DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

2N3738-2N3739 – NPN
2N6424-2N6425 - PNP

SILICON POWER TRANSISTORS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

CHARACTERISTICS	SYMBOL	2N3738 2N6424	2N3739 2N6425	UNIT
Collector-Emitter Voltage	V_{CEO}	225	300	V
Collector-Base Voltage	V_{CBO}	250	325	V
Emitter-Base Voltage	V_{EBO}	6.0		V
Collector Current-Continuous **Peak**	I_C I_{CM}	1.0 2.0		A
Base Current **Peak**	I_B I_{BM}	0.5 1.0		A
Total Power Dissipation @T_c = 25°C **Derate Above 25°C**	P_D	20 0.133		W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +175		°C
Maximum Thermal Resistance Junction to Case	$R_{\Theta JC}$	7.5		°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

CHARACTERISTIC		SYMBOL	MIN.	MAX.	UNIT
OFF CHARACTERISTICS					
Collector Emitter Sustaining Voltage [1] (I_c = 5.0mA, I_B = 0)	2N3738, 2N6424 2N3739, 2N6425	$V_{CEO(SUS)}$	225 300	- -	V
Collector Emitter Cutoff Current (V_{CE} = 125V, I_B = 0) (V_{CE} = 200V, I_B = 0)	 2N3738, 2N6424 2N3739, 2N6425	I_{CEO}	 - -	 0.25 0.25	mA
Collector Cutoff Current (V_{CB} = 250V, I_E = 0) (V_{CB} = 325V, I_E = 0)	 2N3738, 2N6424 2N3739, 2N6425	I_{CBO}	 - -	 0.1 0.1	Ma
Collector Cutoff Current (V_{CE} = 250V, $V_{BE(off)}$ = 1.5V) (V_{CE} = 300V, $V_{BE(off)}$ = 1.5V) (V_{CE} = 125V, $V_{BE(off)}$ = 1.5V, T_c = 150°C) (V_{CE} = 200V, $V_{BE(off)}$ = 1.5V, T_c = 150°C)	 2N3738, 2N6424 2N3739, 2N6425 2N3738, 2N6424 2N3739, 2N6425	I_{CEX}	 - - - -	 0.5 0.5 1.0 1.0	Ma
Emitter Cutoff Current (V_{EB} = 6.0V, I_C = 0)		I_{EBO}	-	0.1	mA
ON CHARACTERISTICS [1]					
DC Current Gain (I_C = 50mA, V_{CE} = 10V) (I_C = 100mA, V_{CE} = 10V) (I_C = 250mA, V_{CE} = 10V)		h_{FE}	 30 40 25	 - 200 -	-
Collector Emitter Sustaining Voltage (I_C = 250A, I_B = 25mA)		$V_{CE(sat)}$	-	2.5	V

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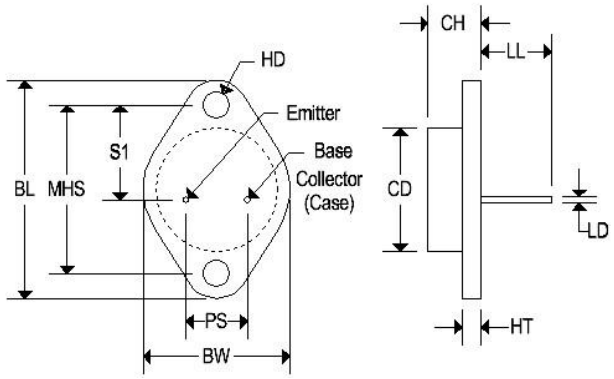
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Base Emitter On Voltage (I_C = 100mA, V_{CE} = 10 V)	$V_{BE(on)}$	-	1.0	V
DYNAMIC CHARACTERISTICS				
Current Gain Bandwidth Product (2) (I_C = 100mA, V_{CE} = 10 V, f = 1.0 MHz)	f_T	10	-	MHz
Output Capacitance (V_{CB} = 100V, I_E = 0, f = 100KHz)	C_{ob}	-	20	pF
Small Signal Current Gain (I_C = 100mA, V_{CE} = 10V, f = 1.0KHZ)	h_{fe}	35	-	-

