

SILICON NPN POWER TRANSISITORS

... designed for medium-speed switching and amplifier applications

FEATURES

- * Gain Ranged Specified at 1A and 3A.
- * Low $V_{CE(sat)}$: typically 0.5 V @ $I_C=5 A$, $I_B=0.5A$
- * Excellent Safe Operating Areas
- * Complementary PNP Types Available 2N3789 thru 2N3792

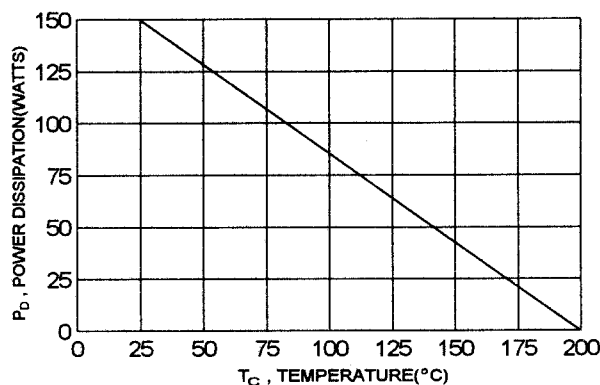
MAXIMUM RATINGS

Characteristic	Symbol	2N3713 2N3715	2N3714 2N3716	Unit
Collector-Base Voltage	V_{CBO}	80	100	V
Collector-Emitter Voltage	V_{CEO}	60	80	V
Emitter-Base Voltage	V_{EBO}	7		V
Collector Current - Continuous	I_C	10		A
Base Current-Continuous	I_B	4		A
Total Power Dissipation @ $T_C=25^\circ C$ Derate above $25^\circ C$	P_D	150 0.857		W W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +200		$^\circ C$

THERMAL CHARACTERISTICS

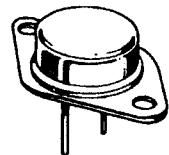
Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.17	$^\circ C/W$

FIGURE -1 POWER DERATING

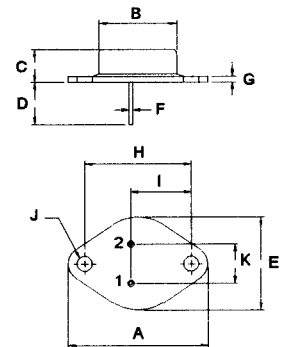


NPN
2N3713
Thru
2N3716

10 AMPERE
POWER TRANSISTORS
NPN SILICON
60-80 VOLTS
150 WATTS



TO-3



PIN 1.BASE
2.EMITTER
COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage (1) ($I_C = 200\text{ mA}$, $I_B = 0$)	2N3713, 2N3715 2N3714, 2N3716	$V_{CE(sus)}$	60 80	V
Collector -Emitter Cutoff Current ($V_{CE} = 80\text{ V}$, $V_{BE(off)} = -1.5\text{ V}$) ($V_{CE} = 100\text{ V}$, $V_{BE(off)} = -1.5\text{ V}$) ($V_{CE} = 60\text{ V}$, $V_{BE(off)} = -1.5\text{ V}$, $T_c = 150^\circ\text{C}$) ($V_{CE} = 80\text{ V}$, $V_{BE(off)} = -1.5\text{ V}$, $T_c = 150^\circ\text{C}$)	2N3713, 2N3715 2N3714, 2N3716 2N3713, 2N3715 2N3714, 2N3716	I_{CEX}	1.0 1.0 10 10	mA
Emitter Cutoff Current ($V_{EB} = 7.0\text{ V}$, $I_C = 0$)	All Types	I_{EBO}	5.0	mA

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 1.0\text{ A}$, $V_{CE} = 2.0\text{ V}$) ($I_C = 3.0\text{ A}$, $V_{CE} = 2.0\text{ V}$)	2N3713, 2N3714 2N3715, 2N3716 2N3713, 2N3714 2N3715, 2N3716	h_{FE}	25 50 15 30	90 180	
Collector-Emitter Saturation Voltage ($I_C = 5.0\text{ A}$, $I_B = 0.5\text{ A}$)	2N3713, 2N3714 2N3715, 2N3716	$V_{CE(sat)}$		1.0 0.8	V
Base-Emitter Saturation Voltage ($I_C = 5.0\text{ A}$, $I_B = 0.5\text{ A}$)	2N3713, 2N3714 2N3715, 2N3716	$V_{BE(sat)}$		2.0 1.5	V
Base-Emitter On Voltage ($I_C = 3.0\text{ A}$, $V_{CE} = 2.0\text{ V}$)	All Types	$V_{BE(on)}$		1.5	V

