NEC

SILICON POWER TRANSISTOR
2SC4346,4346-Z

NPN SILICON TRIPLE DIFFUSED TRANSISTOR
FOR HIGH SPEED SWITCHING, HIGH VOLTAGE SWITCHING

DESCRIPTION

The 2SC4346 is a mold power transistor developed for high-speed switching, high voltage switching, and is ideal for use as a driver in devices such as switching regulators, DC/DC converters, and high-frequency power amplifiers.

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SC4346	TO-251 (MP-3)
2SC4346-Z	TO-252 (MP-3Z)

FEATURES

- Small package, but can control for high-current
- Low collector saturation voltage
  $V_{CE(sat)}$ = 1.0 V MAX. (I_C = 2.0 A)
- Ultra high-speed switching
  t_f = 0.3 μs MAX. (I_C = 2.0 A)
- Base reverse bias safe operating area is wide
  $V_{CEX(SUS)1}$ = 450 V MIN. (I_C = 2.0 A)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Collector to Base Voltage	V_{CBO}	500	V
Collector to Emitter Voltage	V_{CEO}	400	V
Emitter to Base Voltage	V_{EBO}	8.0	V
Collector Current (DC)	$I_{C(DC)}$	5.0	A
Collector Current (pulse)	$I_{C(pulse)}$ Note1	10	A
Base current (DC)	$I_{B(DC)}$	2.5	A
Total Power Dissipation	P_{T1} (T_C = 25°C)	18	W
Total Power Dissipation	P_{T2} (T_A = 25°C)	1.0 Note2, 2.0 Note3	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Notes 1. PW ≤ 10 ms, Duty Cycle ≤ 50%
2. Mounted on print board
3. Mounted on ceramic substrate of 7.5 mm^2 x 0.7 mm

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The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

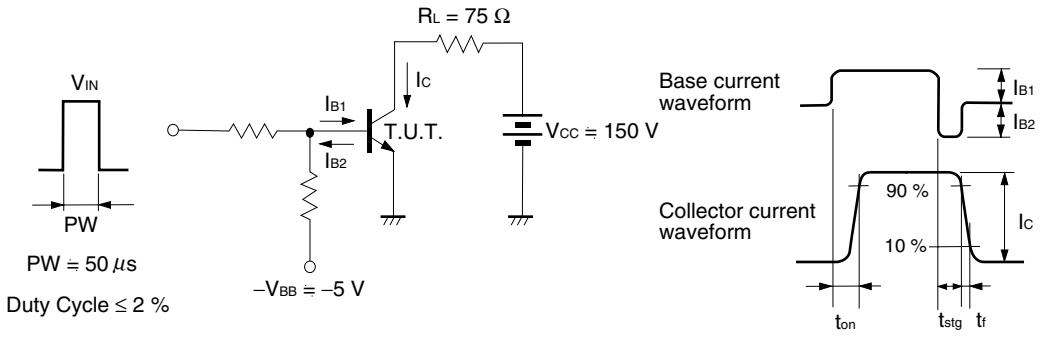
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector to Emitter Voltage	$V_{CEO(SUS)}$	I_C = 2.0 A, I_{B1} = 0.4 A, L = 1 mH	400			V
	$V_{CEX(SUS)1}$	I_C = 2.0 A, I_{B1} = $-I_{B2}$ = 0.4 A, L = 180 μH, Clamped	450			V
	$V_{CEX(SUS)2}$	I_C = 4.0 A, I_{B1} = 1.0 A, $-I_{B2}$ = 0.4 A, L = 180 μH, Clamped	400			V
Collector Cut-off Current	I_{CBO}	V_{CB} = 400 V, I_E = 0			10	μA
	I_{CER}	V_{CB} = 400 V, R_{BE} = 51 Ω, T_A = 125°C			1.0	mA
	I_{CEX1}	V_{CB} = 400 V, $V_{BE(OFF)}$ = –5 V			100	μA
	I_{CEX2}	V_{CB} = 400 V, $V_{BE(OFF)}$ = –5 V, T_A = 125°C			1.0	mA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 5.0 V, I_C = 0			10	μA
DC Current Gain **Note**	h_{FE1}	V_{CE} = 5.0 V, I_C = 5 mA	15			
	h_{FE2}	V_{CE} = 5.0 V, I_C = 0.5 A	20		80	
	h_{FE3}	V_{CE} = 5.0 V, I_C = 2.0 A	10			
Collector Saturation Voltage **Note**	$V_{CE(sat)}$	I_C = 2.0 A, I_B = 0.4 A		0.5	1.0	V
Base Saturation Voltage **Note**	$V_{BE(sat)}$	I_C = 2.0 A, I_B = 0.4 A		1.0	1.5	V
Turn-on Time	t_{on}	I_C = 2.0 A, R_L = 75 Ω			0.7	μs
Storage Time	t_{stg}	I_{B1} = $-I_{B2}$ = 0.4 A, V_{CC} ≒ 150 V			2.5	μs
Fall Time	t_f	See Test Circuit			0.3	μs