Note 1: Pulse Test: Pulse width ≤ 300 us, Duty Cycle ≤ 2.0%
Note 2: $F_t = |h_{fe}| \cdot f_{test}$

MECHANICAL CHARACTERISTICS

Case:	TO-66
Marking:	Alpha-numeric
Polarity:	See below



Dim	TO-66			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	1.205	1.280	30.60	32.50
CD	0.445	0.557	11.303	14.148
CH	0.257	0.284	6.540	7.220
LL	0.374	0.413	9.500	10.50
BW	0.680	0.727	17.26	18.46
LD	0.030	0.036	0.760	0.920
HT	0.054	0.065	1.380	1.650
MHS	0.951	0.976	24.16	24.78
S1	0.545	0.614	13.84	15.60
HD	0.131	0.154	3.320	3.920
PS	0.191	0.210	4.860	5.340

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FIGURE 1 – POWER DERATING

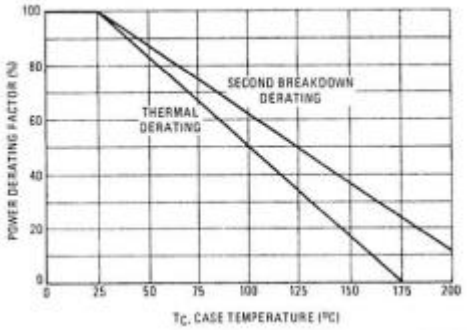
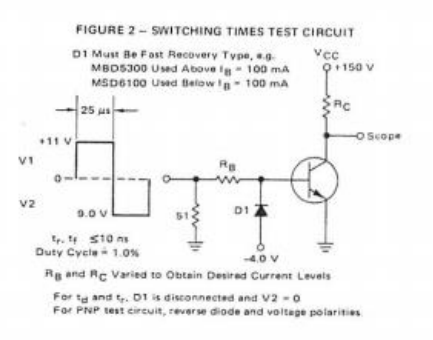


