NPN POWER DARLINGTON TRANSISTOR ARRAY

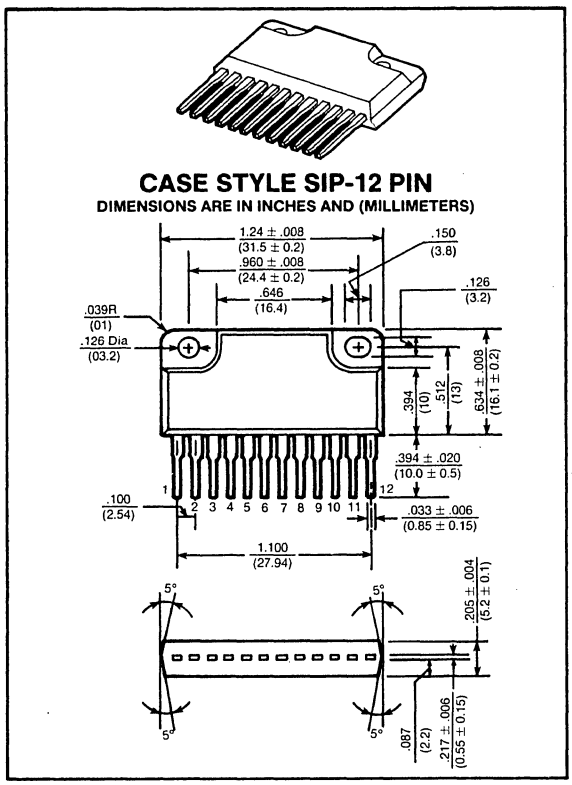
D78A3D1

100 VOLTS
3 AMP, 25 WATTS

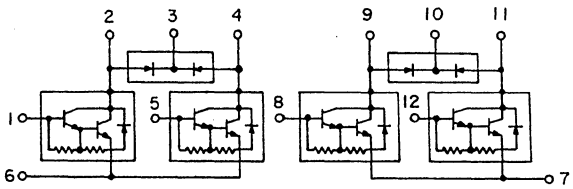
Designed for high power switching applications, hammer drive, pulse motor drive and inductive load drive applications.

Features:

- High reliability small-sized available (4 in 1)
- Epoxy single-inline package with heat sink (12 pin)
- High collector power dissipation: P_D = 25W @ T_A = 25°C (Four device action)
- High collector current: I_C = 3A (Max.)
- High DC current gain: h_{FE} = 2000 (Min.) @ V_{CE} = 2V, I_C = 1.5A



ARRAY CONFIGURATION



maximum ratings (T_A = 25°C) (unless otherwise specified)

RATING	SYMBOL	D78A3D1	UNITS
Collector-Emitter Voltage	V_{CEO}	100	Volts
Collector-Base Voltage	V_{CBO}	120	Volts
Emitter Base Voltage	V_{EBO}	6	Volts
Collector Current — Continuous Peak	I_C I_{CM}	3 6	A
Base Current — Continuous	I_B	0.5	A
Maximum Forward Current	I_{FM}	3	A
Surge Current (1 sec)	I_{FSM}	6	A
Reverse Voltage	V_R	100	A
Collector Power Dissipation (One Device Action, T_A = 25°C)	P_D	3.0	Watts
Collector Power Dissipation (T_A, 25°C (Four Device Action) T_C = 25°C	P_D	5.0 25	Watts
Isolation Voltage (Between Fin to 1 ~ 12 pin)	V_{Isol}	1000	Volts
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	°C

thermal characteristics

Thermal Resistance, Junction to Case	$R_{\theta JC}$	5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	25	°C/W
Maximum Lead Temperature for Soldering Purpose: ⅛" from Case for 5 Seconds	T_L	260	°C

electrical characteristics (T_A = 25° C) (unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
off characteristics					
Collector-Emitter Breakdown Voltage (I_C = 10mA, I_B = 0)	$V_{BR(CEO)}$	100	—	—	Volts
Collector-Base Breakdown Voltage (I_C = 1mA, I_E = 0)	$V_{BR(CBO)}$	120	—	—	Volts
Collector Cutoff Current (V_{CB} = 120V, I_E = 0)	I_{CBO}	—	—	10	μA
Collector Cutoff Current (V_{CE} = 100V, I_B = 0)	I_{CEO}	—	—	10	μA
Emitter Cutoff Current (V_{EB} = 6V, I_C = 0)	I_{EBO}	0.5	—	2.5	mA
second breakdown					
Second Breakdown with Base Foward Biased	FBSOA	SEE FIGURE 13			
on characteristics					
DC Current Gain (I_C = 1.5A, V_{CE} = 2V) (I_C = 3A, V_{CE} = 2V)	h_{FE}	2000 1000	— —	12000 —	—
Collector-Emitter Saturation Voltage (I_C = 1.5A, I_B = 3mA)	$V_{CE(sat)}$	—	—	1.5	Volts
Base-Emitter Saturation Voltage (I_C = 1.5A, I_B = 3mA)	$V_{BE(sat)}$	—	—	2.0	Volts
switching characteristics					
Turn-on Time	V_{CC} = 30V I_{B1} = -I_{B2} = 3mA Duty Cycle = 1%	t_{on}	—	0.3	—	μs
Storage Time		t_{stg}	—	2	—	
Fall Time		t_f	—	0.4	—	

