MJD122
MJD127

Complementary power Darlington transistors

Features

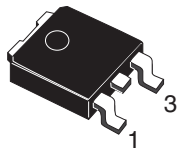
- Low collector-emitter saturation voltage
- Integrated antiparallel collector-emitter diode

Applications

- General purpose linear and switching

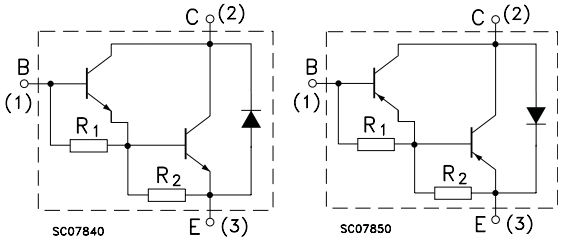
Description

The devices are manufactured in planar technology with “base island” layout and monolithic Darlington configuration. The resulting transistors show exceptional high gain performance coupled with very low saturation voltage.



DPAK

Figure 1. Internal schematic diagrams



NPN: R_1= 7 KΩ R_2= 70 Ω **PNP: R_1= 16 KΩ R_2= 60 Ω**

Table 1. Device summary

Order codes	Marking	Polarity	Package	Packaging
MJD122T4	MJD122	NPN	DPAK	Tape and reel
MJD127T4	MJD127	PNP		

Content

1 Electrical 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)	100	V
V_{EBO}	Emitter-base voltage (I_C = 0)	5	V
I_C	Collector current	8	A
I_{CM}	Collector peak current	16	A
I_B	Base current	0.12	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
$R_{thj\text{-}c}$	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_{CBO}	Collector cut-off current (I_E = 0)	V_{CB} = 100 V		-	10	µA
I_{CEO}	Collector cut-off current (I_B = 0)	V_{CE} = 50 V		-	10	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 = 4 A I_B = 16 mA I_C = 8 A I_B = 80 mA		-	2 4	V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 8 A I_B = 80 mA		-	4.5	V
$V_{BE(on)}$ (1)	Base-emitter on voltage	I_C = 4 A V_{CE} = 4 V		-	2.8	V
h_{FE} (1)	DC current gain	I_C = 4A V_{CE} = 4 V I_C = 8 A V_{CE} = 4 V	1000 100	-	12000	

