

## HORIZONTAL DEFLECTION POWER TRANSISTORS

...specifically designed for use in larg screen color deflection circuits.

### FEATURES:

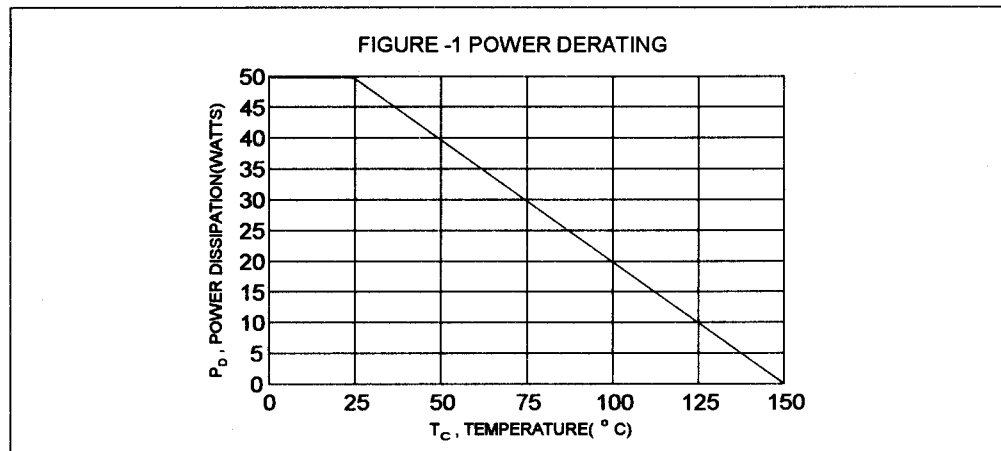
- \* High Voltage:  $V_{CBO}=1500V$
- \* Low Saturation Voltage : $V_{CE(sat)}=5.0V(Max.) @ I_C = 4.0 A$
- \* High Speed : $t_r=1.0 us(Max.) @ I_{CP}=4.0 A, I_{B1} = 0.8A$
- \* Built-in Damper Type
- \* Glass Passivated Collector-Base Junction

### MAXIMUM RATINGS

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	1500	V
Collector-Emitter Voltage	$V_{CEO}$	600	V
Emitter-Base Voltage	$V_{EBO}$	5.0	V
Collector Current-Continuous	$I_C$	5.0	A
Base Current	$I_B$	2.5	A
Total Power Dissipation @ $T_C=25^{\circ}C$ Derate above $25^{\circ}C$	$P_D$	50 0.4	W W/ $^{\circ}C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +150	$^{\circ}C$

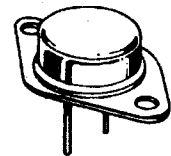
### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	2.5	$^{\circ}C/W$

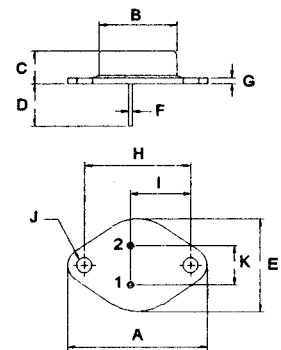


**NPN**  
**2SD870**

**5 AMPERE**  
**POWER**  
**TRANSISTORS**  
**1500 VOLTS**  
**50 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 Cutoff Current ( $V_{CB}=500\text{ V}$ , $I_E=0$ )	$I_{CBO}$		10	$\mu\text{A}$
Emitter-Base Voltage ( $I_E = 200\text{ mA}$ , $I_C = 0$ )	$V_{EBO}$	5.0		V

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )	hFE	8.0		
Collector - Emitter Saturation Voltage ( $I_C = 4.0\text{ A}$ , $I_B = 0.8\text{ A}$ )	$V_{CE(sat)}$		5.0	V
Base - Emitter Saturation Voltage ( $I_C = 4.0\text{ A}$ , $I_B = 0.8\text{ A}$ )	$V_{BE(sat)}$		1.5	V
Forward Voltage (Damper Diode) ( $I_F=5.0\text{ A}$ )	$-V_F$		2.0	V

**DYNAMIC CHARACTERISTICS**

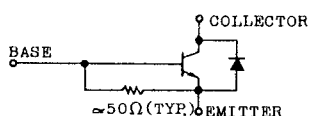
Current Gain - Bandwidth Product ( $I_C = 0.1\text{ A}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )	$f_T$	3.0(Typ)		MHz
Collector Output Capacitance ( $V_{CB}=10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	170(Typ)		pF

