

DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

...designed for general-purpose amplifier and low speed switching applications

FEATURES:

- * Collector-Emitter Sustaining Voltage-
 $V_{CE(SUS)}$ = 60 V (Min) - BDV64,BDV65
 = 80 V (Min) - BDV64A,BDV65A
 = 100 V (Min) - BDV64B,BDV65B
- * Collector-Emitter Saturation Voltage
 $V_{CE(sat)}$ = 2.0 V (Max.) @ $I_C = 5.0$ A
- * Monolithic Construction with Built-in Base-Emitter Shunt Resistor

PNP	NPN
BDV64	BDV65
BDV64A	BDV65A
BDV64B	BDV65B

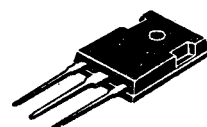
12 AMPERE
DARLINGTON
COMPLEMENTARY SILICON
POWER TRANSISTORS
60-100 VOLTS
125 WATTS

MAXIMUM RATINGS

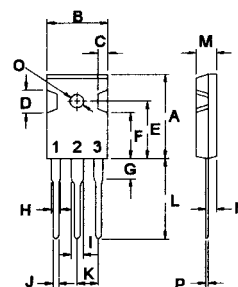
Characteristic	Symbol	BDV64 BDV65	BDV64A BDV65A	BDV64B BDV65B	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	100	V
Collector-Base Voltage	V_{CBO}	60	80	100	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	12 20			A
Base Current	I_B	0.5			A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	125 1.0			W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	- 65 to +150			$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.0	$^\circ\text{C/W}$



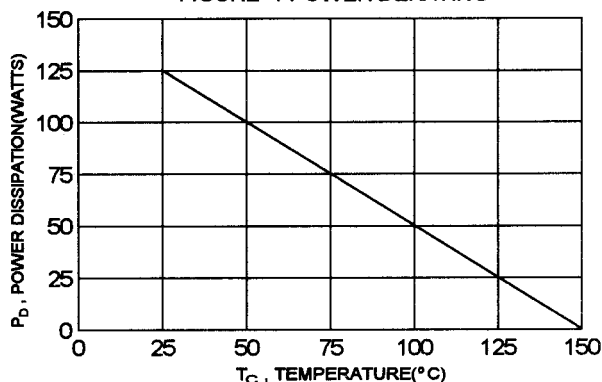
TO-247(3P)



PIN 1.BASE
2.COLLECTOR
3.EMITTER

DIM	MILLIMETERS	
	MIN	MAX
A	20.63	22.38
B	15.38	16.20
C	1.90	2.70
D	5.10	6.10
E	14.81	15.22
F	11.72	12.84
G	4.20	4.50
H	1.82	2.46
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.50	21.50
M	4.68	5.36
N	2.40	2.80
O	3.25	3.65
P	0.55	0.70

FIGURE -1 POWER DERATING



Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector - Emitter Sustaining Voltage (1) $(I_C = 30 \text{ mA}, I_B = 0)$	BDV64,BDV65 BDV64A,BDV65A BDV64B,BDV65B	$V_{CEO(sus)}$	60 80 100		V
Collector Cutoff Current $(V_{CE} = 30 \text{ V}, I_B = 0)$ $(V_{CE} = 40 \text{ V}, I_B = 0)$ $(V_{CE} = 50 \text{ V}, I_B = 0)$	BDV64,BDV65 BDV64A,BDV65A BDV64B,BDV65B	I_{CEO}		1.0 1.0 1.0	mA
Collector Cutoff Current $(V_{CB} = 60 \text{ V}, I_E = 0)$ $(V_{CB} = 80 \text{ V}, I_E = 0)$ $(V_{CB} = 100 \text{ V}, I_E = 0)$	BDV64,BDV65 BDV64A,BDV65A BDV64B,BDV65B	I_{CBO}		0.4 0.4 0.4	mA
Emitter Cutoff Current $(V_{EB} = 5.0 \text{ V}, I_C = 0)$		I_{EBO}		5.0	mA

ON CHARACTERISTICS (1)

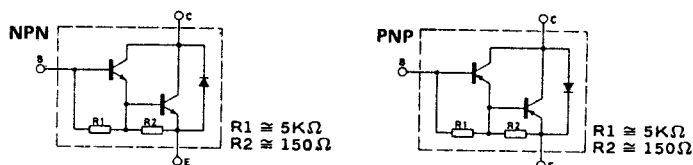
DC Current Gain $(I_C = 1.0 \text{ A}, V_{CE} = 4.0 \text{ V})$ $(I_C = 5.0 \text{ A}, V_{CE} = 4.0 \text{ V})$ $(I_C = 10 \text{ A}, V_{CE} = 4.0 \text{ V})$	hFE	2500(Typ) 1000 500(Typ)		
Collector-Emitter Saturation Voltage $(I_C = 5.0 \text{ A}, I_B = 20 \text{ mA})$	$V_{CE(sat)}$		2.0	V
Base-Emitter On Voltage $(I_C = 5.0 \text{ A}, V_{CE} = 4.0 \text{ V})$	$V_{BE(on)}$		2.5	V

