MJD112
MJD117

Complementary power Darlington transistors

Features

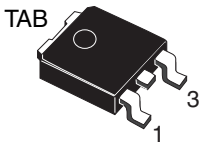
- Good h_{FE} linearity
- High f_T frequency
- Monolithic Darlington configuration with integrated antiparallel collector-emitter diode

Application

- Linear and switching industrial equipment

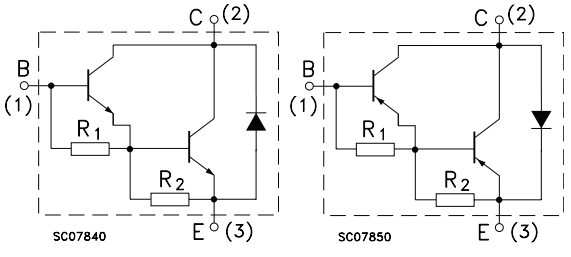
Description

The devices are manufactured in planar technology with “base island” layout and monolithic Darlington configuration.



TO-252
(DPAK)

Figure 1. Internal schematic diagram



R_1 typ. = 15 kΩ R_2 typ. = 100 Ω

Table 1. Device summary

Order codes	Marking	Polarity	Package	Packaging
MJD112T4	MJD112	NPN	DPAK	Tape and reel
MJD117T4	MJD117	PNP	DPAK	Tape and reel

1 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage (I_E = 0)	100	V
V_{CEO}	Collector-emitter voltage (I_B = 0)		
V_{EBO}	Emitter-base voltage (I_C = 0)	5	V
I_C	Collector current	2	A
I_{CM}	Collector peak current	4	A
I_B	Base current	0.05	A
P_{TOT}	Total dissipation at T_{case} = 25 °C	20	W
T_{STG}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Note: For PNP types voltage and current values are negative.

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case max.	6.25	°C/W

2 Electrical characteristics

T_{case} = 25 °C; unless otherwise specified.

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CEV}	Collector cut-off current (V_{BE} = -1.5 V)	V_{CE} = 80 V V_{CE} = 80 V, T_c = 125 °C		-	10 0.5	µA mA
I_{CBO}	Collector cut-off current (I_E = 0)	V_{CB} = 80 V V_{CB} = 100 V		-	10 20	µA
I_{CEO}	Collector cut-off current (I_B = 0)	V_{CE} = 50 V		-	20	µA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 5 V		-	2	mA
$V_{CEO(sus)}$(1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 30 mA	100	-		V
$V_{CE(sat)}$(1)	Collector-emitter saturation voltage	I_C = 2 A I_B = 8 mA		-	2	V
		I_C = 4 A I_B = 40 mA		-	3	
$V_{BE(sat)}$(1)	Base-emitter saturation voltage	I_C = 4 A I_B = 40 mA		-	4	V
$V_{BE(on)}$	Base-emitter on voltage	I_C = 2 A V_{CE} = 3 V		-	2.8	V
h_{FE}(1)	DC current gain	I_C = 0.5 A V_{CE} = 3 V	500	-		
		I_C = 2 A V_{CE} = 3 V	1000	-	12000	
		I_C = 4 A V_{CE} = 3 V	200	-		
f_T	Transition frequency	I_C = 0.75 A V_{CE} = 10 V f = 1 MHz	25	-		MHz
C_{CBO}	Collector base capacitance (I_E = 0)	V_{CB} = 10 V f = 0.1 MHz for MJD112 for MJD117		-	100 200	pF pF

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %

Note: For PNP types voltage and current values are negative.

2.1 Typical characteristic (curves)

Figure 2. DC current gain (V_{CE} = 3 V NPN)

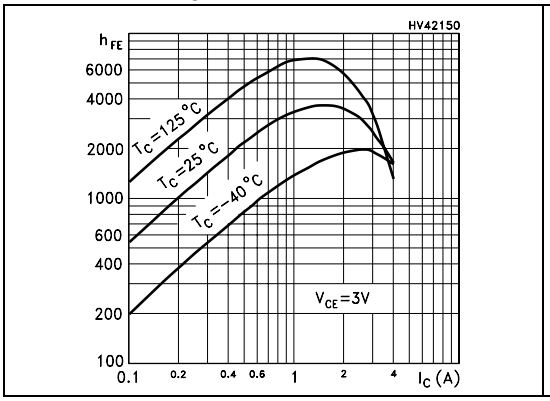


Figure 3. DC current gain (V_{CE} = - 3 V PNP)