1. Pulsed duration = 300 µs, duty cycle ≤1.5%

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

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

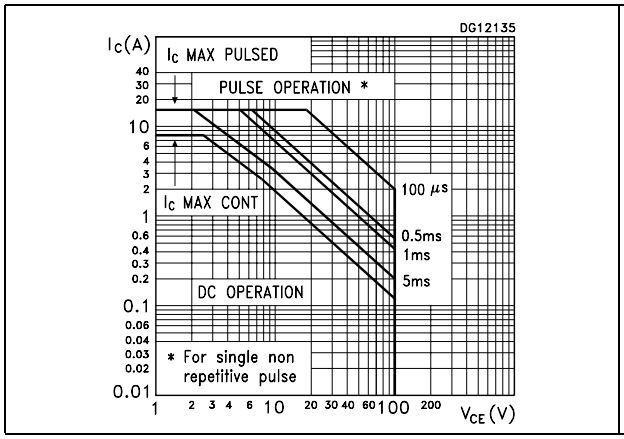


Figure 3. Derating curve

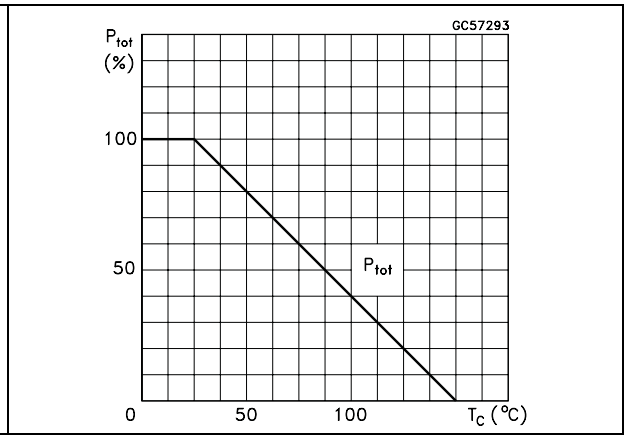


Figure 4. DC current gain for NPN type

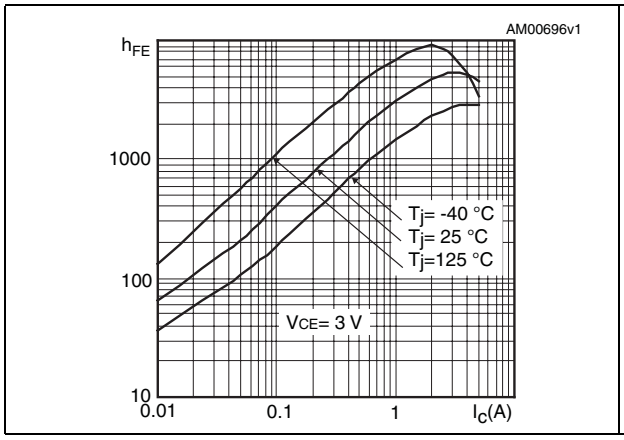


Figure 5. DC current gain for PNP type

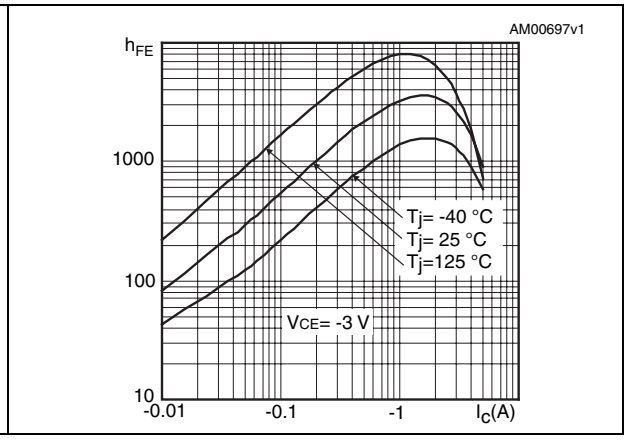


Figure 6. Collector-emitter saturation voltage for NPN type

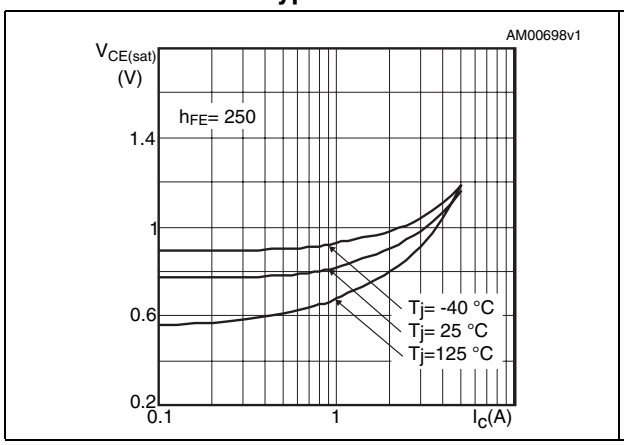


