Darlington Complementary Silicon Power Transistors

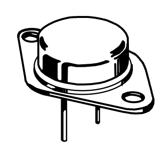
. . . designed for general−purpose amplifier and low−frequency switching applications.

- High DC Current Gain @ I_C = 10 Adc —
  h_{FE} = 2400 (Typ) — 2N6282, 2N6283, 2N6284
  = 4000 (Typ) — 2N6285, 2N6286, 2N6287
- Collector−Emitter Sustaining Voltage —
  $V_{CEO(sus)}$ = 60 Vdc (Min) — 2N6282, 2N6285
  = 80 Vdc (Min) — 2N6283, 2N6286
  = 100 Vdc (Min) — 2N6284, 2N6287
- Monolithic Construction with Built−In Base−Emitter Shunt Resistors

NPN
2N6282
thru
2N6284*
PNP
2N6285
thru
2N6287*

*ON Semiconductor Preferred Device

DARLINGTON
20 AMPERE
COMPLEMENTARY
SILICON
POWER TRANSISTORS
60, 80, 100 VOLTS
160 WATTS



CASE 1−07
TO−204AA
(TO−3)

***MAXIMUM RATINGS**

Rating	Symbol	2N6282 2N6285	2N6283 2N6286	2N6284 2N6287	Unit
Collector−Emitter Voltage	V_{CEO}	60	80	100	Vdc
Collector−Base Voltage	V_{CB}	60	80	100	Vdc
Emitter−Base Voltage	V_{EB}	5.0			Vdc
Collector Current — Continuous Peak	I_C	20 40			Adc
Base Current	I_B	0.5			Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	160 0.915			Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200			°C

***THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.09	°C/W

*Indicates JEDEC Registered Data.

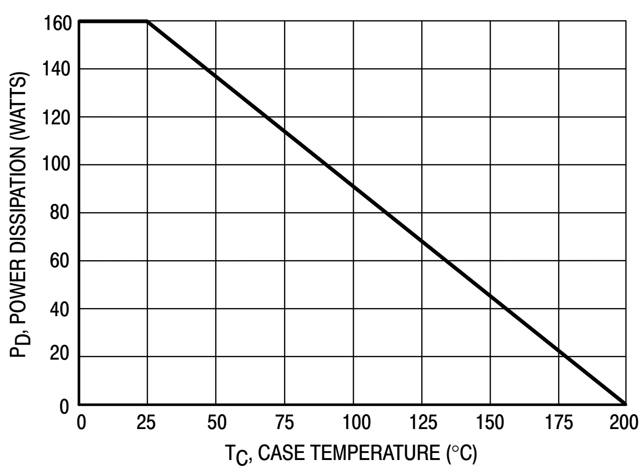


Figure 1. Power Derating

Preferred devices are ON Semiconductor recommended choices for future use and best overall value.

***ELECTRICAL CHARACTERISTICS** (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Sustaining Voltage (I_C = 0.1 Adc, I_B = 0)	2N6282, 2N6285 2N6283, 2N6286 2N6284, 2N6287	$V_{CEO(sus)}$	60 80 100	— — —	Vdc
Collector Cutoff Current (V_{CE} = 30 Vdc, I_B = 0) (V_{CE} = 40 Vdc, I_B = 0) (V_{CE} = 50 Vdc, I_B = 0)	2N6282, 2N6285 2N6283, 2N6286 2N6284, 2N6287	I_{CEO}	— — —	1.0 1.0 1.0	mAdc
Collector Cutoff Current (V_{CE} = Rated V_{CB}, $V_{BE(off)}$ = 1.5 Vdc) (V_{CE} = Rated V_{CB}, $V_{BE(off)}$ = 1.5 Vdc, T_C = 150°C)		I_{CEX}	— —	0.5 5.0	mAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)		I_{EBO}	—	2.0	mAdc
ON CHARACTERISTICS (1)					
DC Current Gain (I_C = 10 Adc, V_{CE} = 3.0 Vdc) (I_C = 20 Adc, V_{CE} = 3.0 Vdc)		h_{FE}	750 100	18,000 —	—
Collector−Emitter Saturation Voltage (I_C = 10 Adc, I_B = 40 mAdc) (I_C = 20 Adc, I_B = 200 mAdc)		$V_{CE(sat)}$	— —	2.0 3.0	Vdc
Base−Emitter On Voltage (I_C = 10 Adc, V_{CE} = 3.0 Vdc)		$V_{BE(on)}$	—	2.8	Vdc
Base−Emitter Saturation Voltage (I_C = 20 Adc, I_B = 200 mAdc)		$V_{BE(sat)}$	—	4.0	Vdc
DYNAMIC CHARACTERISTICS					
Magnitude of Common Emitter Small−Signal Short−Circuit Forward Current Transfer Ratio (I_C = 10 Adc, V_{CE} = 3.0 Vdc, f = 1.0 MHz)		$\|h_{fe}\|$	4.0	—	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 0.1 MHz)	2N6282,83,84 2N6285,86,87	C_{ob}	— —	400 600	pF
Small−Signal Current Gain (I_C = 10 Adc, V_{CE} = 3.0 Vdc, f = 1.0 kHz)		h_{fe}	300	—	—

