

## DARLINGTON COPLEMENTARY SILICON POWER TRANSISTORS

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

### FEATURES:

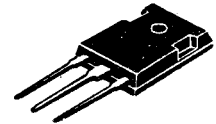
- \* Collector-Emitter Sustaining Voltage-  
 $V_{CE(sus)}$  = 60 V (Min) - BDV64, BDV65  
 = 80 V (Min) - BDV64A, BDV65A  
 = 100 V (Min) - BDV64B, BDV65B
- \* Collector-Emitter Saturation Voltage  
 $V_{CE(sat)}$  = 2.0 V (Max.) @  $I_C = 5.0$  A
- \* Monolithic Construction with Built-in Base-Emitter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

PNP	NPN
BDV64	BDV65
BDV64A	BDV65A
BDV64B	BDV65B

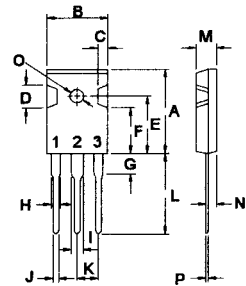
12 AMPERE DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS  
60-100 VOLTS  
125 WATTS

### 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 $25^\circ\text{C}$	$P_D$	125 1.0			W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +150			$^\circ\text{C}$



TO-247(3P)



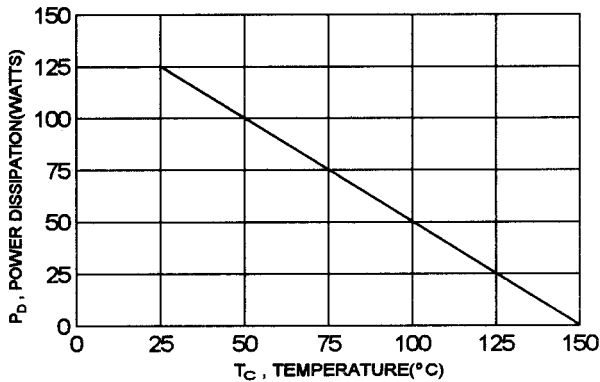
PIN 1.BASE  
2.COLLECTOR  
3.EMITTER

### THERMAL CHARACTERISTICS

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

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



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

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

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

**ON CHARACTERISTICS (1)**

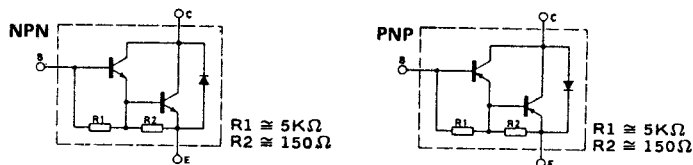
<b>DC Current Gain</b> ( $I_c = 1.0\text{ A}, V_{CE} = 4.0\text{ V}$ ) ( $I_c = 5.0\text{ A}, V_{CE} = 4.0\text{ V}$ ) ( $I_c = 10\text{ A}, V_{CE} = 4.0\text{ V}$ )	hFE	2500(Typ) 1000 500(Typ)		
<b>Collector-Emitter Saturation Voltage</b> ( $I_c = 5.0\text{ A}, I_B = 20\text{ mA}$ )	$V_{CE(sat)}$		2.0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

**DYNAMIC CHARACTERISTICS**

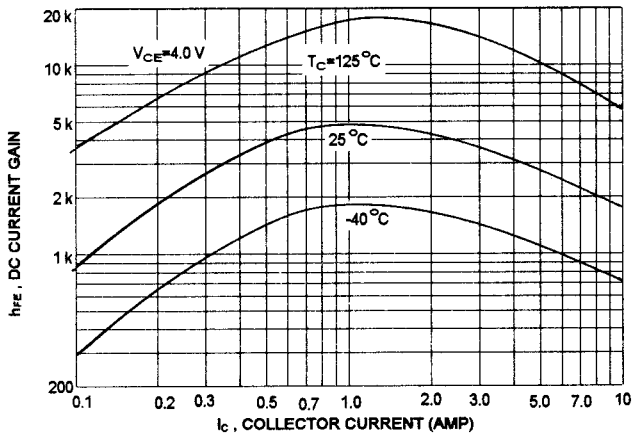
<b>Small-Signal Current Gain</b> ( $I_c = 5.0\text{ A}, V_{CE} = 4.0\text{ V}, f = 1.0\text{ MHz}$ )	$h_{fe}$	40		
<b>Output Capacitance</b> ( $V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$ )	$C_{ob}$		300	pF

