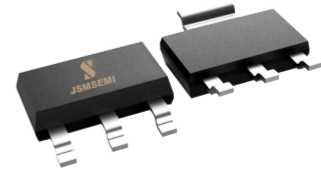


Description

The device is manufactured in Planar Technology with "Base Island" layout. The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage.



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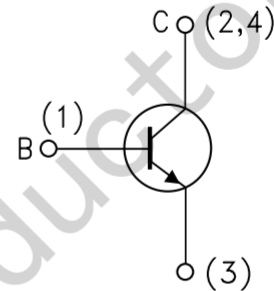
Features

- Very low collector to emitter saturation voltage
- High current gain characteristic
- Fast-switching speed

Applications

- Emergency lighting
- Voltage regulators
- Relay drivers
- High efficiency low voltage switching applications

Figure 1. Internal schematic diagram



Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage ($I_E = 0$)	150	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	60	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	7	V
I_C	Collector current	5	A
I_{CM}	Collector peak current ($t_p < 5$ ms)	10	A
I_B	Base current	1	A
I_{BM}	Base peak current ($t_p < 5$ ms)	2	A
P_{tot}	Total dissipation at $T_{amb} = 25$ °C	1.6	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-amb}$	Thermal resistance junction-ambient ⁽¹⁾	78	°C/W

1. Device mounted on a p.c.b. area of 1 cm²

Electrical characteristics

 ($T_{case} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current ($I_E = 0$)	$V_{CB} = 120\text{ V}$			50	nA
		$V_{CB} = 120\text{ V}$ $T_c = 100\text{ }^{\circ}\text{C}$			1	μA
I_{EBO}	Emitter cut-off current ($I_C = 0$)	$V_{EB} = 7\text{ V}$			10	nA
$V_{(BR)CBO}$	Collector-base breakdown voltage ($I_E = 0$)	$I_C = 100\text{ }\mu\text{A}$	150			V
$V_{(BR)CEO}^{(1)}$	Collector-emitter breakdown voltage ($I_B = 0$)	$I_C = 10\text{ mA}$	60			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage ($I_C = 0$)	$I_E = 100\text{ }\mu\text{A}$	7			V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 100\text{ mA}$ $I_B = 5\text{ mA}$		10	50	mV
		$I_C = 1\text{ A}$ $I_B = 50\text{ mA}$		70	120	mV
		$I_C = 2\text{ A}$ $I_B = 50\text{ mA}$		140	250	mV
		$I_C = 5\text{ A}$ $I_B = 200\text{ mA}$		320	500	mV
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = 4\text{ A}$ $I_B = 200\text{ mA}$		1	1.15	V
$V_{BE(on)}^{(1)}$	Base-emitter on voltage	$I_C = 4\text{ A}$ $V_{CE} = 1\text{ V}$		0.89	1	V
$h_{FE}^{(1)}$	DC current gain	$I_C = 10\text{ mA}$ $V_{CE} = 1\text{ V}$	150	300	350	
		$I_C = 2\text{ A}$ $V_{CE} = 1\text{ V}$	150	270		
		$I_C = 5\text{ A}$ $V_{CE} = 1\text{ V}$	90	140		
		$I_C = 10\text{ A}$ $V_{CE} = 1\text{ V}$	30	50		
f_T	Transition frequency	$V_{CE} = 10\text{ V}$ $I_C = 100\text{ mA}$		130		MHz
C_{CBO}	Collector-base capacitance ($I_E = 0$)	$V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$		50		pF
t_{on} t_s t_f	Resistive load					
	Turn-on time	$I_C = 1\text{ A}$ $V_{CC} = 10\text{ V}$		50		ns
	Storage time	$I_{B1} = -I_{B2} = 0.1\text{ A}$		1.35		μs
	Fall time			120		ns

 1. Pulse duration = 300 μs , duty cycle $\leq 1.5\%$

Electrical characteristics (curves)