FIGURE 2 – SWITCHING TIMES TEST CIRCUIT



NPN
2N3738, 2N3739

PNP
2N6424, 2N6425

FIGURE 3 – TURN-ON TIME

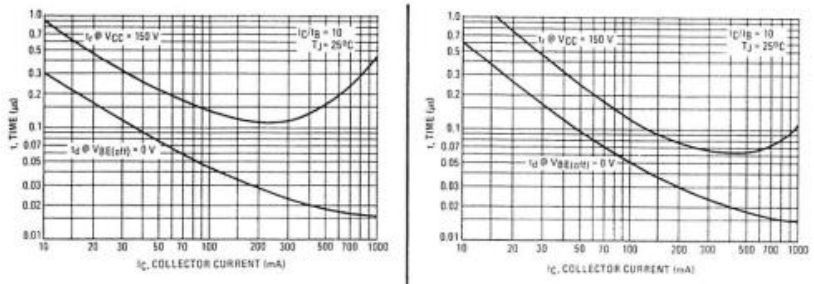


FIGURE 4 – TURN-OFF TIME

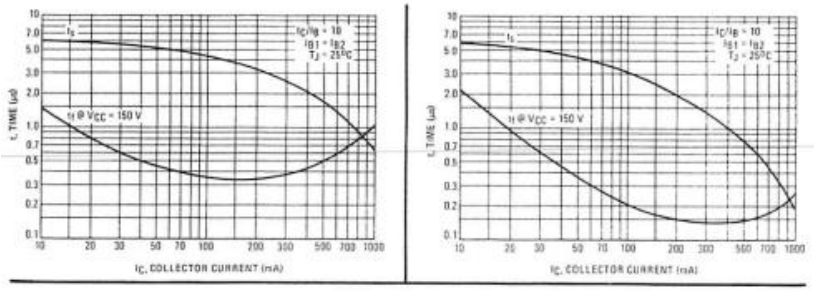


FIGURE 5 – CURRENT-GAIN – BANDWIDTH PRODUCT

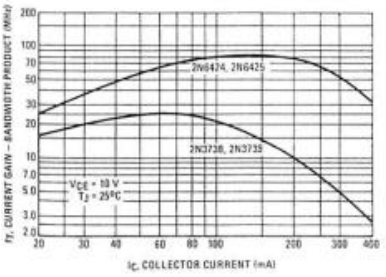


FIGURE 6 – CAPACITANCE

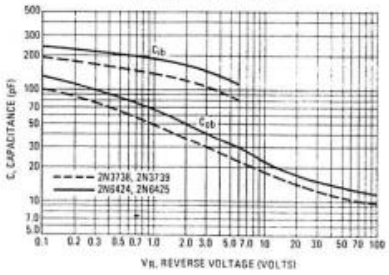


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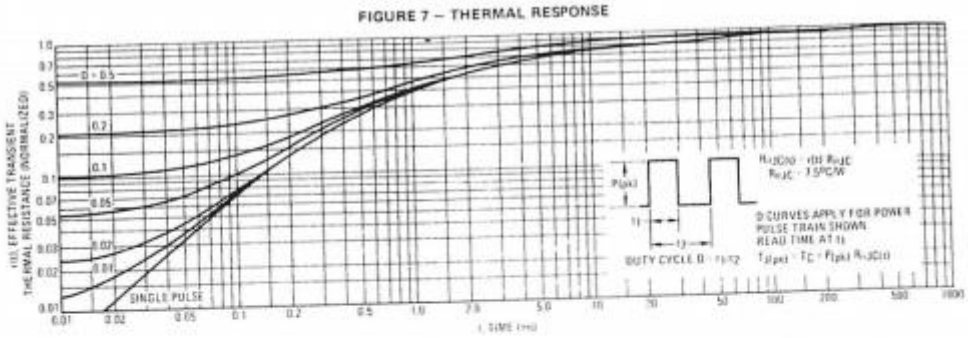
FIGURE 7 – THERMAL RESPONSE



ACTIVE-REGION SAFE OPERATING AREA

FIGURE 8 – 2N3738, 2N3739

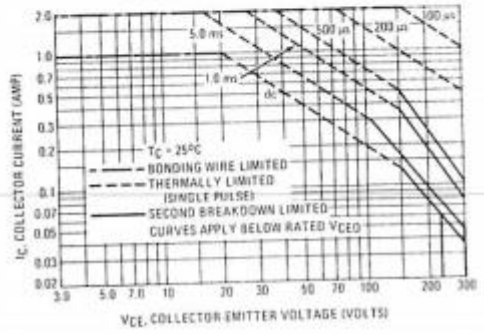
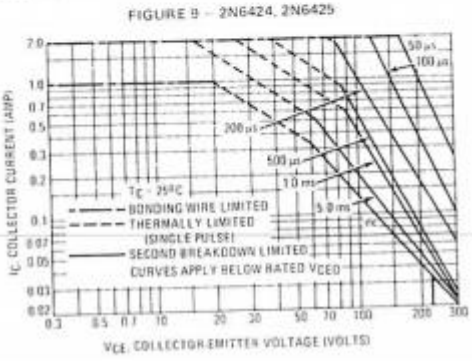