Figure 7. Collector-emitter saturation voltage for PNP type

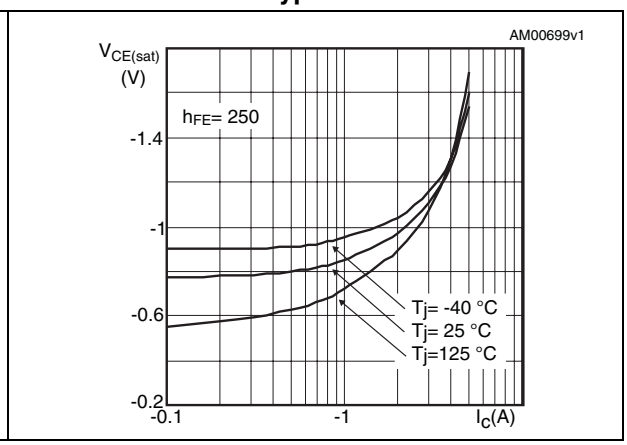


Figure 8. Base-emitter saturation voltage for NPN type

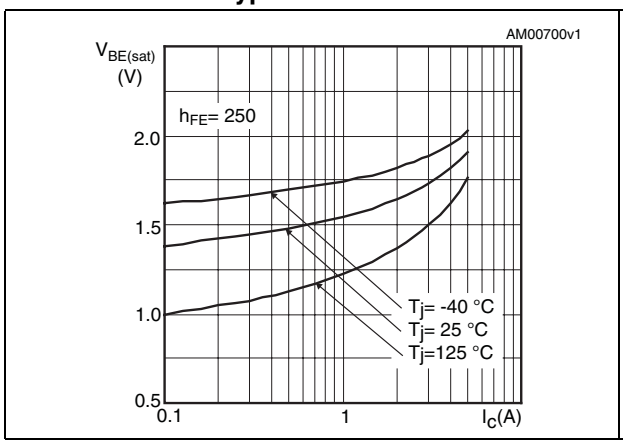


Figure 9. Base-emitter saturation voltage for PNP type

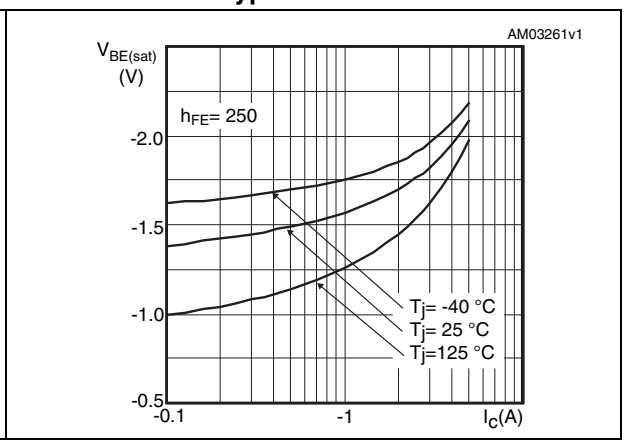


Figure 10. Base-emitter on voltage for NPN type

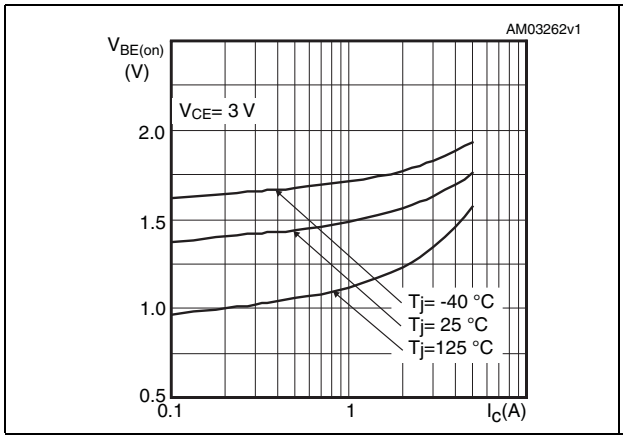


Figure 11. Base-emitter on voltage for PNP type

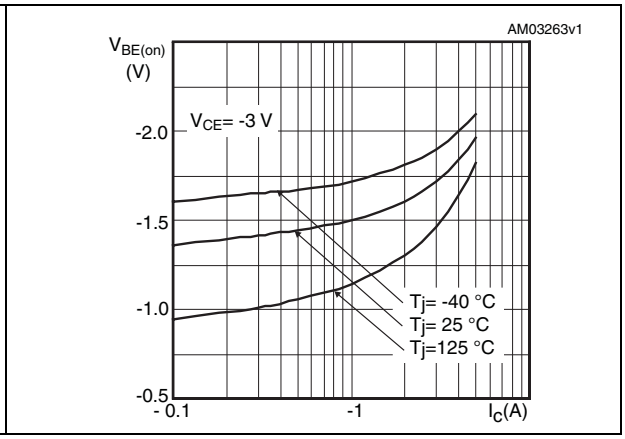


Figure 12. Resistive load switching times for NPN type (on)