DYNAMIC CHARACTERISTICS

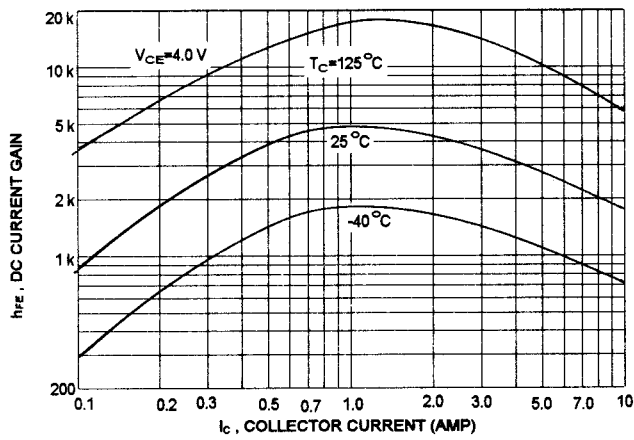
Small-Signal Current Gain ($I_C = 5.0 \text{ A}$, $V_{CE} = 4.0 \text{ V}$, $f = 1.0 \text{ MHz}$)	h_{fe}	40		
Output Capacitance ($V_{CB} = 10 \text{ V}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}		300	pF

(1) Pulse Test: Pulse width = 300 μ s , Duty Cycle $\leq$ 2.0%

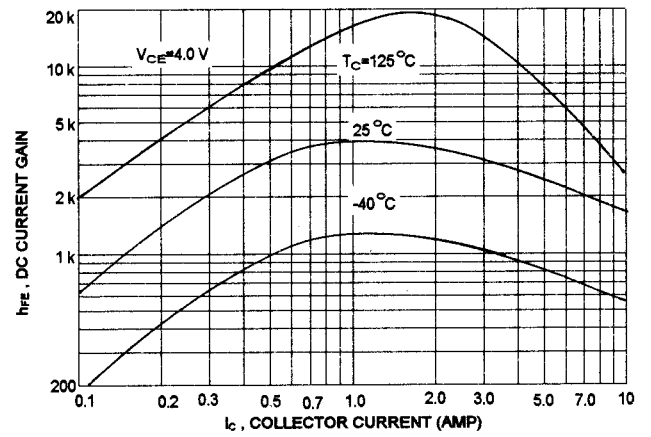
INTERNAL SCHEMATIC DIAGRAMS



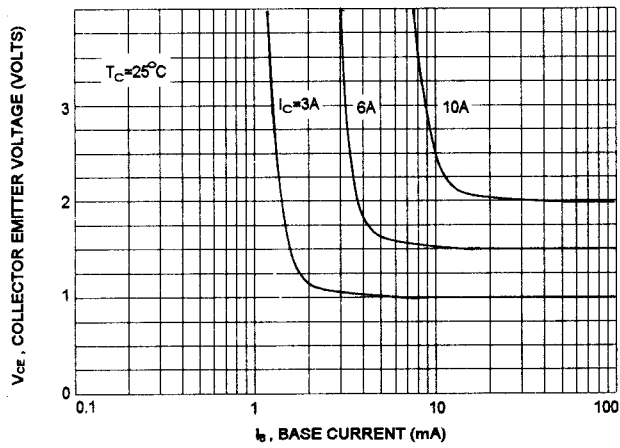
PNP BDV64,A,B
DC CURRENT GAIN



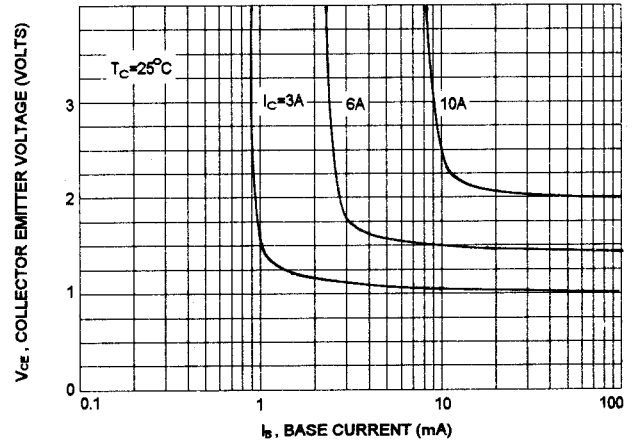
NPN BDV65,A,B