Note Pulsed

h_{FE} CLASSIFICATION

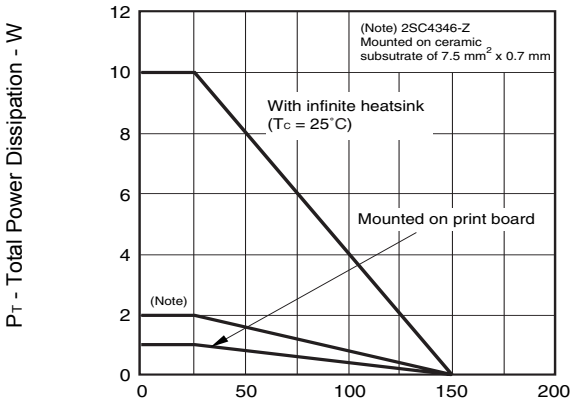
Marking	M	L	K
h_{FE2}	20 to 40	30 to 60	40 to 80

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

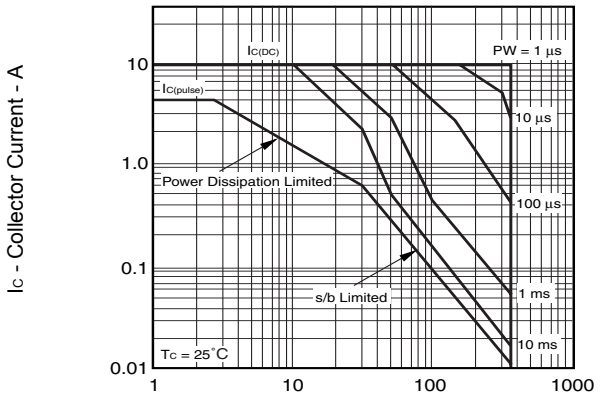


TYPICAL CHARACTERISTICS (T_A = 25°C)

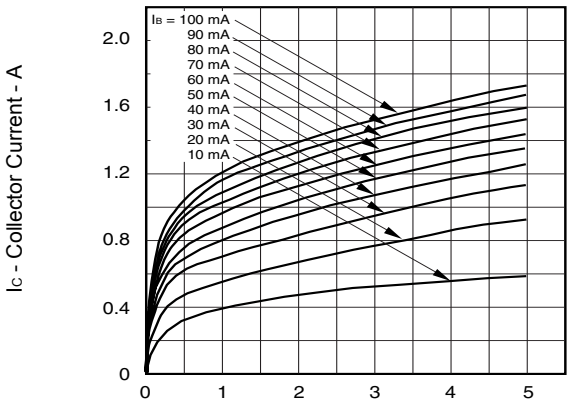
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