FIGURE 9 – 2N6424, 2N6425



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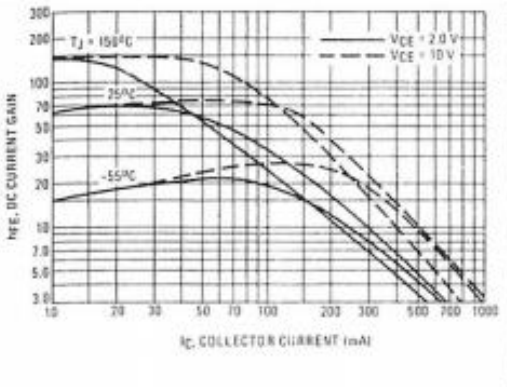
NPN
2N3738, 2N3739

PNP
2N6424, 2N6425

FIGURE 10 – DC CURRENT GAIN



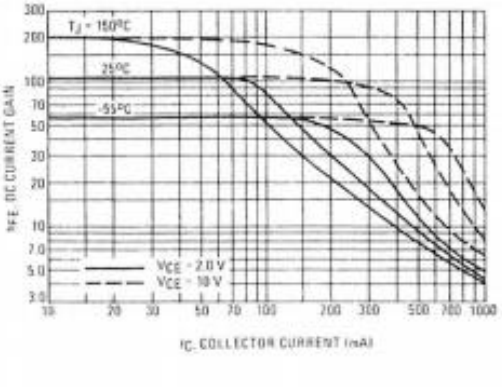
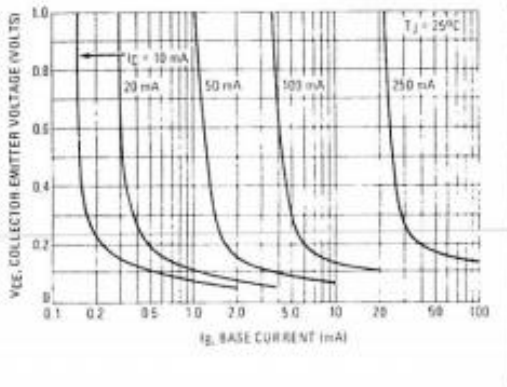


FIGURE 11 – COLLECTOR SATURATION REGION



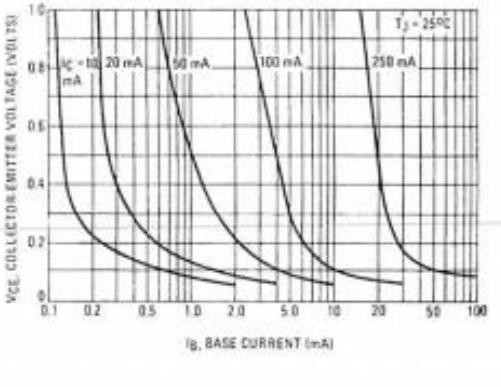
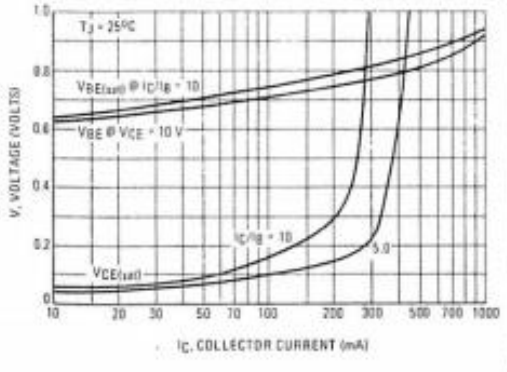


FIGURE 12 – "ON" VOLTAGE



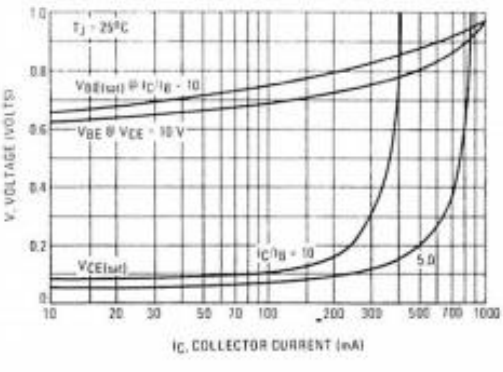


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FIGURE 13 – TEMPERATURE COEFFICIENTS

