

PNP SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SA1742 is a power transistor developed for high-speed switching and features a high h_{FE} at low $V_{CE(sat)}$. This transistor is ideal for use as a driver in DC/DC converters and actuators.

In addition, a small resin-molded insulation type package contributes to high-density mounting and reduction of mounting cost.

FEATURES

- High h_{FE} and low $V_{CE(sat)}$:
 $h_{FE} \geq 100$ MIN. @ $V_{CE} = -2.0$ V, $I_C = -1.5$ A
 $V_{CE(sat)} \geq -0.3$ V MAX. @ $I_C = -4.0$ V, $I_B = -0.2$ A
- Full-mold package that does not require an insulating board or bushing

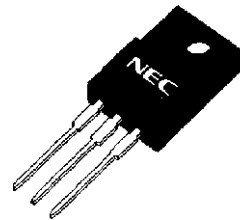
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	V_{CBO}		-100	V
Collector to emitter voltage	V_{CEO}		-60	V
Emitter to base voltage	V_{EBO}		-7.0	V
Collector current (DC)	$I_{C(DC)}$		-7.0	A
Collector current (pulse)	$I_{C(pulse)}$	$PW \leq 300 \mu s$, duty cycle $\leq 10\%$	-14	A
Base current (DC)	$I_{B(DC)}$		-3.5	A
Total power dissipation	P_T	$T_C = 25^\circ\text{C}$	30	W
		$T_A = 25^\circ\text{C}$	2.0	W
Junction temperature	T_j		150	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

ORDERING INFORMATION

Part No.	Package
2SA1742	Isolated TO-220

(Isolated TO-220)



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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

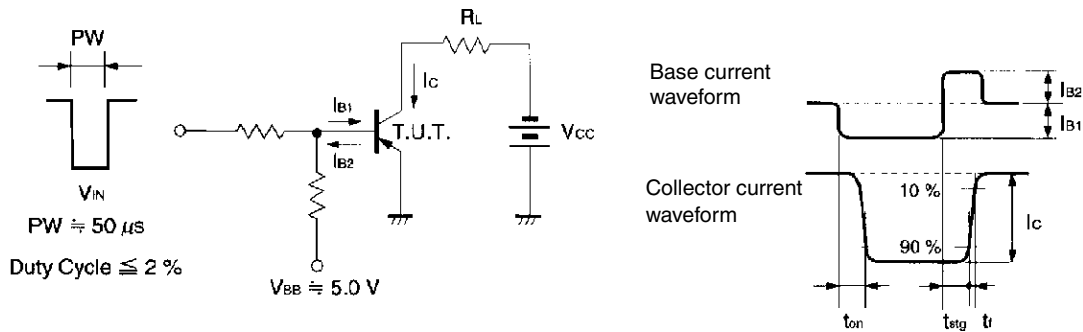
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	V _{CE0(SUS)}	I _C = -4.0 V, I _B = -0.4 A, L = 1 mH	-60			V
	V _{CEx(SUS)}	I _C = -4.0 A, I _{B1} = -I _{B2} = -0.4 A, V _{BE(OFF)} = 1.5 V, L = 180 μH, clamped	-60			V
Collector cutoff current	I _{CB0}	V _{CB} = -60 V, I _E = 0 A			-10	μA
	I _{CER}	V _{CE} = -60 V, R _{BE} = 50 Ω, T _A = 125°C			-1.0	mA
	I _{CEx1}	V _{CE} = -60 V, V _{BE(OFF)} = 1.5 V			-10	μA
	I _{CEx2}	V _{CE} = -60 V, V _{BE(OFF)} = 1.5 V, T _A = 125°C			-1.0	mA
Emitter cutoff current	I _{E0}	V _{EB} = -5.0 V, I _C = 0 A			-10	μA
DC current gain	h _{FE1}	V _{CE} = -2.0 V, I _C = -0.7 A ^{Note}	100			
	h _{FE2}	V _{CE} = -2.0 V, I _C = -1.5 A ^{Note}	100		400	
	h _{FE3}	V _{CE} = -2.0 V, I _C = -4.0 A ^{Note}	60			
Collector saturation voltage	V _{CE(sat)1}	I _C = -4.0 A, I _B = -0.2 A ^{Note}			-0.3	V
	V _{CE(sat)2}	I _C = -6.0 A, I _B = -0.3 A ^{Note}			-0.5	V
Base saturation voltage	V _{BE(sat)1}	I _C = -4.0 A, I _B = -0.2 A ^{Note}			-1.2	V
	V _{BE(sat)2}	I _C = -6.0 A, I _B = -0.3 A ^{Note}			-1.5	V
Collector capacitance	C _{ob}	V _{CB} = -10 V, I _E = 0 A, f = 1.0 MHz		180		pF
Gain bandwidth product	f _T	V _{CB} = -10 V, I _C = -1.0 A		40		MHz
Turn-on time	t _{on}	I _C = -4.0 A, R _L = 12.5 Ω, I _{B1} = -I _{B2} = -0.2 A, V _{CC} ≅ -50 V Refer to the test circuit.			0.3	μs
Storage time	t _{stg}				1.5	μs
Fall time	t _f				0.3	μs