(1) Pulse Test: Pulse width =  $300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

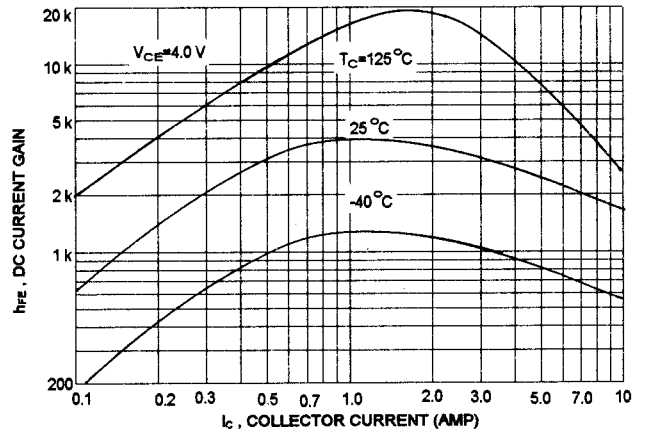
**INTERNAL SCHEMATIC DIAGRAMS**



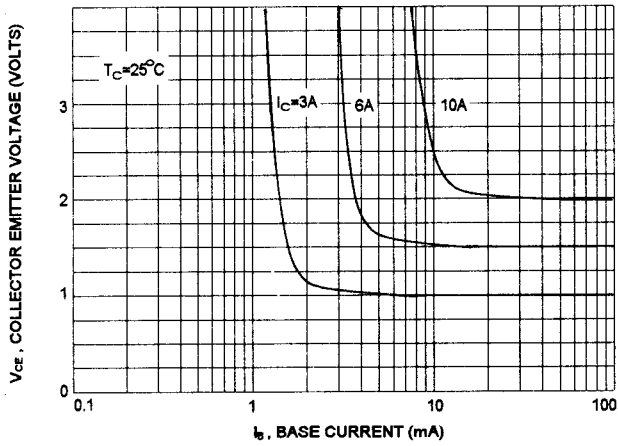
PNP BDV64,A,B  
DC CURRENT GAIN



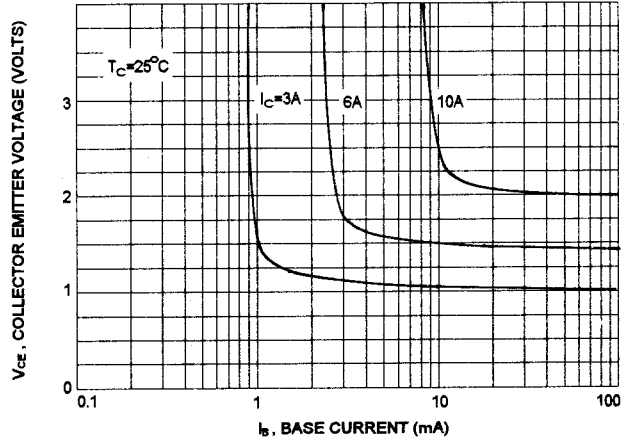
NPN BDV65,A,B  
DC CURRENT GAIN



COLLECTOR SATURATION REGION

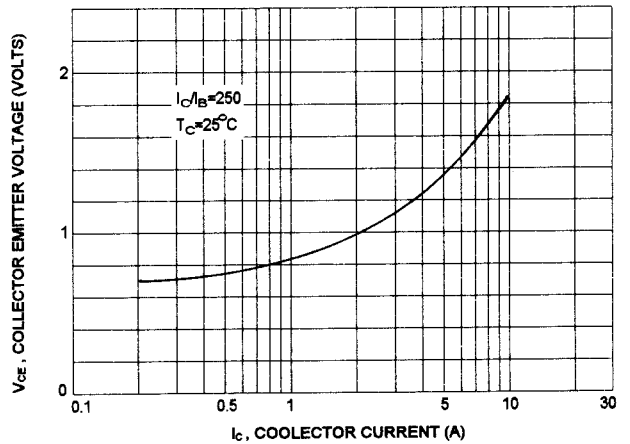