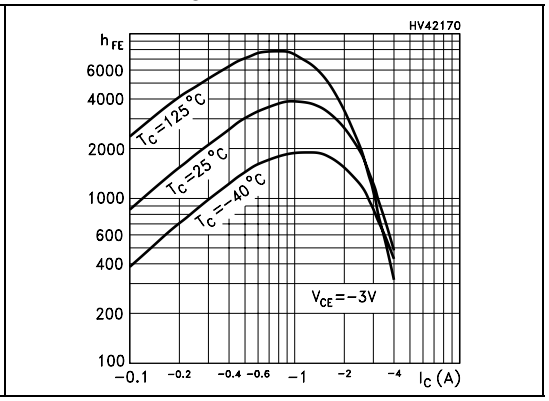


Figure 4. DC current gain (V_{CE} = 5 V NPN)

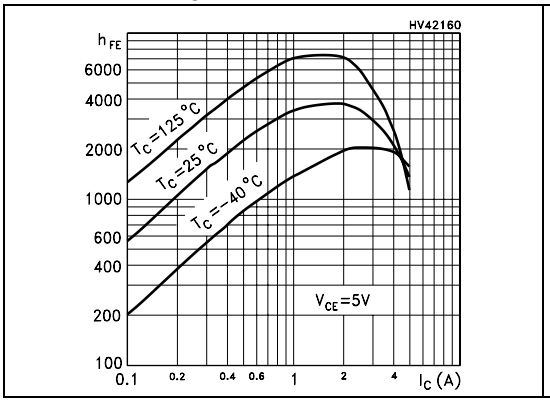


Figure 5. DC current gain (V_{CE} = - 5 V PNP)

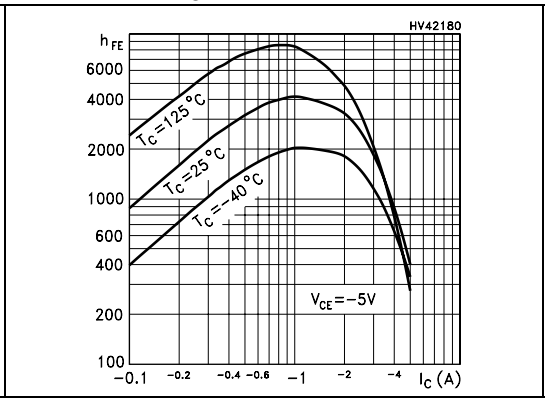


Figure 6. Collector-emitter saturation voltage (NPN)

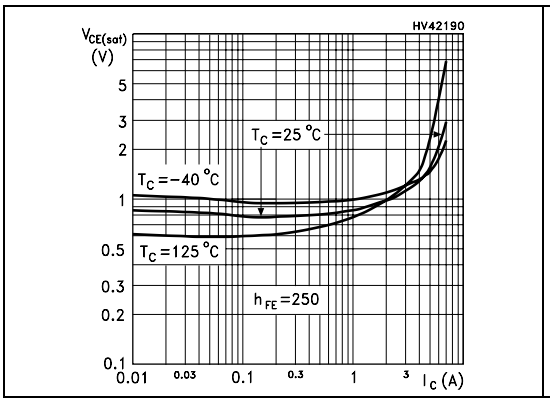


Figure 7. Collector-emitter saturation voltage (PNP)

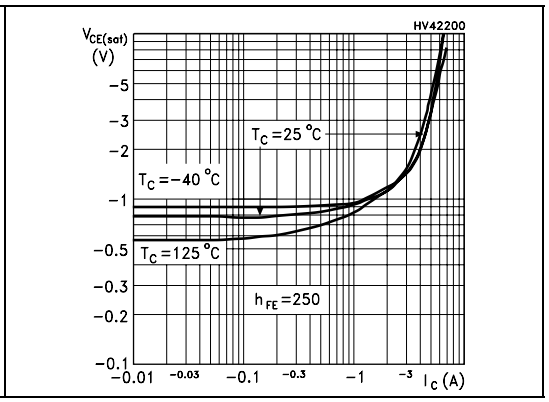


Figure 8. Base-emitter saturation voltage (NPN)