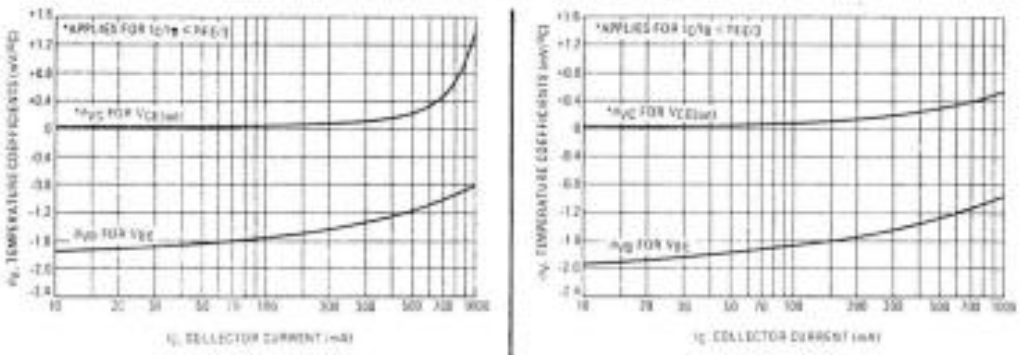


FIGURE 14 – COLLECTOR CUTOFF REGION

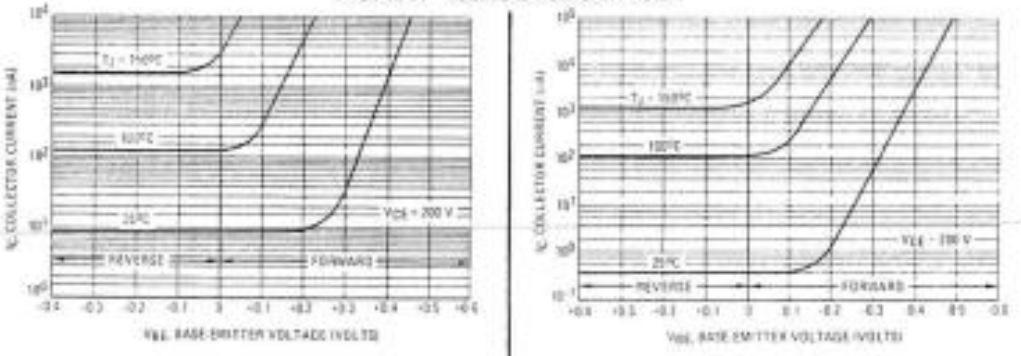
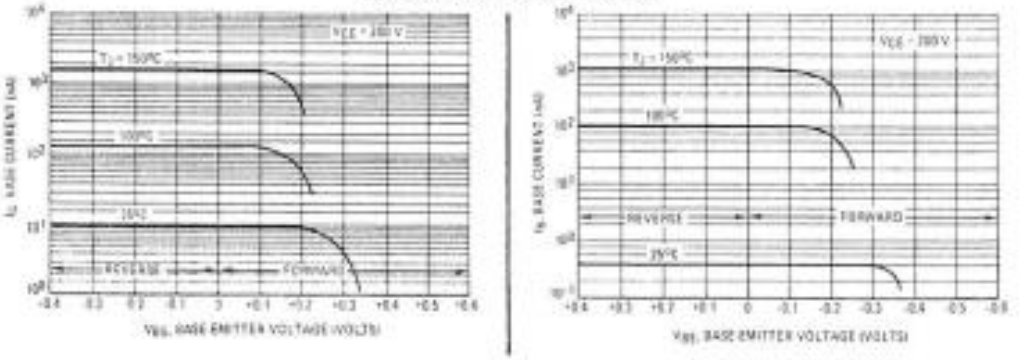


FIGURE 15 – BASE CUTOFF REGION



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