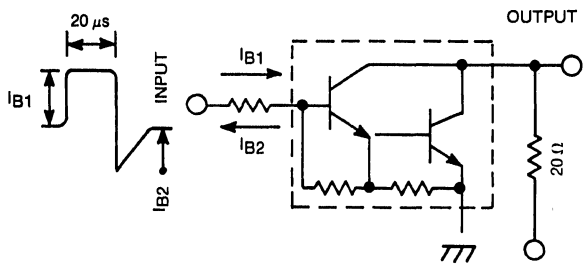


FIG. 1 SWITCHING TIME TEST CIRCUIT

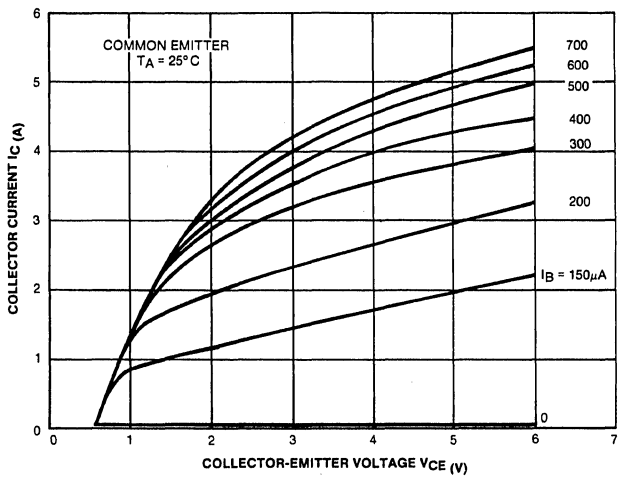


FIG. 2 I_C — V_{CE}

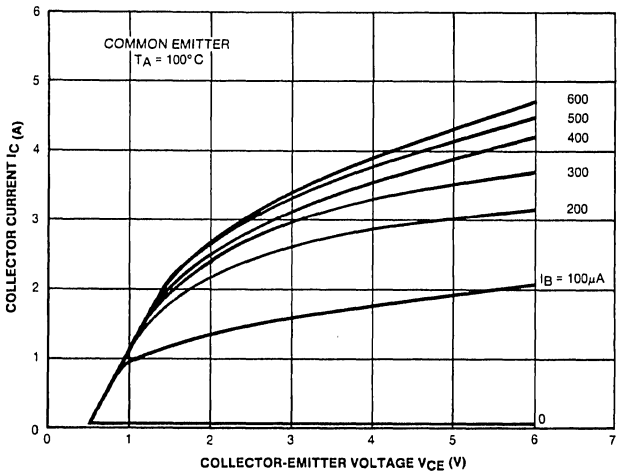


FIG. 3 I_C — V_{CE}

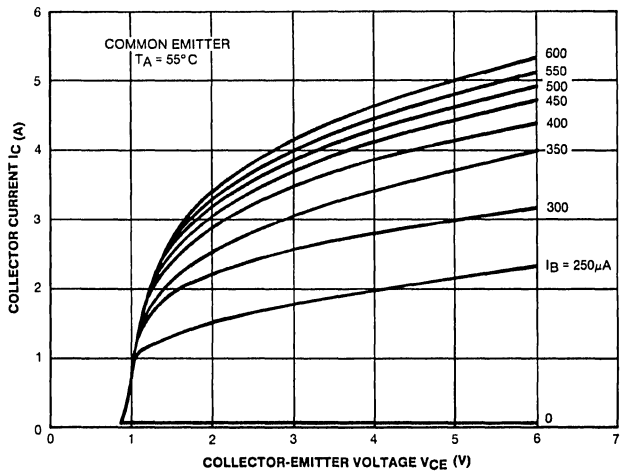


FIG. 4 I_C — V_{CE}