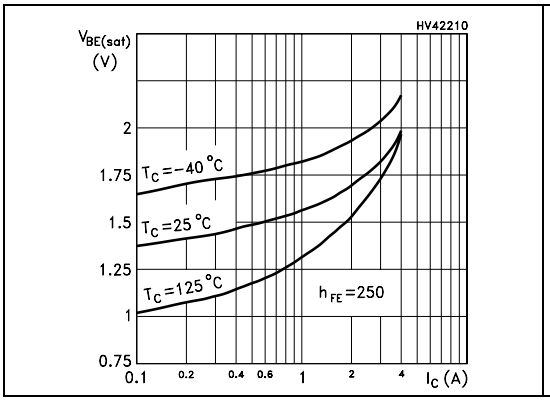


Figure 9. Base-emitter saturation voltage (PNP)

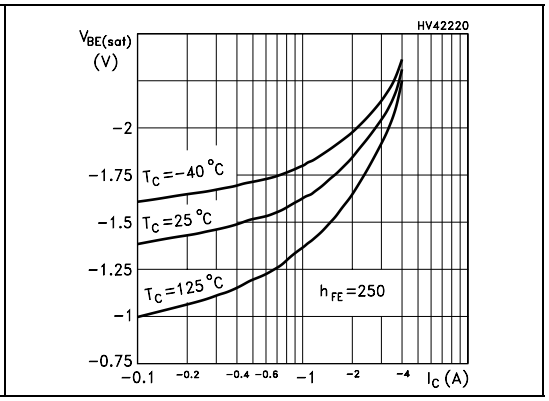


Figure 10. Base-emitter on voltage (NPN)

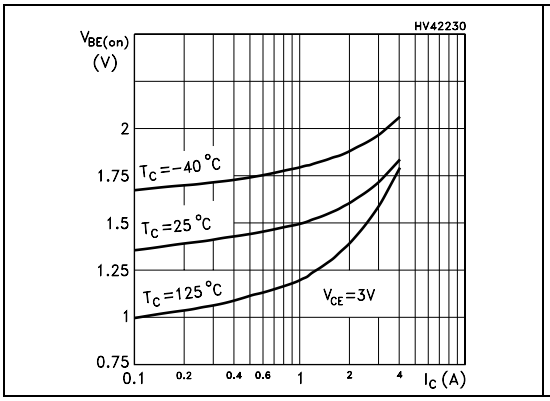


Figure 11. Base-emitter on voltage (PNP)

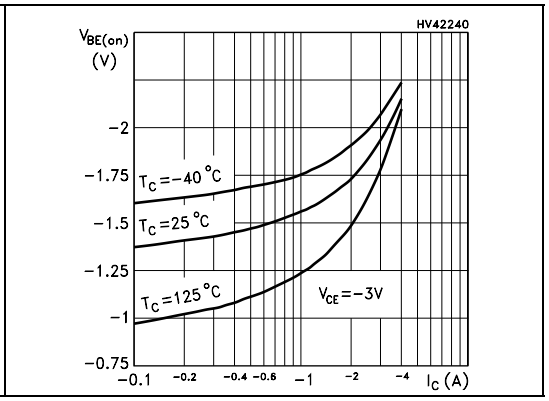


Figure 12. Resistive load switching time (NPN, on)

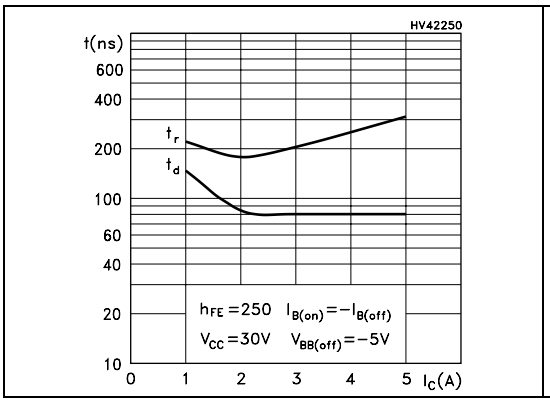


Figure 13. Resistive load switching time (PNP, on)

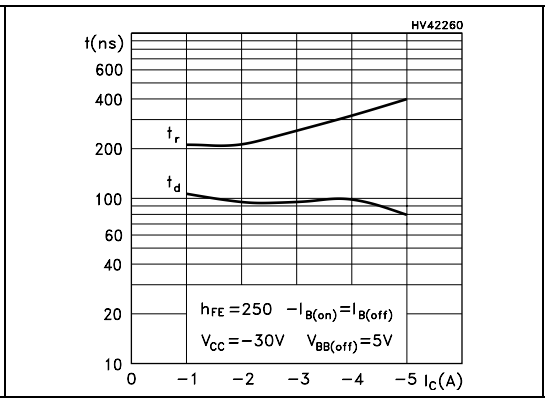


Figure 14. Resistive load switching time (NPN, off)