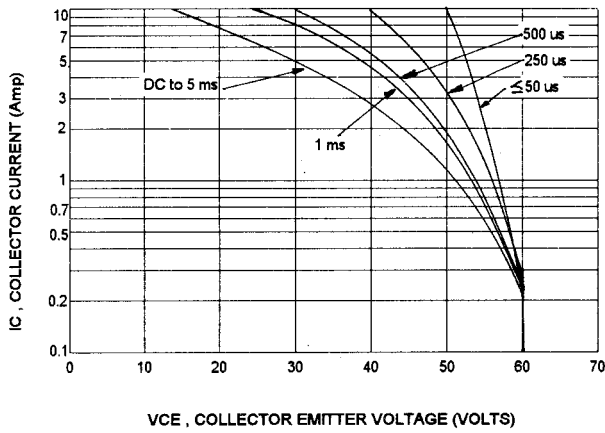
DYNAMIC CHARACTERISTICS

Current-Gain Bandwidth Product ($I_C = 500\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1\text{ MHz}$)	f_T	4.0		MHz
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(1) Pulse Test: Pulse width = 300 μs , Duty Cycle $\leq 2.0\%$ (2) $f_T = |h_{fe}| \cdot f_{test}$

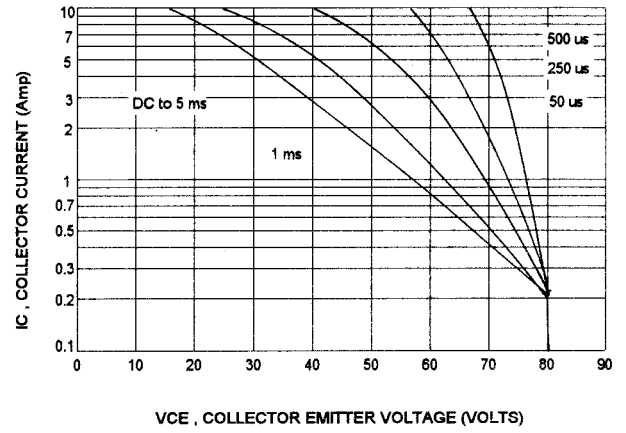
2N3713,2N3715

ACTIVE REGION SAFE OPERATING AREA

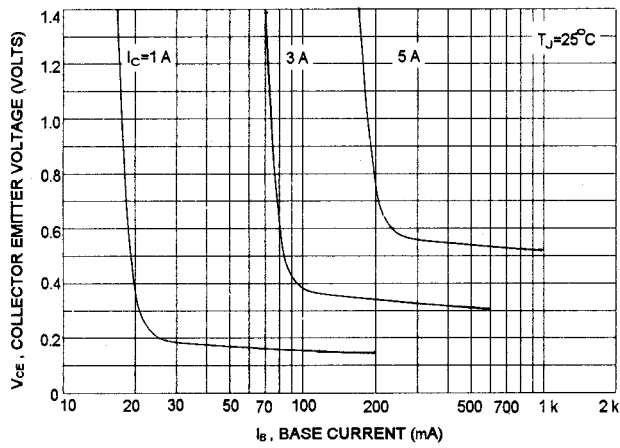


2N3714,2N3716

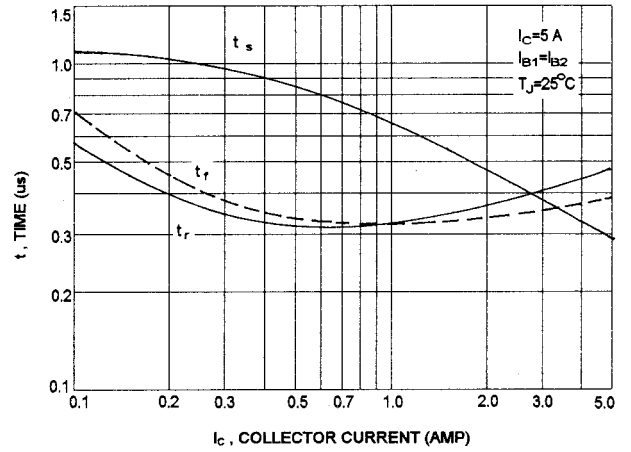
ACTIVE REGION SAFE OPERATING AREA



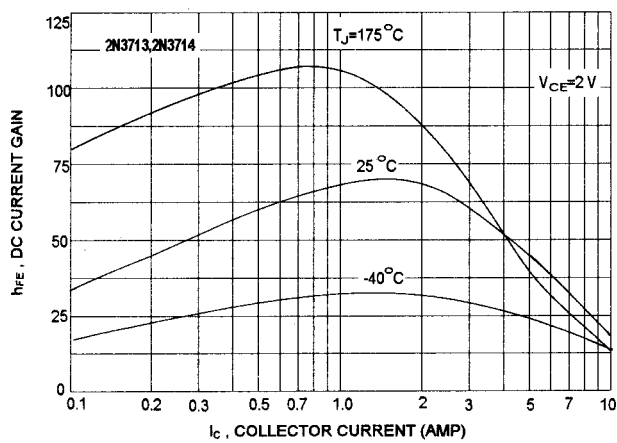
COLLECTOR SATURATION REGION



TYPICAL SWITCHING TIME



DC CURRENT GAIN



DC CURRENT GAIN