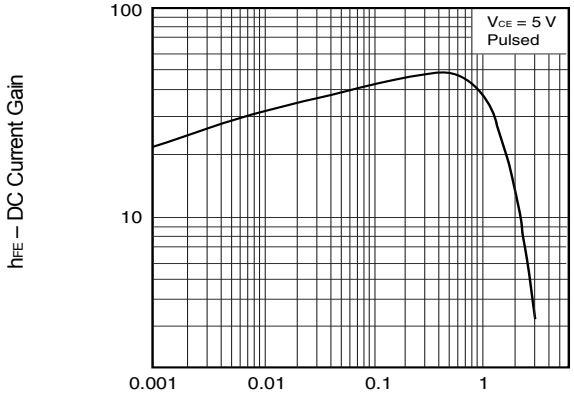
FORWARD BIAS SAFE OPERATING AREA



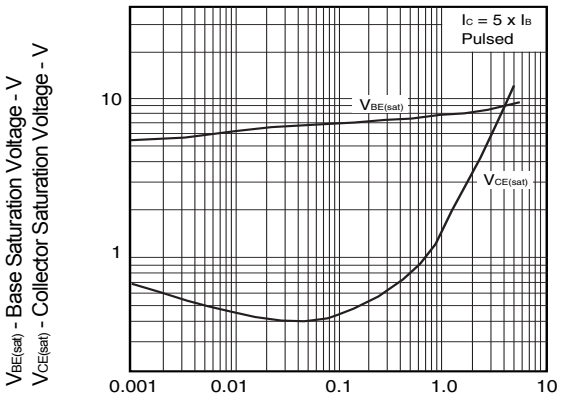
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



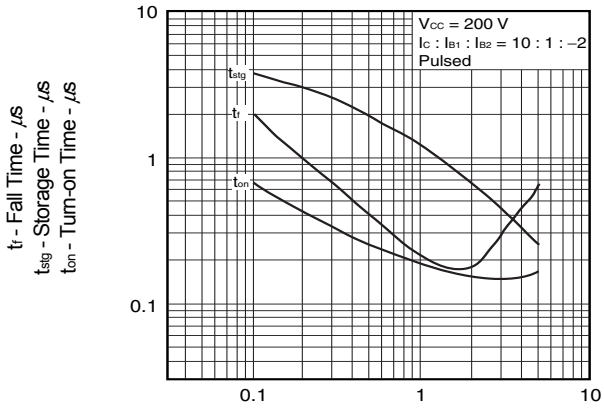
DC CURRENT GAIN vs. COLLECTOR CURRENT



COLLECTOR AND BASE SATURATION VOLTAGE vs.
COLLCTOR CURRENT

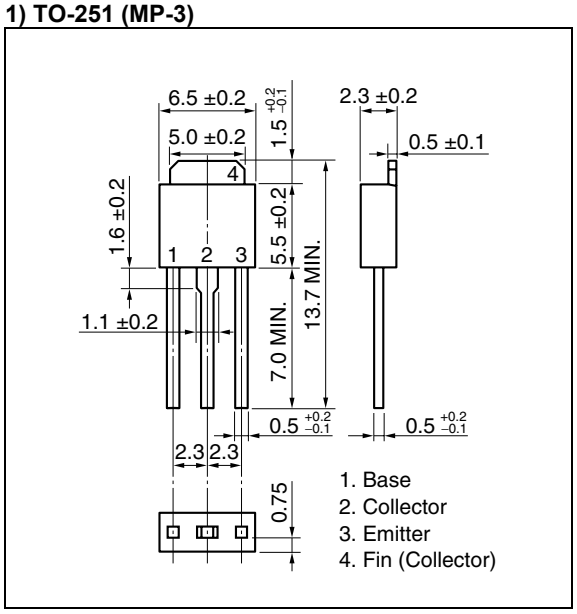


TURN-ON, STORAGE TIME AND FALL TIME vs.
COLLECTOR CURRENT

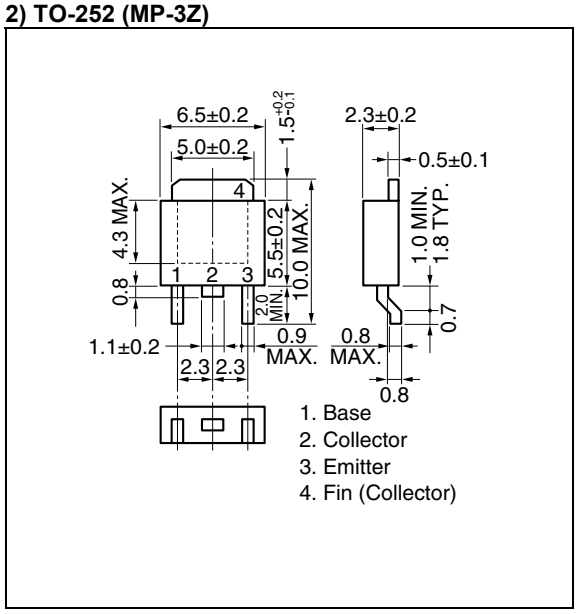


PACKAGE DRAWINGS (Unit: mm)

★ **1) TO-251 (MP-3)**



2) TO-252 (MP-3Z)



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