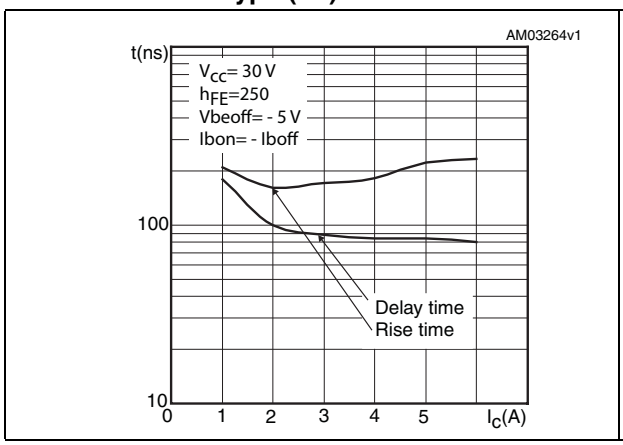


Figure 13. Resistive load switching times for PNP type (on)

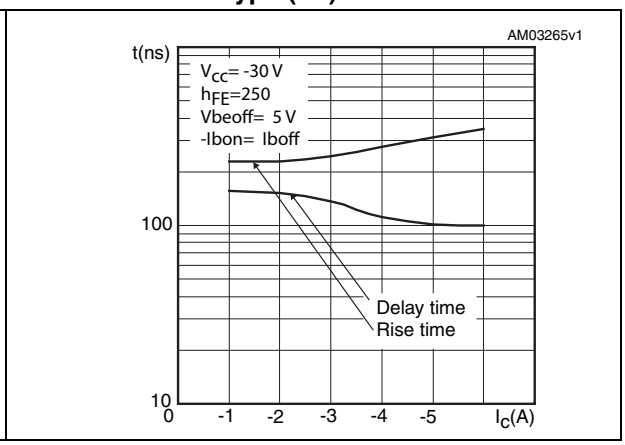


Figure 14. Resistive load switching times for NPN type (off)

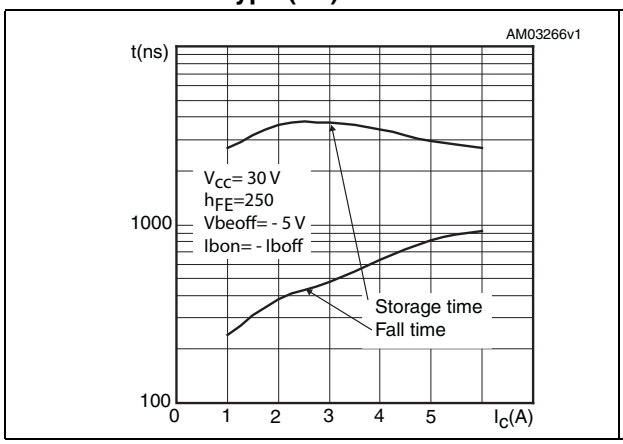


Figure 15. Resistive load switching times for PNP type (off)

