

SILICON POWER TRANSISTOR 2SA1647, 2SA1647-Z

PNP SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SA1647 is a mold power transistor developed for highspeed switching and features a very low collector-to-emitter saturation voltage.

This transistor is ideal for use in switching regulators, DC/DC converters, motor drivers, solenoid drivers, and other low-voltage power supply devices, as well as for high-current switching.

FEATURES

- · Available for high-current control in small dimension
- · Z type is a lead processed product and is deal for mounting a hybrid IC.
- Low collector saturation voltage: $V_{CE(sat)} = -0.3 \text{ V MAX.}$ (@Ic = -3 A)
- · Fast switching speed: $t_f = 0.4 \ \mu s \ MAX. \ (@Ic = -3 \ A)$
- · High DC current gain and excellent linearity

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

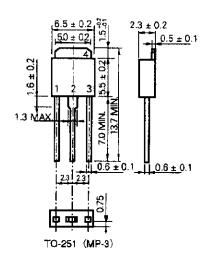
Parameter	Symbol	Ratings	Unit
Collector to base voltage	Vсво	-150	٧
Collector to emitter voltage	VCEO	-100	V
Base to emitter voltage	VEBO	-7.0	٧
Collector current (DC)	Ic(DC)	-5.0	Α
Collector current (pulse)	IC(pulse)*	-10	Α
Base current (DC)	I _{B(DC)}	-2.5	Α
Total power dissipation	P _T (Tc = 25 °C)	18	W
Total power dissipation	PT (TA = 25 °C)	1.0**, 2.0***	W
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55 to +150	°C

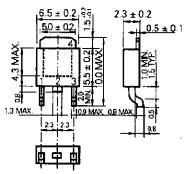
*: PW \leq 10 ms, duty cycle \leq 50%

**: Printing board mounted

***: $7.5 \text{ mm}^2 \times 0.7 \text{ mm}$ ceramic board mounted

PACKAGE DRAWING (UNIT: mm)





TO-252 (MP-3Z)

Electrode Connection

- 1. Base
- 2. Collector
- 3. Emitter

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ELECTRICAL CHARACTERISTICS (TA = 25°C)

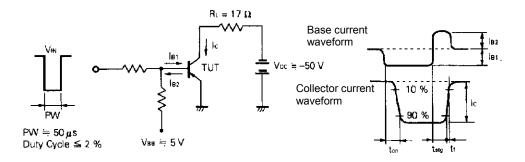
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	VCEO(SUS)	Ic = -2.5 A, I _B = -0.25 A, L = 1 mH	-100			V
Collector to emitter voltage	VCEX(SUS)	$I_C = -2.5 \text{ A}, I_{B1} = -I_{B2} = -0.25 \text{ A},$ $V_{BE(OFF)} = 1.5 \text{ V}, L = 180 \ \mu\text{H}, clamped$				V
Collector cutoff current	Ісво	VcB = -100 V, IE = 0			-10	μΑ
Collector cutoff current	ICER	Vce = -100 V, R _{BE} = 50 Ω , T _A = 125 °C			-1.0	mA
Collector cutoff current	ICEX1	$V_{CE} = -100 \text{ V}, V_{BE(OFF)} = 1.5 \text{ V}$			-10	μΑ
Collector cutoff current	ICEX2	$V_{CE} = -100 \text{ V}, V_{BE(OFF)} = 1.5 \text{ V},$ $T_A = 125 \text{ °C}$			-1.0	mA
Emitter cutoff current	ІЕВО	$V_{EB(OFF)} = -5.0 \text{ V}, \text{ Ic} = 0$			-10	μΑ
DC current gain	hFE1*	VcE = -2.0 V, Ic = -0.5 A	100			
DC current gain	h _{FE2} *	$V_{CE} = -2.0 \text{ V, Ic} = -1.0 \text{ A}$	100		400	
DC current gain	h _{FE3} *	$V_{CE} = -2.0 \text{ V}, \text{ Ic} = -3.0 \text{ A}$	60			
Collector saturation voltage	VCE(sat)1*	$I_{C} = -3.0 \text{ A}, I_{B} = -0.15 \text{ A}$			-0.3	V
Collector saturation voltage	VCE(sat)2*	Ic = -4.0 A, I _B = -0.2 A			-0.5	V
Base saturation voltage	VBE(sat)1*	Ic = -3.0 A, I _B = -0.15 A			-1.2	V
Base saturation voltage	V _{BE(sat)2} *	$I_{C} = -4.0 \text{ A}, I_{B} = -0.2 \text{ A}$			-1.5	V
Collector capacitance	Cob	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$		110		pF
Gain bandwidth product	f⊤	VcE = -10 V, Ic = 0.5 A		90		MHz
Turn-on time	ton	$Ic = -3.0 \text{ A}, \text{ RL} = 17 \Omega,$			0.3	μs
Storage time	tstg	$I_{B1} = -I_{B2} = -0.15 \text{ A}, \text{ Vcc } \cong -50 \text{ V}$ Refer to the test circuit.			1.5	μs
Fall time	tf	Tieres to the test offeur.			0.4	μs