*Indicates JEDEC Registered Data.
(1) Pulse test: Pulse Width = 300 μs, Duty Cycle = 2%

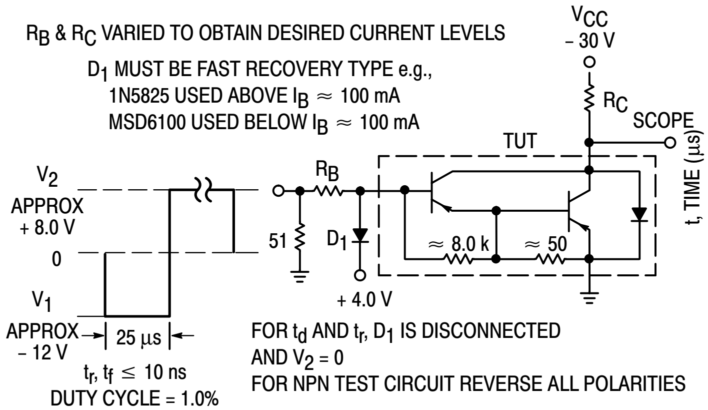


Figure 2. Switching Times Test Circuit

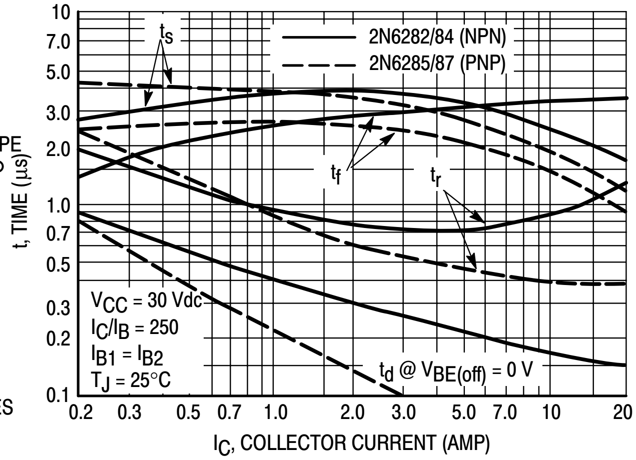


Figure 3. Switching Times

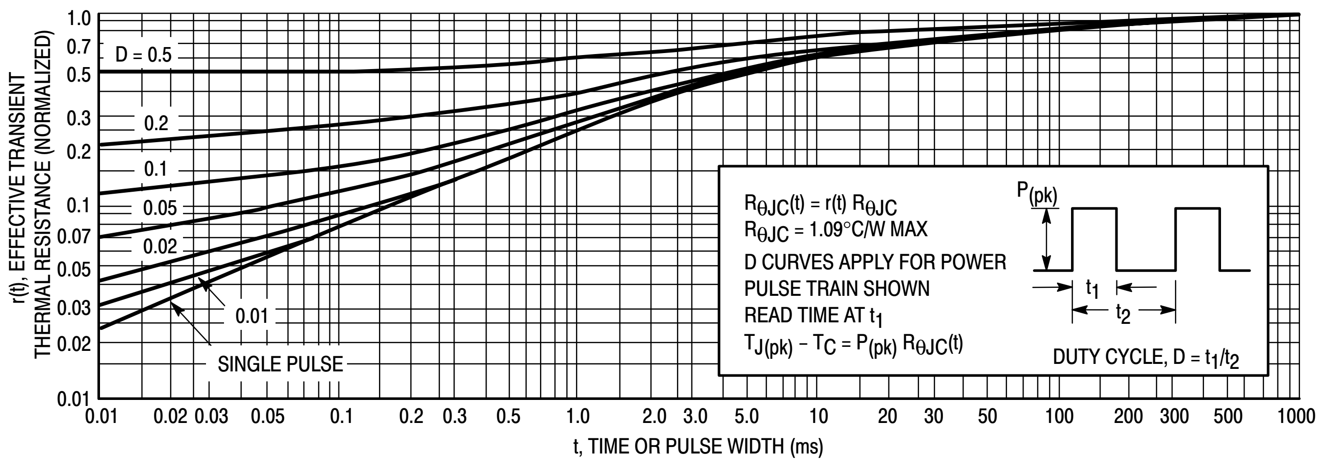


Figure 4. Thermal Response

ACTIVE−REGION SAFE OPERATING AREA

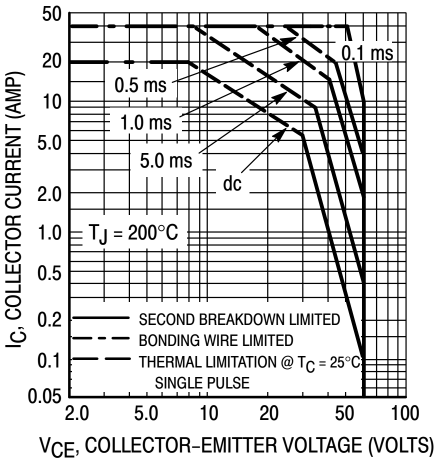


Figure 5. 2N6282, 2N6285

