_{CE(SAT)}$	0.30	V
Base Saturation Voltage ( $I_B = 3$ ma, $I_C = 50$ ma)	$V_{BE(SAT)}$	0.85	V

Forward Current Transfer Ratio ( $V_{CE} = 4.5V, I_C = 2$  ma)  $h_{FE}$

### SMALL SIGNAL CHARACTERISTICS

Forward Current Transfer Ratio Collector Voltage,  $V_C = 4.5V$ , Frequency of measurement = 1000 cps  $h_{rc}$

$V_{CE} = 10V; I_C = 1$  ma;  $f = 1$  Kc;  $T_A = 25°C$

Forward Current Transfer Ratio  $h_{fc}$

Input Impedance  $h_{ie}$

Output Admittance  $h_{oe}$

Voltage Feedback Ratio  $h_{re}$

	2N3402,3 2N3414,5	2N3404,5 2N3416,7	2N3402,4 2N3414,6	2N3403,5 2N3415,7	
Min.			75	180	
Max.			225	540	
Min.			75	180	
Max.			225	540	
Min.			180	300	
Max.			330	8300	ohms
Min.			14	20	µmhos
Max.			.27	.4	$\times 10^{-3}$