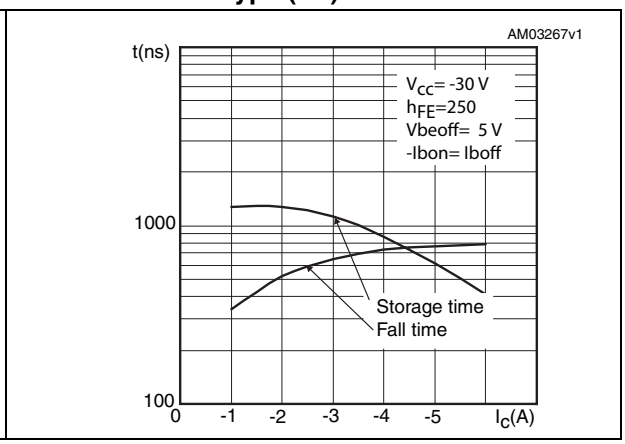


Figure 16. Capacitances for NPN type

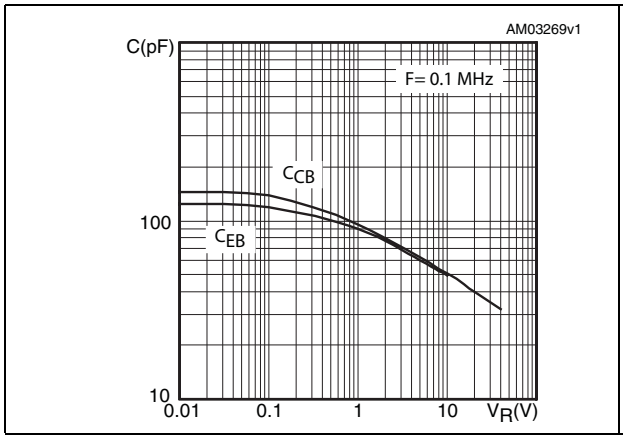
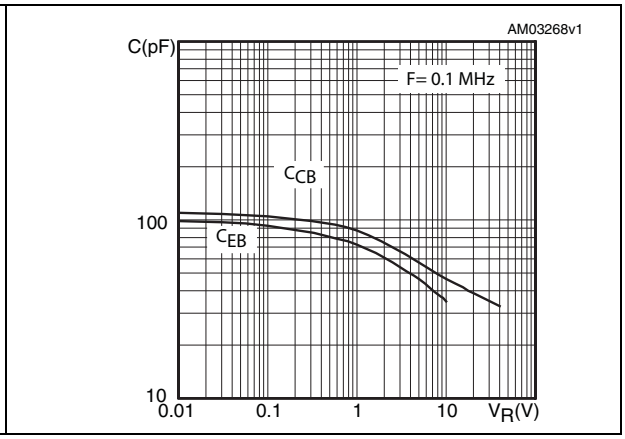
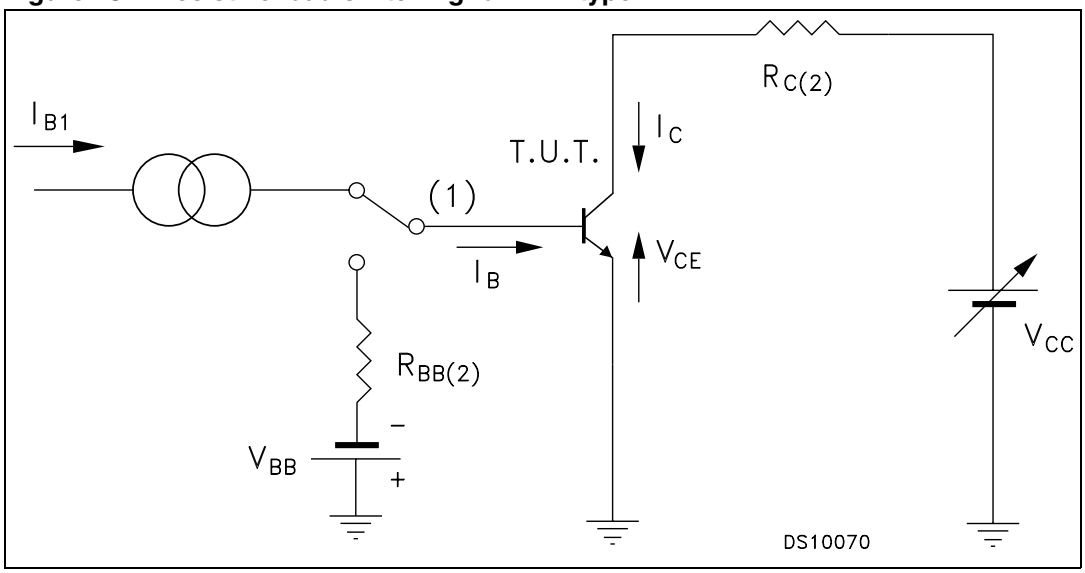