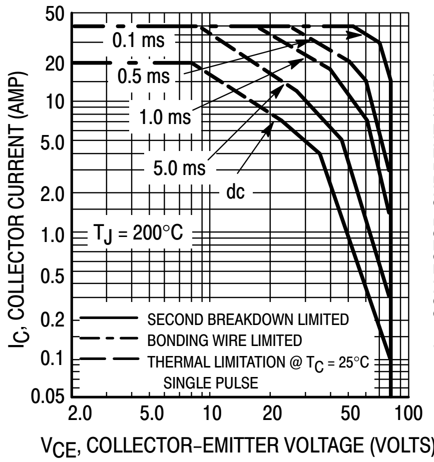


Figure 6. 2N6283, 2N6286

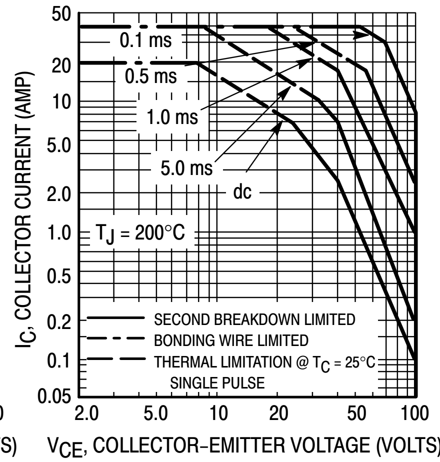


Figure 7. 2N6284, 2N6287

There are two limitations 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 the curves indicate.

The data of Figures 5, 6, and 7 is based on $T_{J(pk)}$ = 200°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)}$ < 200°C. $T_{J(pk)}$ may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

