

**NPN BD683**  
**PNP BD684**

## SILICON DARLINGTON POWER TRANSISTORS

The BD683 is NPN epitaxial-base transistors in monolithic Darlington circuit for audio and video applications.

They are mounted in Jedec TO-126 plastic package.  
PNP complement is BD684.

### ABSOLUTE MAXIMUM RATINGS

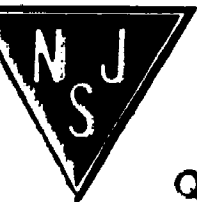
Symbol	Ratings	Value	Unit
$V_{CEO}$	Collector-Emitter Voltage	120	V
$V_{CBO}$	Collector-Base Voltage	140	V
$V_{EBO}$	Emitter-Base Voltage	5	V
$I_C$	Collector Current	$I_C$	4
		$I_{CM}$	6
$I_B$	Base current (peak value)	$I_{BM}$	0.1
$P_T$	Total power Dissipation	@ $T_{mb} = 25^\circ\text{C}$	40
$T_J$	Junction Temperature		150
$T_{Stg}$	Storage Temperature		-65 to +150

### THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
$R_{thJ-mb}$	Thermal Resistance, Junction to mounting base	3.12	K/W
$R_{thJ-a}$	Thermal Resistance, Junction to ambient in free air	100	K/W

NJ Semi-Conductors reserves the right to change test conditions, parameters limits and package dimensions without notice information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

**Quality Semi-Conductors**



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## ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit
$I_{CBO}$	Collector cut-off current	$I_E=0, V_{CB}=V_{CEOMAX}=120\text{ V}$ $I_E=0, V_{CB}=1/2V_{CBOMAX}=70\text{ V}, T_J=150^\circ\text{C}$	-	-	0,2 1	mA
$I_{CEO}$	Collector cut-off current	$I_B=0, V_{CE}=1/2V_{CEOMAX}=60\text{ V}$	-	-	0,2	mA
$I_{EBO}$	Emitter cut-off current	$I_C=0, V_{EB}=5\text{ V}$	-	-	5	mA
$V_{CE(SAT)}$	Collector-Emitter saturation Voltage	$I_C=1.5\text{ A}, I_B=6\text{ mA}$	-	-	2,5	V
$h_{FE}$	DC Current Gain	$V_{CE}=3\text{ V}, I_C=500\text{ mA}$	-	2200	-	
		$V_{CE}=3\text{ V}, I_C=1,5\text{ A}$	750	-	-	
		$V_{CE}=3\text{ V}, I_C=4\text{ A}$	-	1500	-	
$V_{BE}$	Base-Emitter Voltage(1&2)	$V_{CE}=3\text{ V}, I_C=1,5\text{ A}$	-	-	2,5	V
$h_{fe}$	Small signal current gain	$V_{CE}=3\text{ V}, I_C=1,5\text{ A}, f=1\text{ MHz}$	10	-	-	
$f_{hfe}$	Ut-off frequency	$V_{CE}=3\text{ V}, I_C=1,5\text{ A}$	-	60	-	kHz
$V_F$	Diode forward voltage	$I_F=1,5\text{ A}$				
$I_{(SB)}$	Second-breakdown collector current	$V_{CE}=50\text{ V}, t_p=20\text{ms, non rep., without heatsink}$	0,8	-	-	A
$t_{on}$	Turn-on time	$I_{con}=1,5\text{ A}, I_{bon}=-I_{boff}=6\text{ mA}, V_{CC}=30\text{ V}$	-	0,8	2	$\mu\text{s}$
$t_{off}$	Turn-off time		-	4,5	8	

1. Measured under pulse conditions:  $t_p < 300\mu\text{s}, \delta < 2\%$ .
2.  $V_{BE}$  decreases by about 3,6 mV/K with increasing temperature.

## MECHANICAL DATA CASE TO-126

	DIMENSIONS			
	mm		inches	
	min	max	min	max
A	7.4	7.8	0.295	0.307
B	10.5	10.8	0.413	0.425
C	2.4	2.7	0.094	0.106
D	0.7	0.9	0.027	0.035
E	2.2 typ.		0.087 typ.	
F	0.49	0.75	0.019	0.029
G	4.4 typ.		0.173 typ.	
H	2.54 typ.		0.100 typ.	
L	15.7 typ.		0.618 typ.	
M	1.2 typ.		0.047 typ.	
N	3.8 typ.		0.149 typ.	
P	3.0	3.2	0.118	0.126

Pin 1 :	Emitter
Pin 2 :	Collector
Pin 3 :	Base