Figure 2. Derating curve

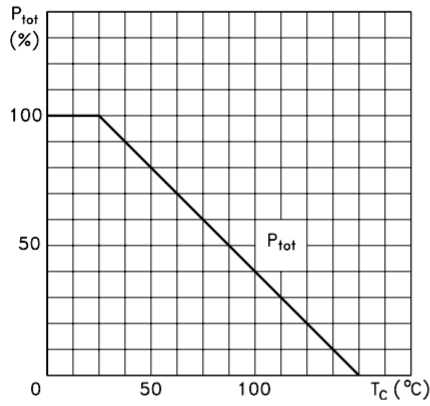


Figure 3. DC current gain

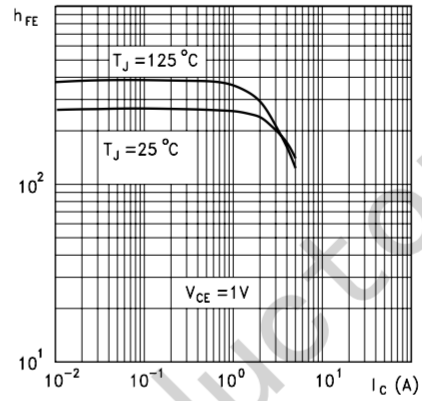


Figure 4. Collector-emitter saturation voltage

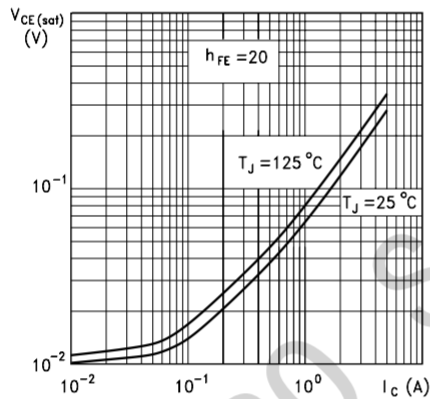


Figure 5. Collector-emitter saturation voltage

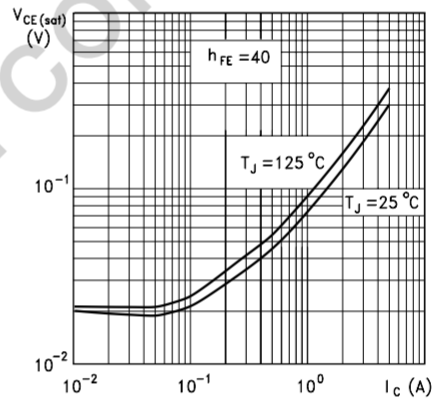


Figure 6. Base-emitter saturation voltage

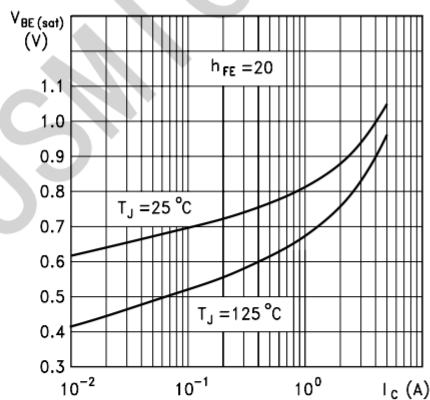


Figure 7. Base-emitter on voltage

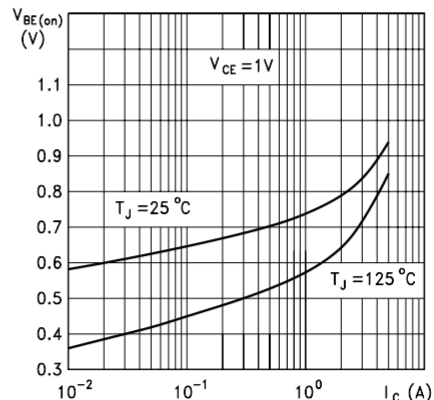


Figure 8. Resistive load switching time

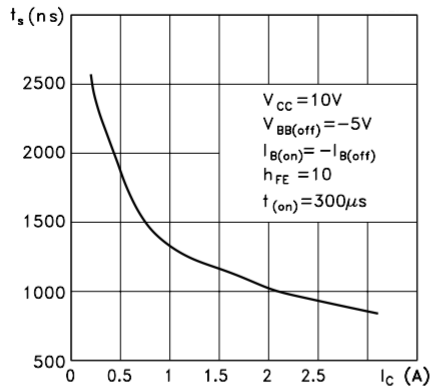