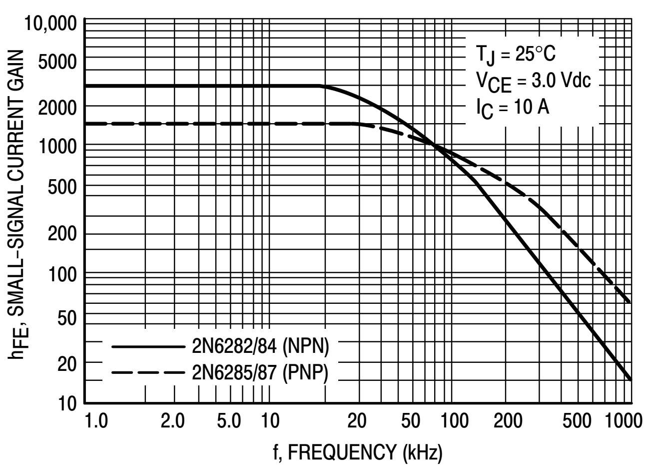


Figure 8. Small−Signal Current Gain

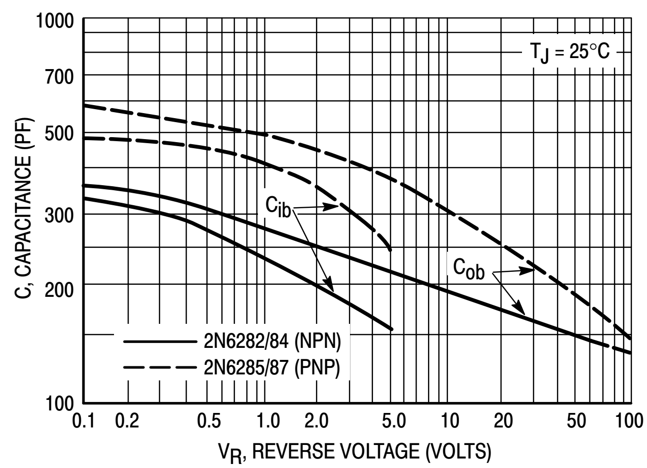


Figure 9. Capacitance

NPN
2N6282, 2N6283, 2N6284

PNP
2N6285, 2N6286, 2N6287

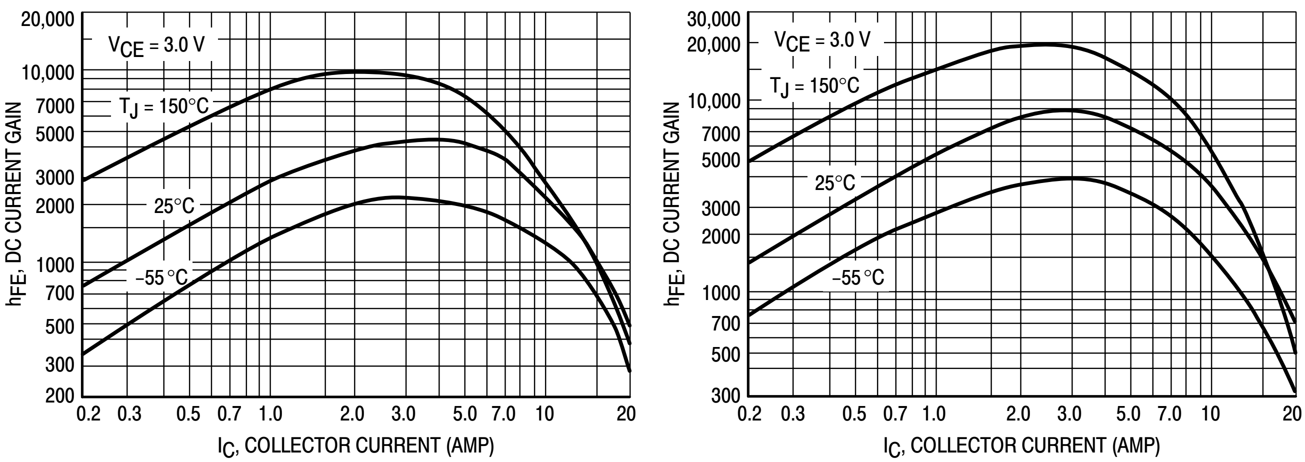