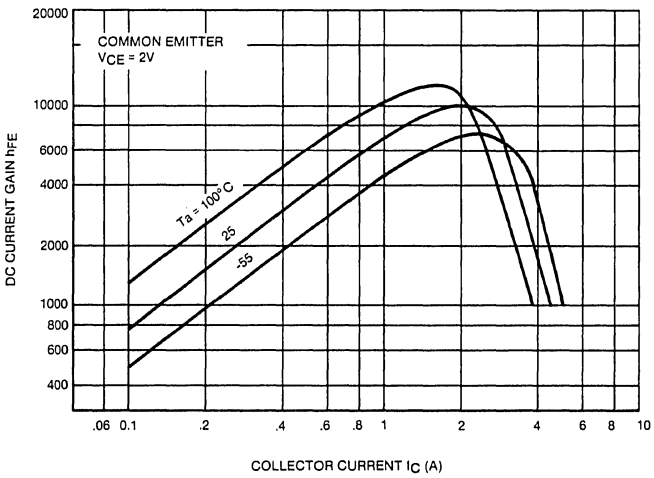


FIG. 5 h_{FE} - I_C

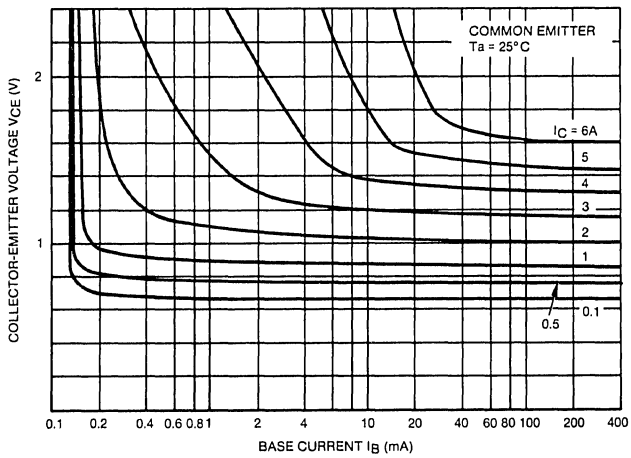


FIG. 6

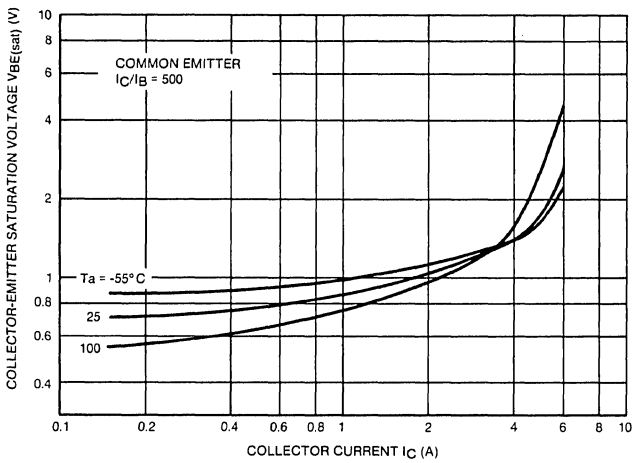


FIG. 7 $V_{CE(sat)}$ - I_C

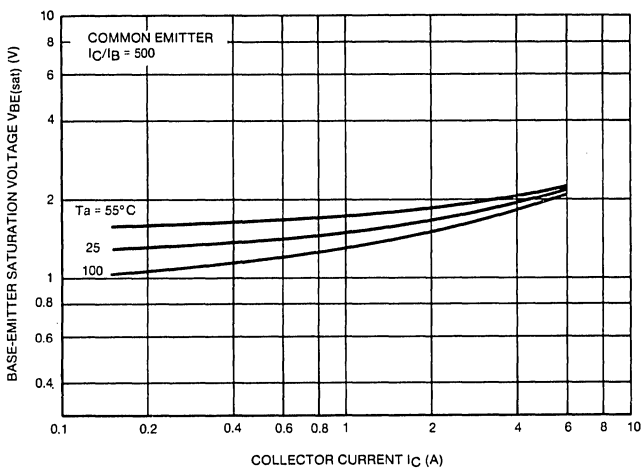


FIG. 8 $V_{BE(sat)}$ - I_C

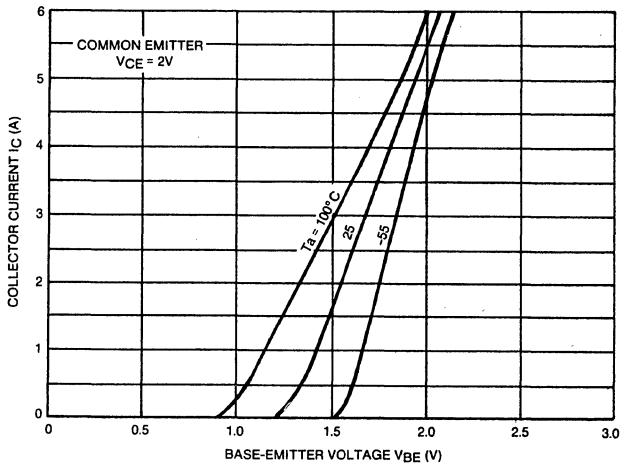