DC CURRENT GAIN



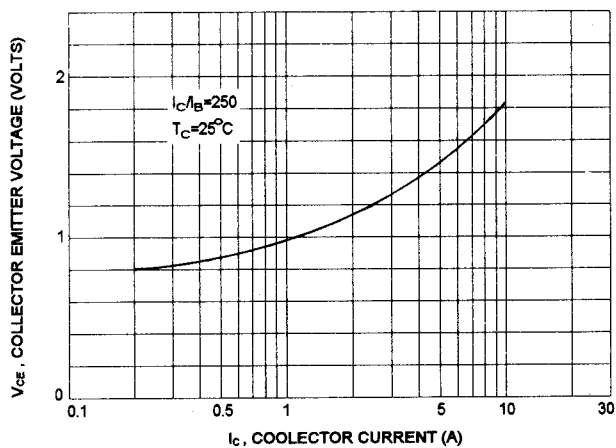
COLLECTOR SATURATION REGION



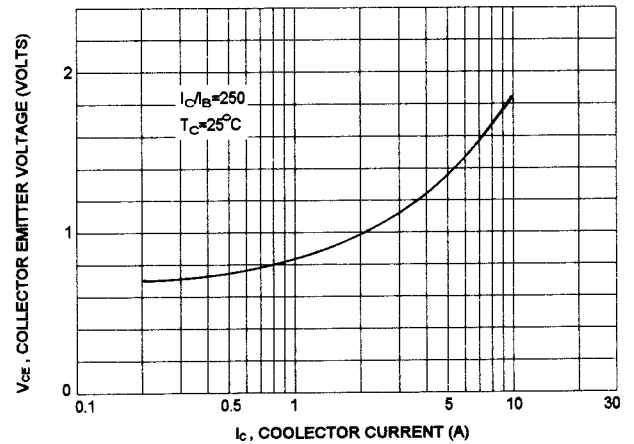
COLLECTOR SATURATION REGION



$V_{CE(sat)} - I_C$



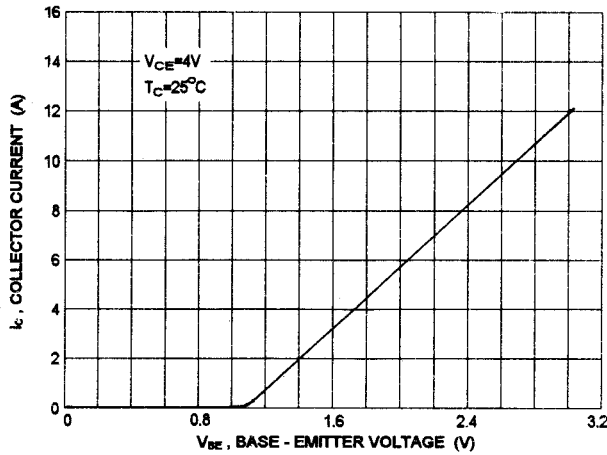
$V_{CE(sat)} - I_C$



BDV64,A,B PNP / BDV65,A,B NPN

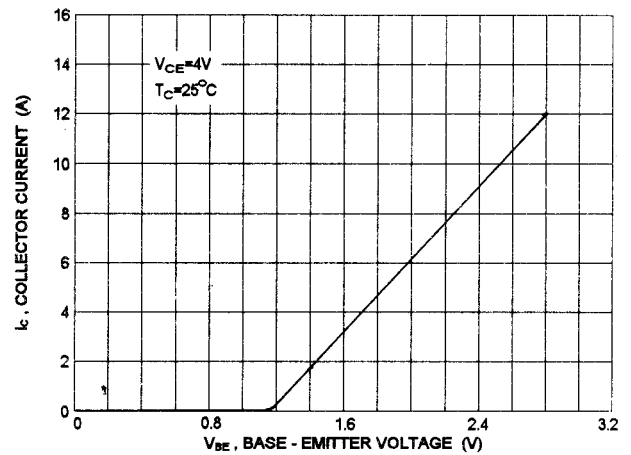
PNP BDV64,A,B

$I_C - V_{BE}$



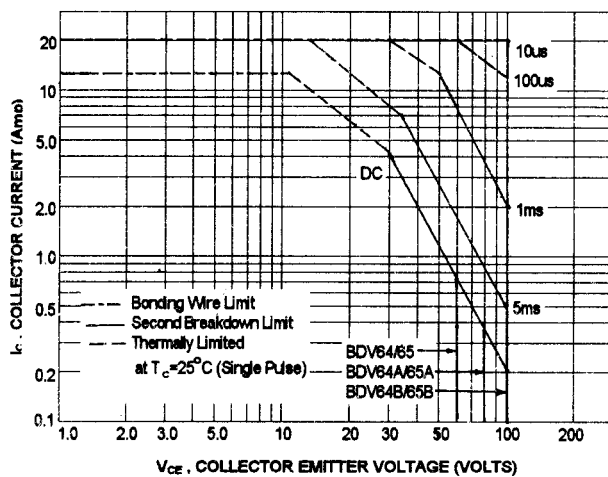
BDV65,A,B

$I_C - V_{BE}$



ACTIVE-REGION. SAFE OPERATING AREA (SOA)

BDV64,A,B / BDV65,A,B



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.