Figure 10. DC Current Gain

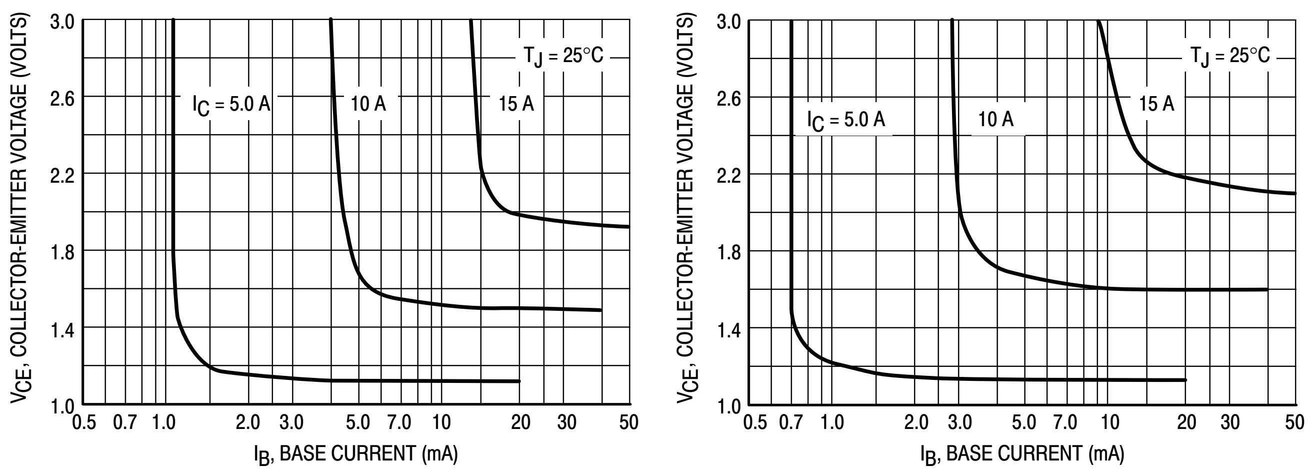


Figure 11. Collector Saturation Region

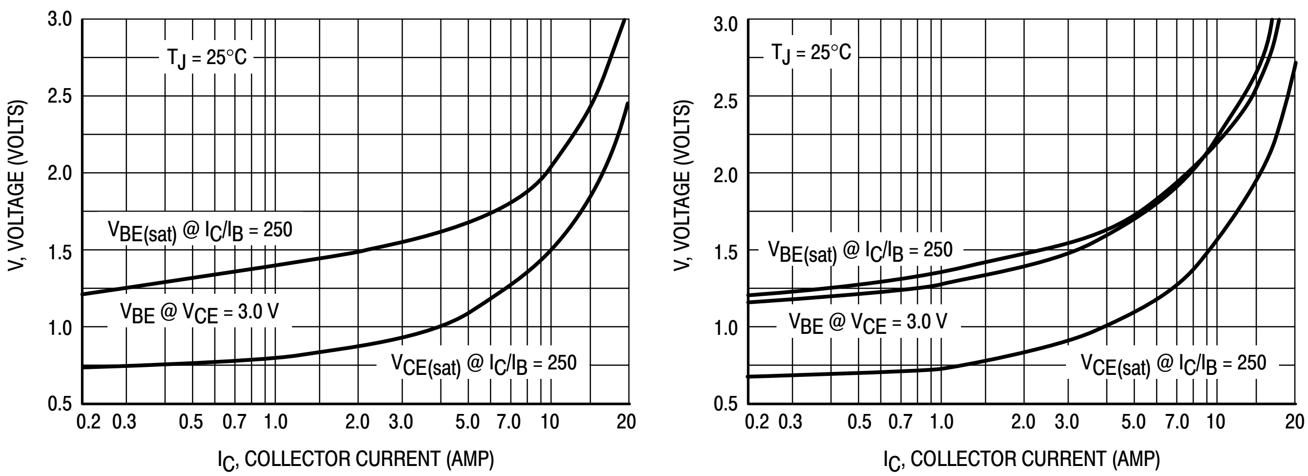


Figure 12. “On” Voltages

NPN
2N6282, 2N6283, 2N6284

PNP
2N6285, 2N6286, 2N6287