Note Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

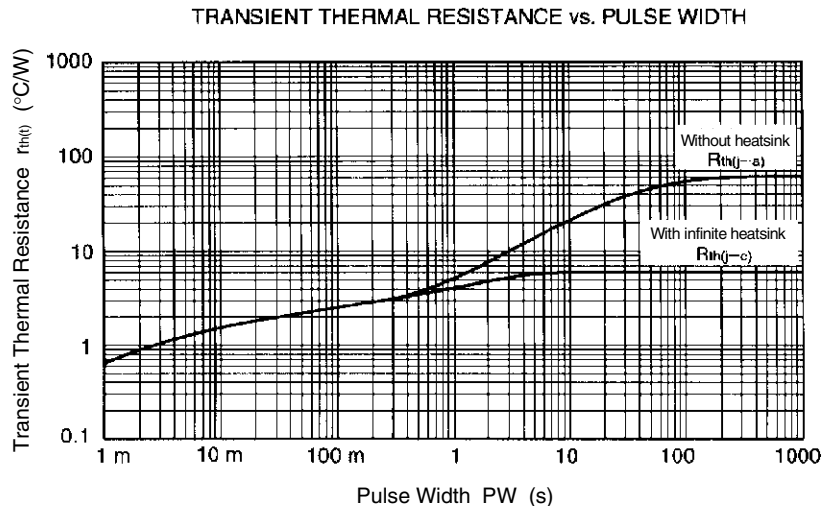
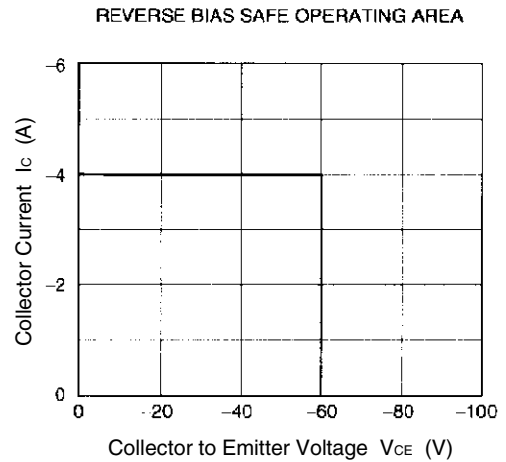
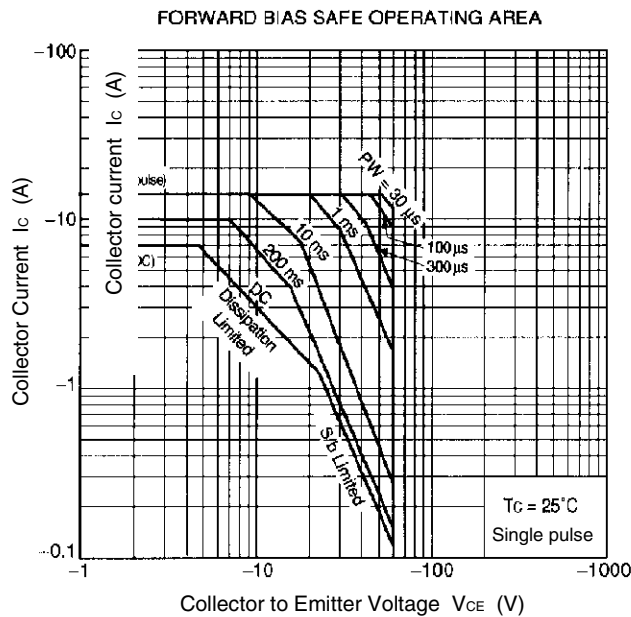
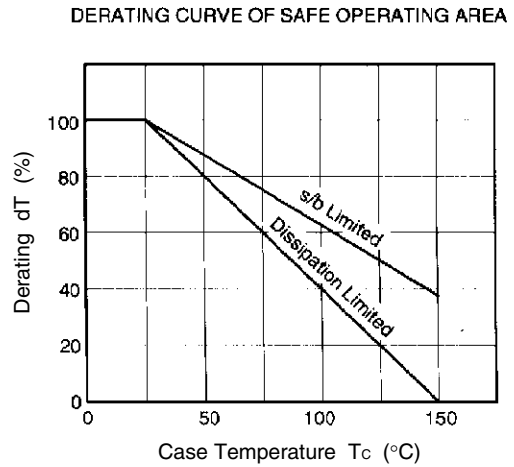
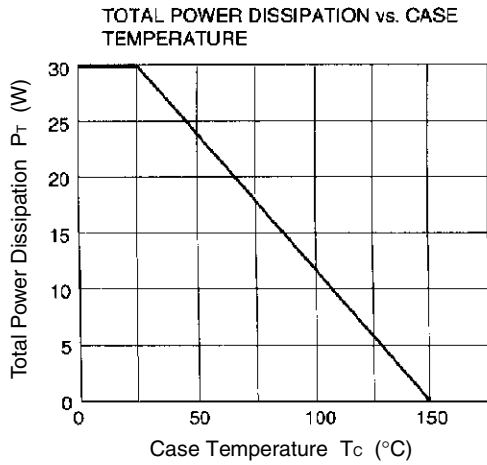
h_{FE} CLASSIFICATION