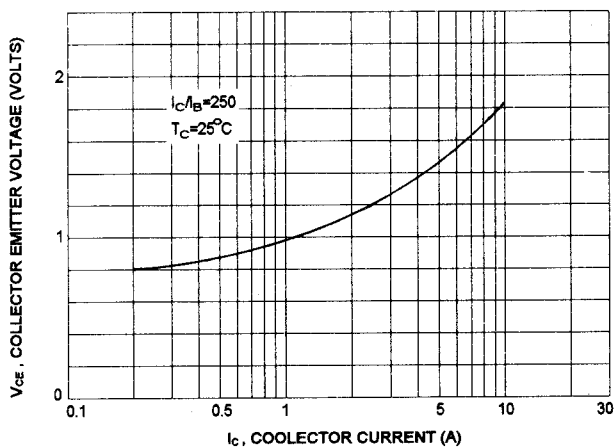


COLLECTOR SATURATION REGION



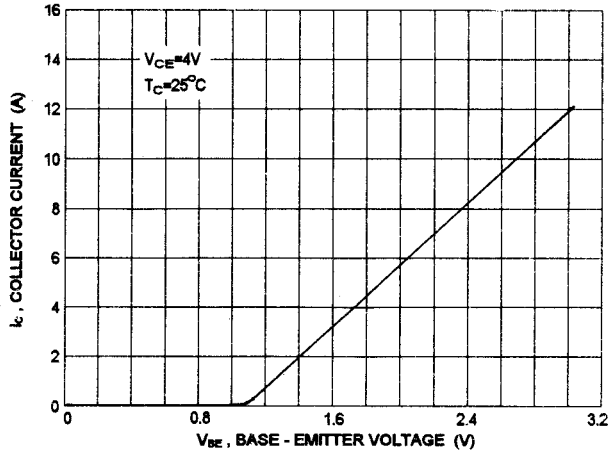
VCE(sat) - Ic

VCE(sat) - Ic



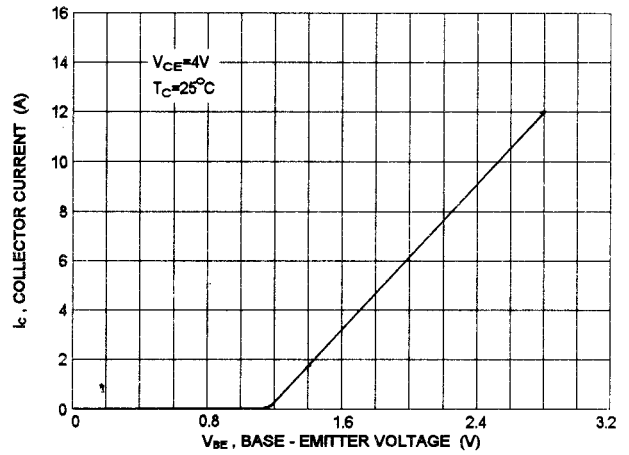
PNP BDV64,A,B

$I_c - V_{be}$



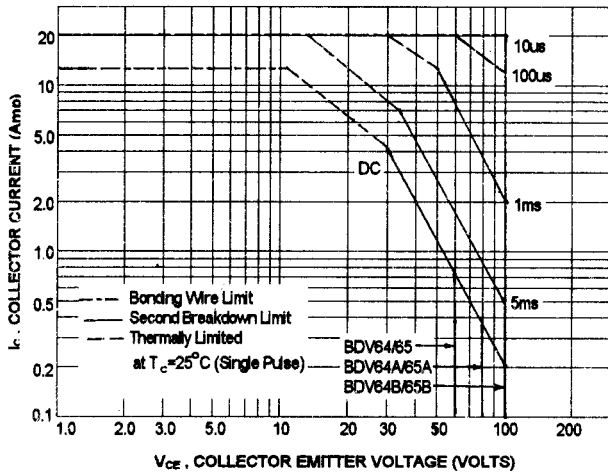
BDV65,A,B

$I_c - V_{be}$



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

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