Figure 9. Resistive load switching time

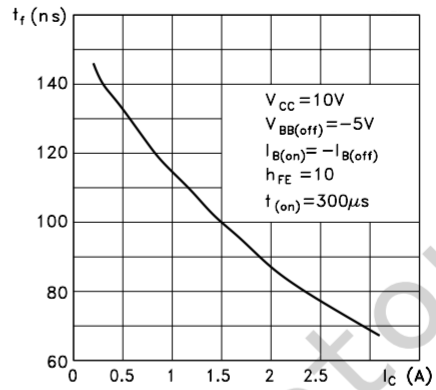


Figure 10. Resistive load switching time

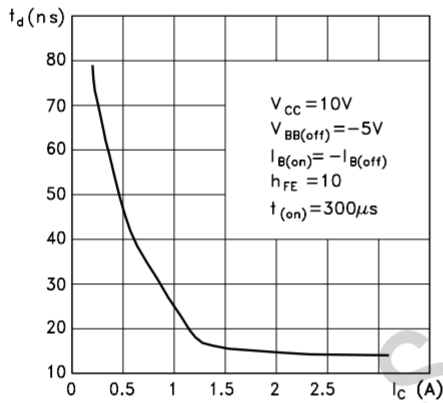


Figure 11. Inductive load switching time

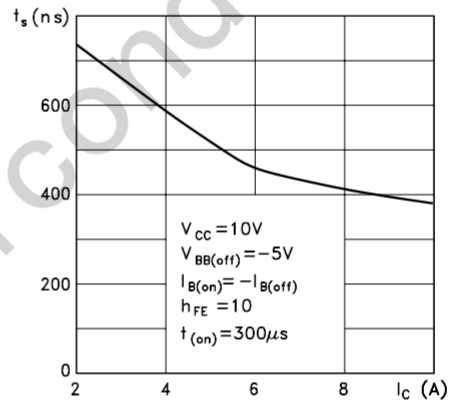
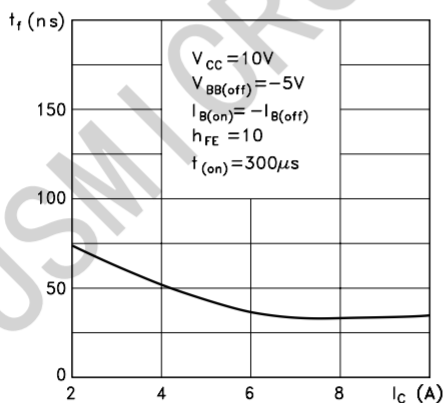
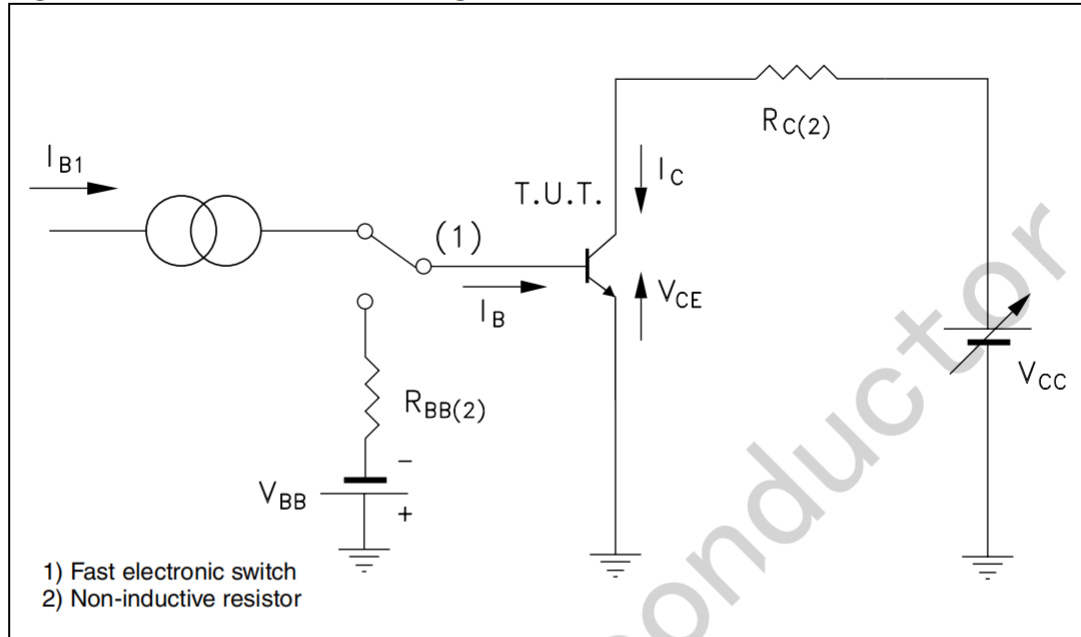


Figure 12. Inductive load switching time



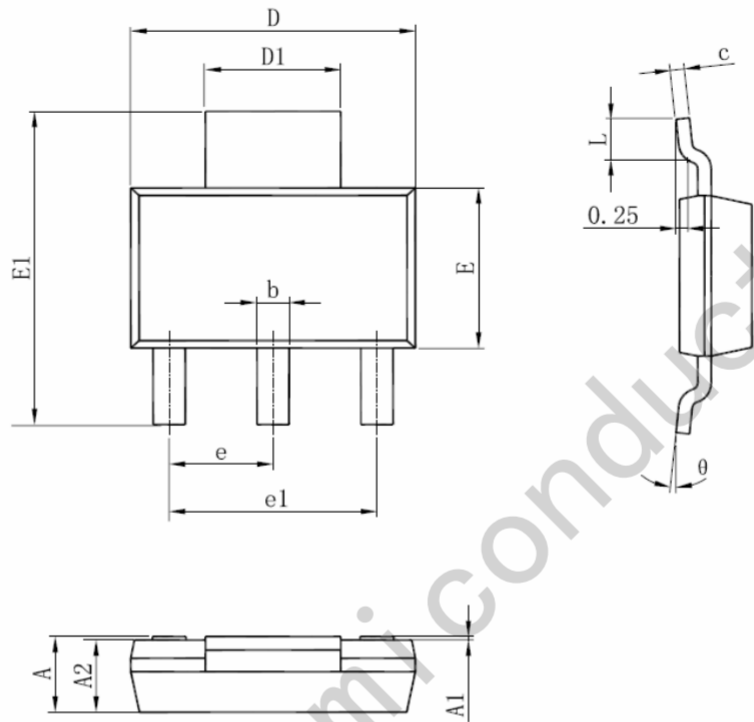
Test circuit

Figure 13. Resistive load switching test circuit



Package Information

SOT-223



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°