Marking	M	L	K
h _{FE2}	100 to 200	150 to 300	200 to 400

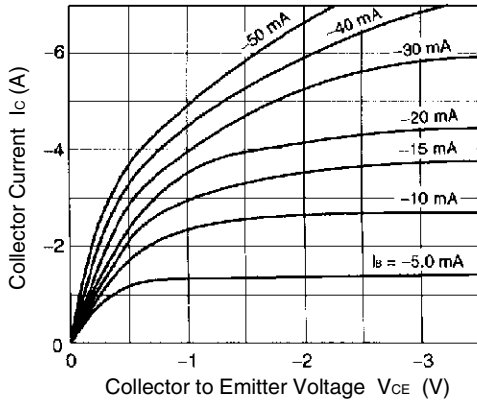
SWITCHING TIME (t_{on}, t_{stg}, t_f) TEST CIRCUIT



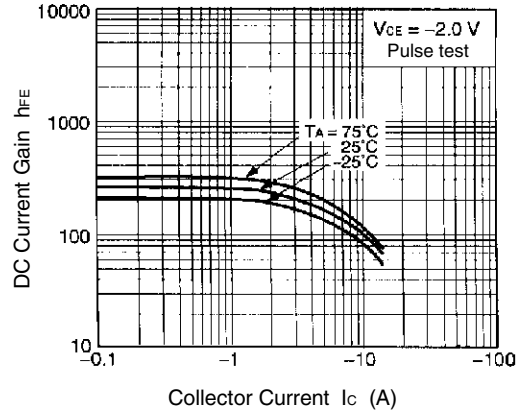
TYPICAL CHARACTERISTICS (T_A = 25°C)



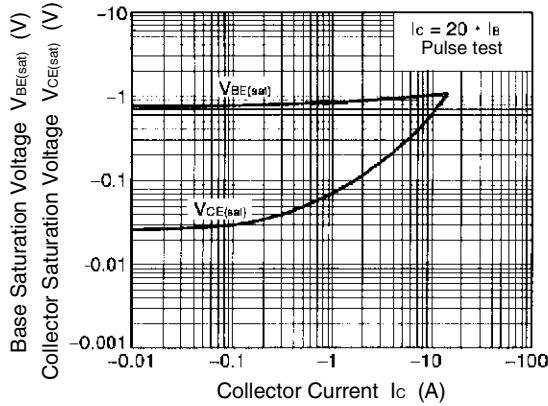
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



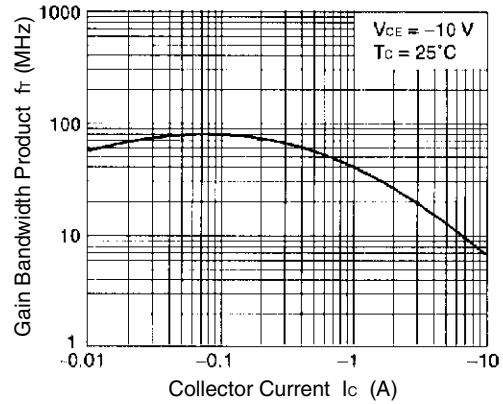
DC CURRENT GAIN vs. COLLECTOR CURRENT



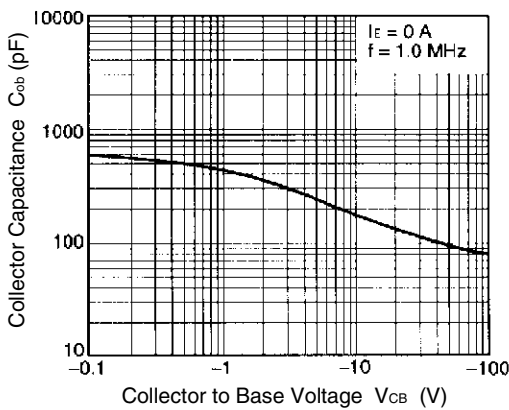
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



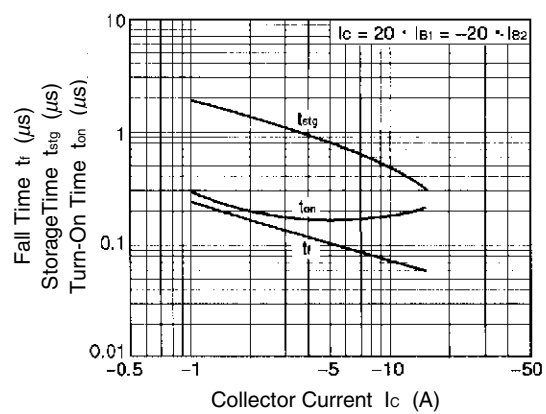
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



TURN ON TIME, STORAGE TIME AND FALL TIME vs. COLLECTOR CURRENT



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