**SWITCHING CHARACTERISTICS**

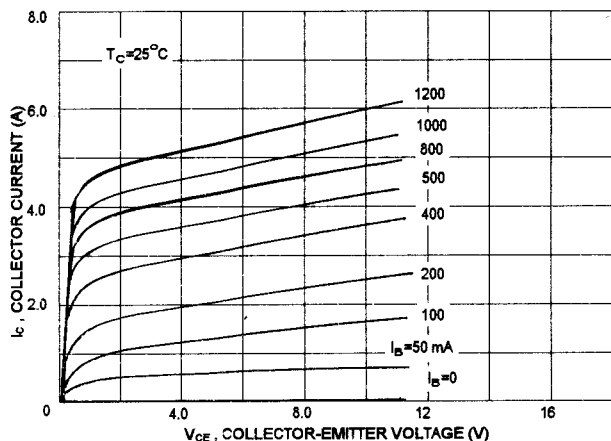
Fall Time	$I_C = 4.0\text{ A}$ , $I_{B1}(\text{end})=0.8\text{ A}$	$t_f$	1.0	$\mu\text{ s}$
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(1) Pulse Test: Pulse width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ 

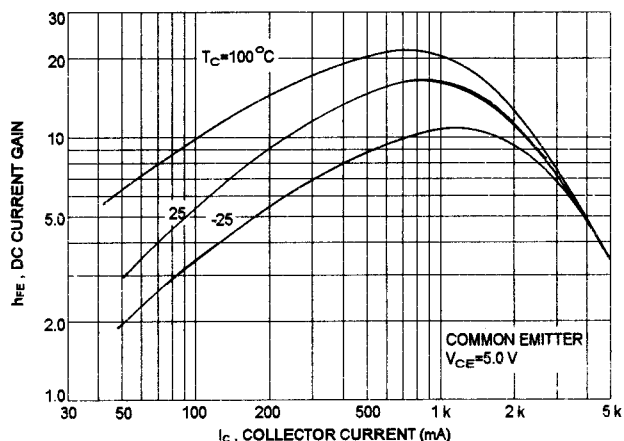
EQUIVALENT CIRCUIT



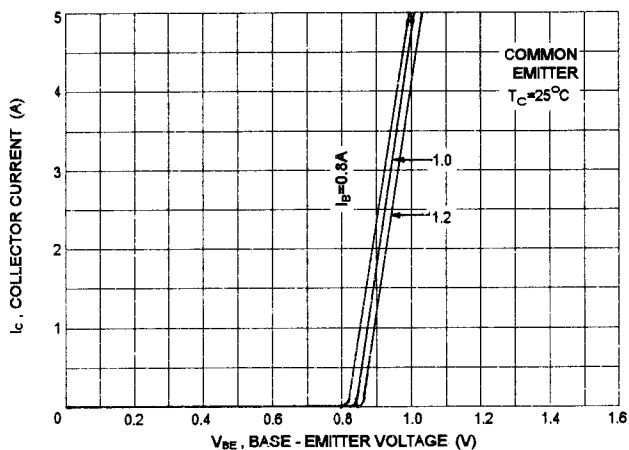
$I_c - V_{ce}$



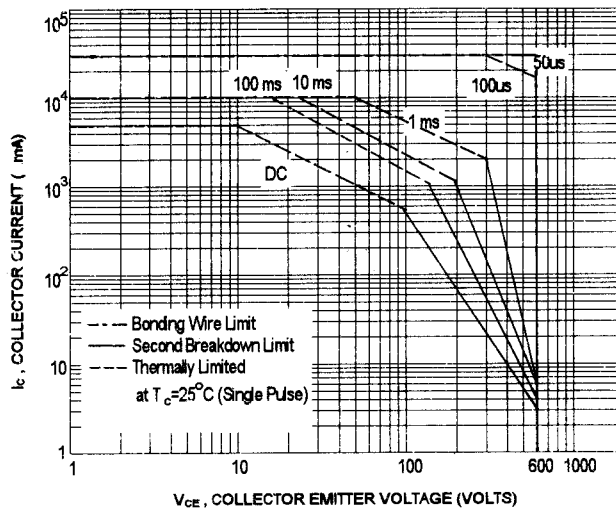
DC CURRENT GAIN



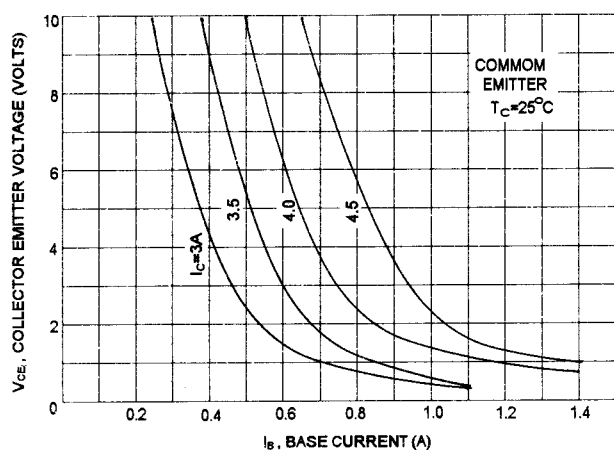
$I_c - V_{BE}$



ACTIVE-REGION SAFE OPERATING AREA (SOA)



COLLECTOR SATURATION REGION



There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_c - V_{ce}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of SOA curve is base on  $T_{J(PK)} = 150^\circ\text{C}$ ;  $T_c$  is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} \leq 150^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.