Figure 17. Capacitances for PNP type



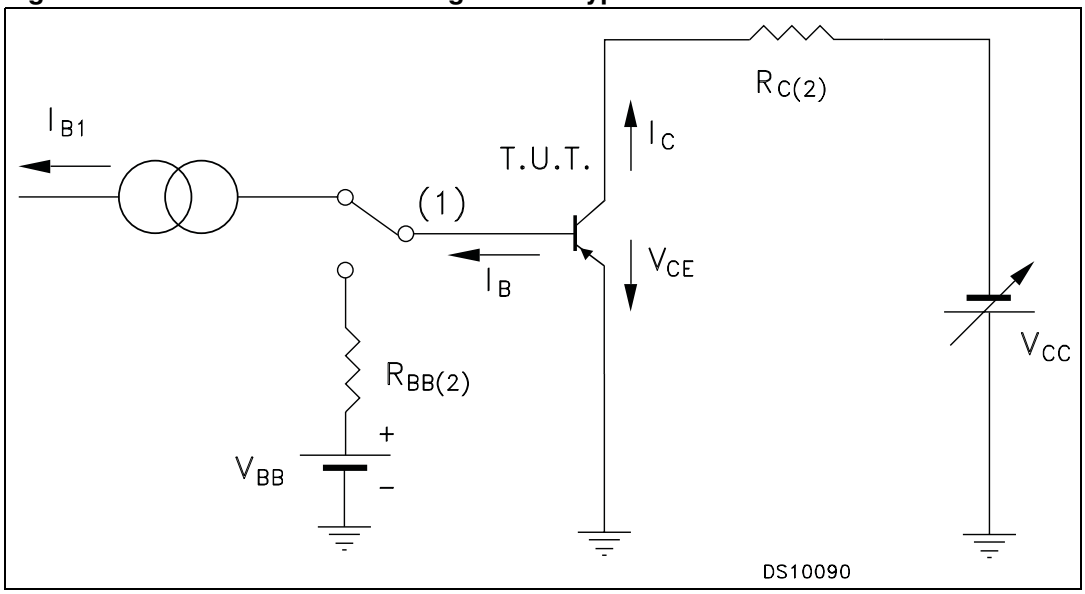
3 Test circuits

Figure 18. Resistive load switching for NPN type



1. Fast electronic switch
2. Non-inductive resistor

Figure 19. Resistive load switching for PNP type



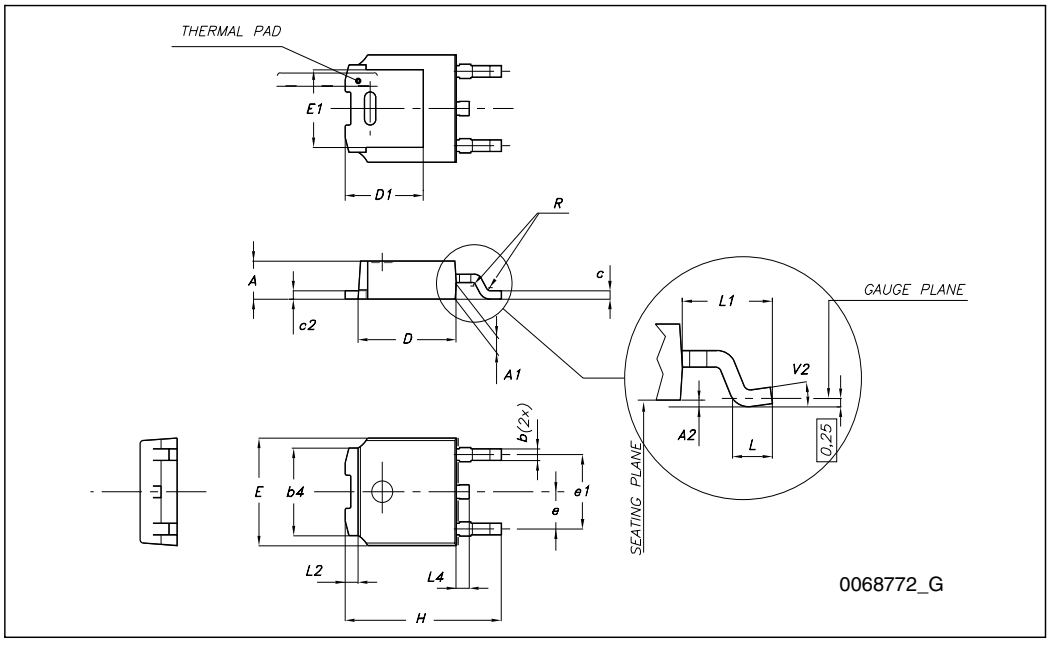
1. Fast electronic switch
2. Non-inductive resistor

4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

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 °



5 Revision history

Table 5. Document revision history

Date	Revision	Changes
01-Aug-2002	8	
01-Oct-2007	9	Collector current limits have been improved
03-Oct-2007	10	Package mechanical data updated
21-Apr-2009	11	The device MJD127 has been inserted *Section 2.1: Electrical characteristics (curves)* has been updated