FIG. 9 IC - VBE

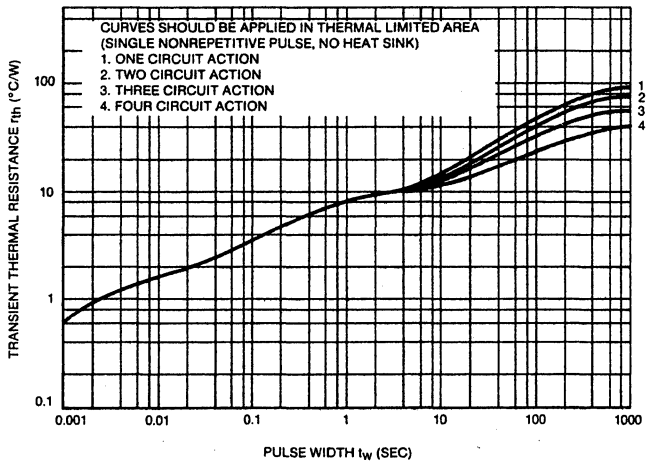


FIG. 10 rth - tw

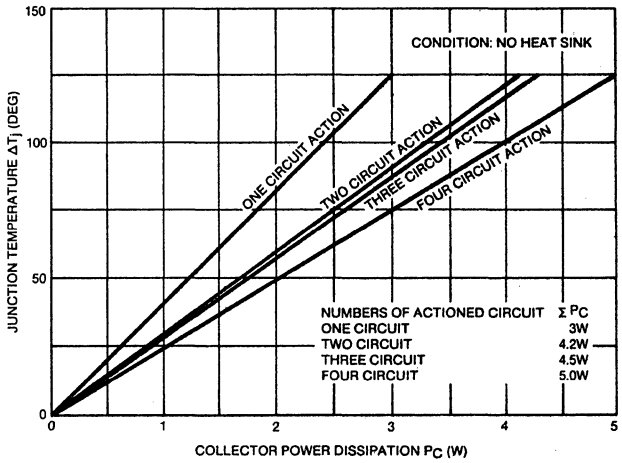


FIG. 11

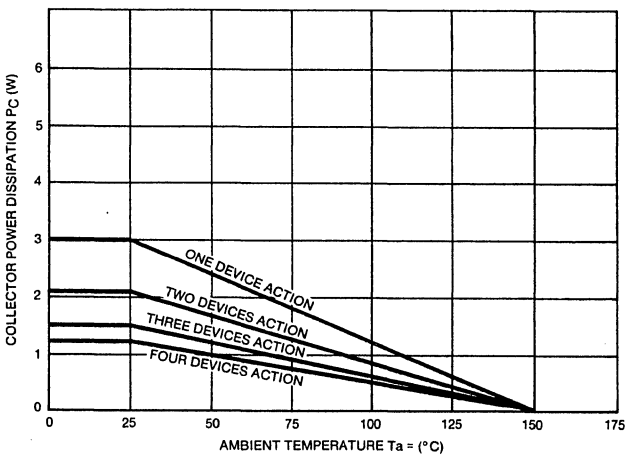


FIG. 12 PC - Ta

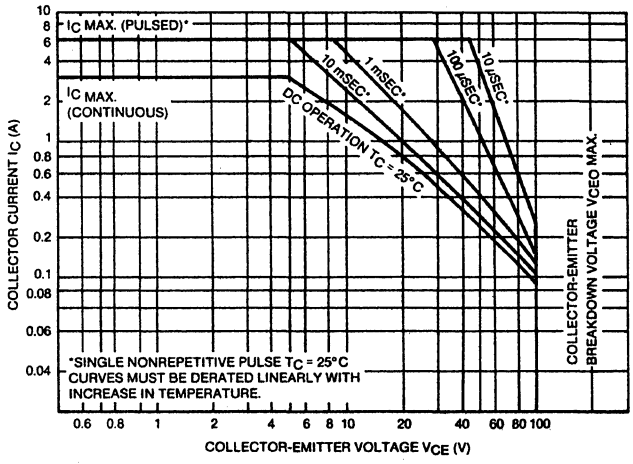


FIG. 13 SAFE OPERATING AREA