^{*} Pulse test PW \leq 350 μ s, duty cycle \leq 2%/Pulsed

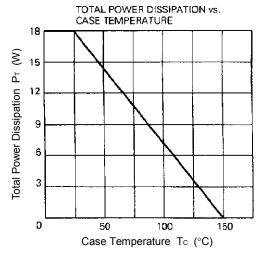
hfe CLASSIFICATION

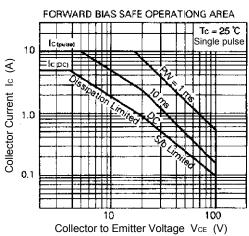
Marking	М	L	K
h _{FE2}	100 to 200	150 to 300	200 to 400

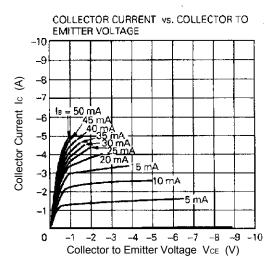
SWITCHING TIME TEST CIRCUIT

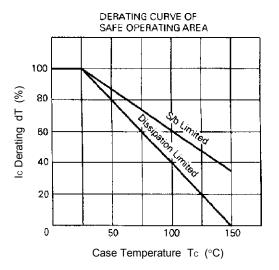


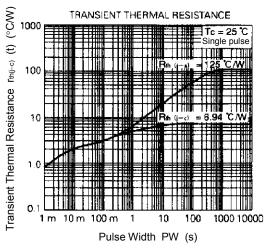
TYPICAL CHARACTERISTICS (TA = 25°C)

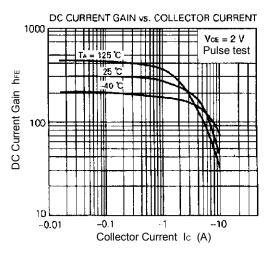


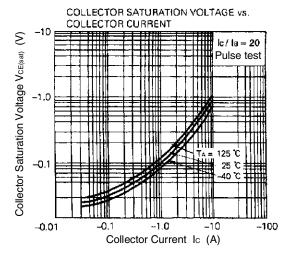


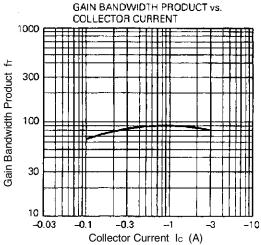


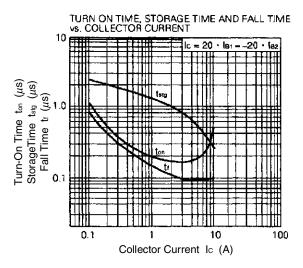


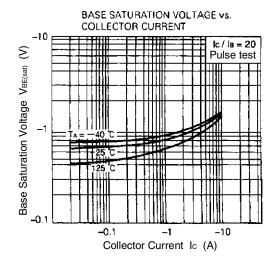


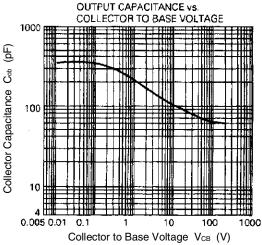














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