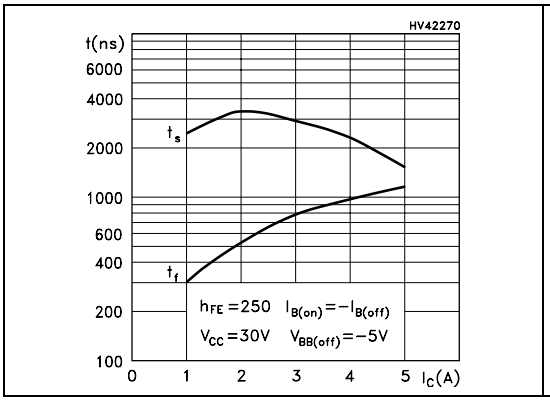
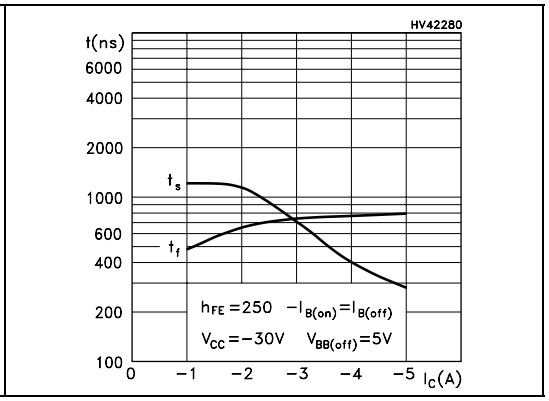


Figure 15. Resistive load switching time (PNP, off)



3 Package mechanical data

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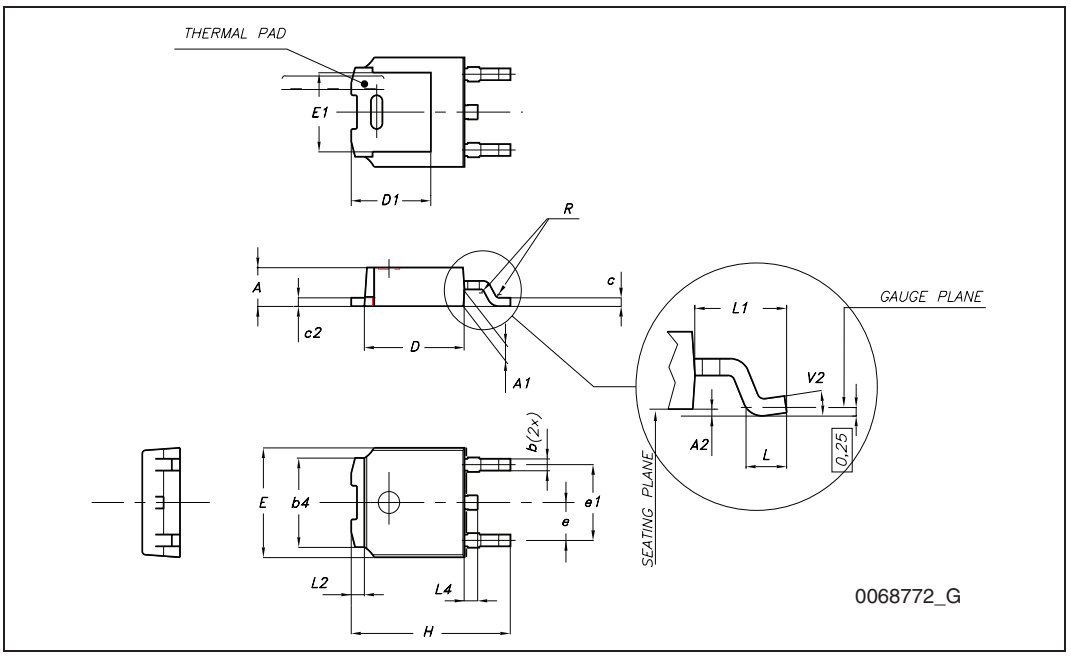
TO-252 (DPAK) mechanical data			
DIM.	mm.		
	min.	typ	max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1		5.10	
E	6.40		6.60
E1		4.70	
e		2.28	
e1	4.40		4.60
H	9.35		10.10
L	1		
L1		2.80	
L2		0.80	
L4	0.60		1
R		0.20	
V2	0 °		8 °



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
21-Jun-2004	2	Document migration, no content change.
21-Jan-2010	3	Modified TO-252 (DPAK) mechanical data.

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