

High-voltage Switching Transistor (-400V, -0.5A)

2SA1812 / 2SA1727 / 2SA1776

●Features

- 1) High breakdown voltage, $BV_{CEO} = -400V$.
- 2) Low saturation voltage, typically $V_{CE(sat)} = -0.3V$ at $I_C / I_B = -100mA / -10mA$.
- 3) High switching speed, typically $t_f : 1\mu s$ at $I_C = -100mA$.
- 4) Wide SOA (safe operating area).

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit	
Collector-base voltage	V_{CBO}	-400	V	
Collector-emitter voltage	V_{CEO}	-400	V	
Emitter-base voltage	V_{EBO}	-7	V	
Collector current	I_C	-0.5	A (DC)	
		-1.0	A (Pulse) *1	
Collector power dissipation	2SA1812	Pc	0.5	W
			2	W *2
			1	W
			10	W (Tc=25°C)
Collector power dissipation	2SA1727	Pc	1	W
			1	W *3
Junction temperature	T_j	150	°C	
Storage temperature	T_{stg}	-55 to +150	°C	

*1 Single pulse *2 When mounted on a 40×40×0.7mm ceramic board.

*3 When $t = 1.7mm$ and the foil collector area on the PC board is 1cm² or greater.

●Packaging specifications and hFE

Type	2SA1812	2SA1727	2SA1776
Package	MPT3	CPT3	ATV
hFE	PQ	PQ	PQ
Marking	AJ*	—	—
Code	T100	TL	TV2
Basic ordering unit (pieces)	3000	3000	2500

* Denotes hFE

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	-400	—	—	V	$I_C = -50\mu A$
Collector-emitter breakdown voltage	BV_{CEO}	-400	—	—	V	$I_C = -1mA$
Emitter-base breakdown voltage	BV_{EBO}	-7	—	—	V	$I_E = -50\mu A$
Collector cutoff current	I_{CBO}	—	—	-10	μA	$V_{CB} = -400V$
Emitter cutoff current	I_{EBO}	—	—	-10	μA	$V_{EB} = -6V$
DC current transfer ratio	hFE	82	150	270	—	$V_{CE} = -5V, I_C = 50mA$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	-1	V	$I_C / I_B = -100mA / -10mA$
Base-emitter saturation voltage	$V_{BE(sat)}$	—	—	-1.2	V	$I_C / I_B = -100mA / -10mA$
Transition frequency	f_T	—	12	—	MHz	$V_{CE} = -5V, I_E = 50mA, f = 5MHz$
Output capacitance	C_{ob}	—	18	—	pF	$V_{CE} = -10V, I_E = 0A, f = 1MHz$
Turn-on time	t_{on}	—	0.6	—	μs	$I_C = -100mA, R_L = 1.5k\Omega$ $I_{B1} = -I_{B2} = -10mA$ $V_{CC} \leq -150V$
Storage time	t_{stg}	—	2.7	—	μs	
Fall time	t_f	—	1	—	μs	

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● Electrical characteristic curves

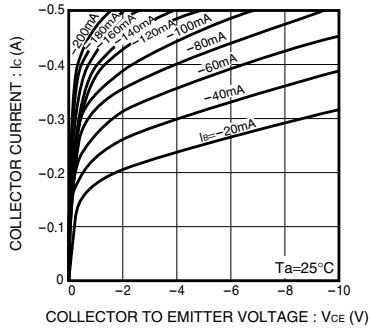


Fig.1 Grouded emitter output characteristics

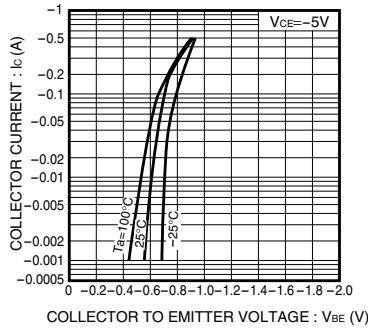


Fig.2 Grouded emitter propagation characteristics

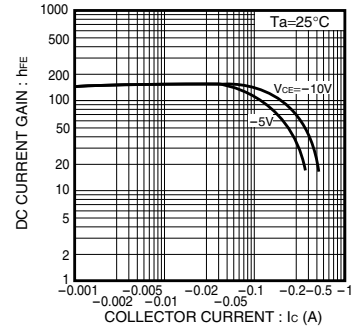


Fig.3 DC current gain vs. collector current (I)

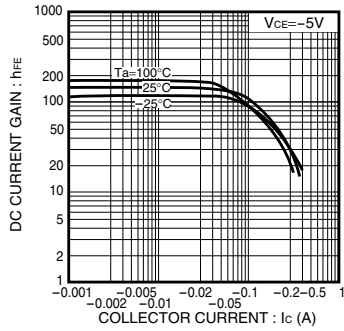


Fig.4 DC current gain vs. collector current (II)

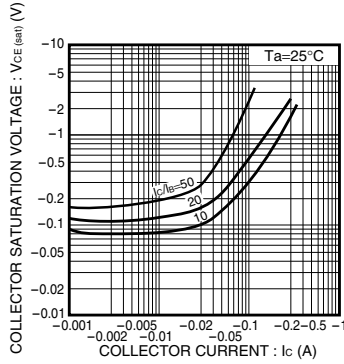


Fig.5 Collector-emitter saturation voltage vs. collector current

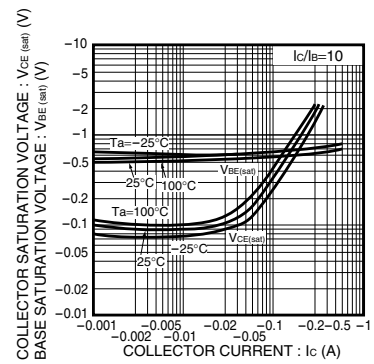


Fig.6 Collector-emitter saturation voltage vs. collector current Base-emitter saturation voltage vs. collector current