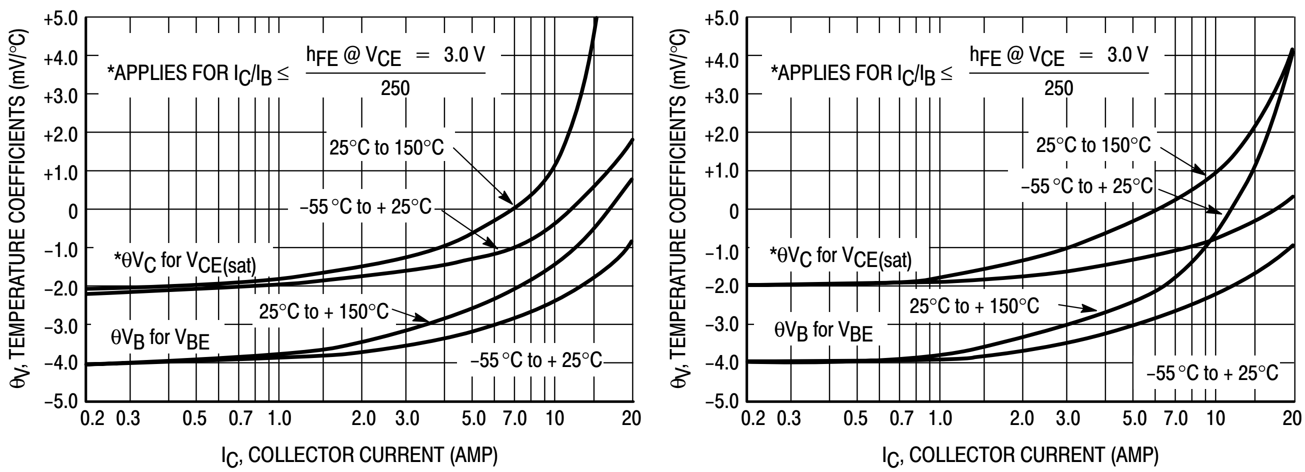


Figure 13. Temperature Coefficients

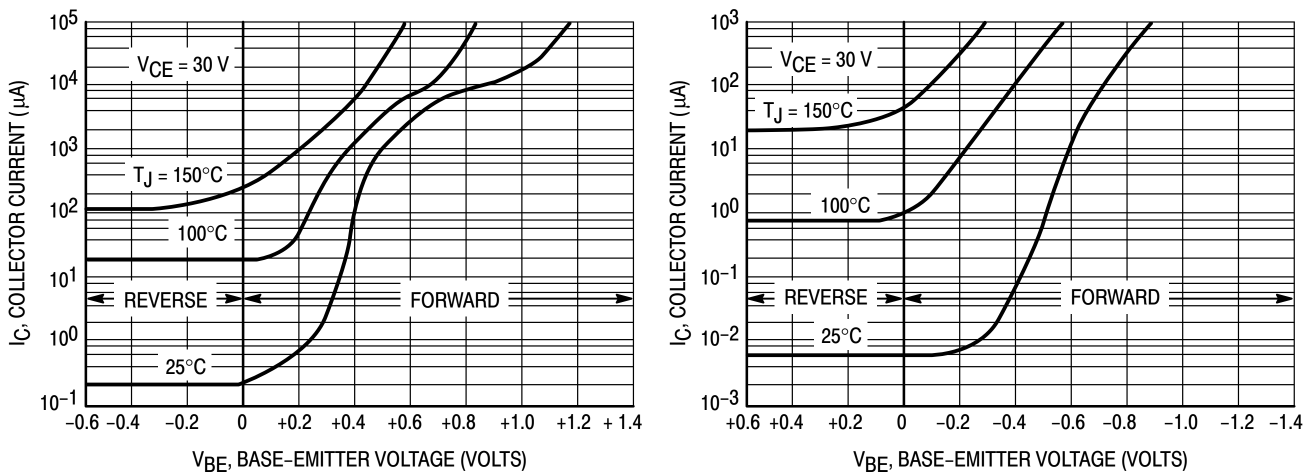


Figure 14. Collector Cut−Off Region

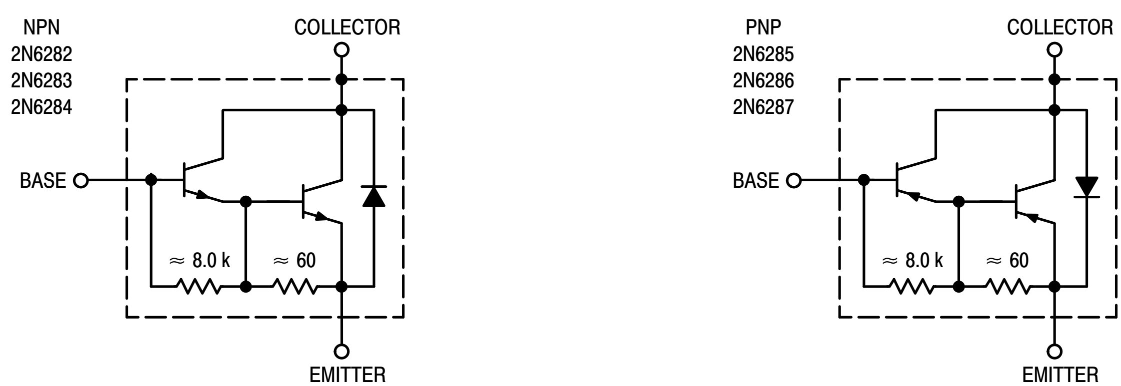


Figure 15. Darlington Schematic