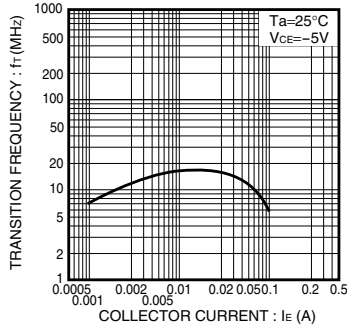


Fig.7 TRANSITION FREQUENCY vs. EMITTER CURRENT

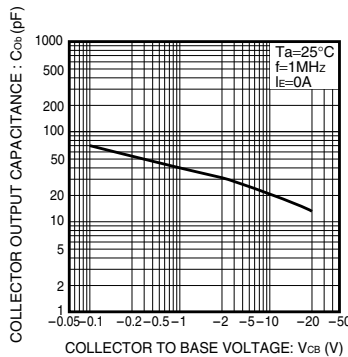


Fig.8 Collector output capacitance vs. collector-base voltage

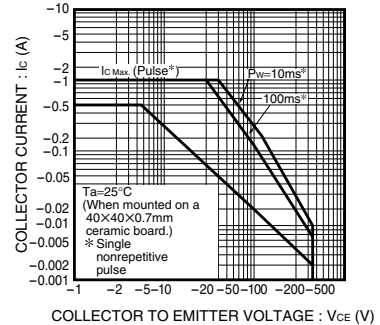


Fig.9 Safe operating area (2SA1812)

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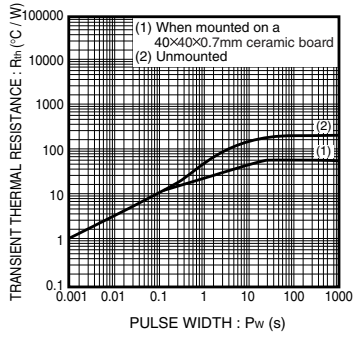


Fig. 10 TRANSIENT THERMAL RESISTANCE (2SA1812)

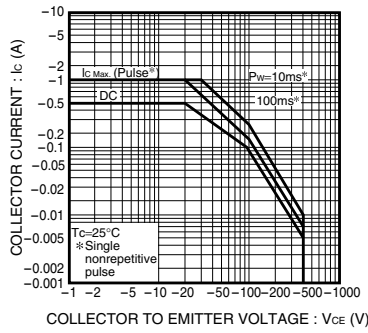


Fig. 11 Safe operating area (2SA1727)

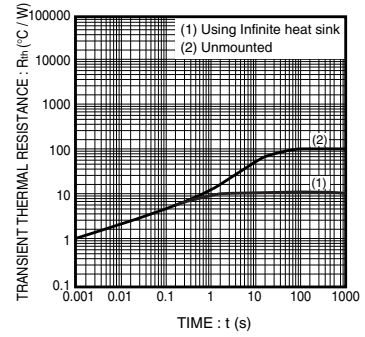


Fig. 12 TRANSIENT THERMAL RESISTANCE (2SA1727)

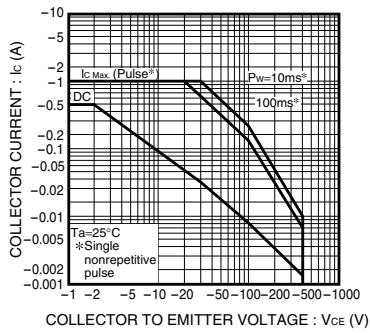


Fig. 13 Safe operating area (2SA1776)

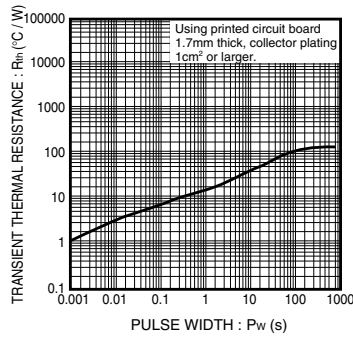


Fig. 14 TRANSIENT THERMAL RESISTANCE (2SA1776)

●Switching characteristic measurement circuit

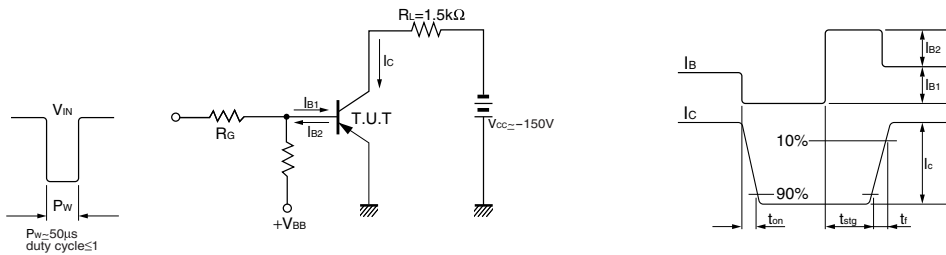


Fig. 15 Switching characteristic measurement circuit

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