



# 400V/4A Switching Regulator Applications

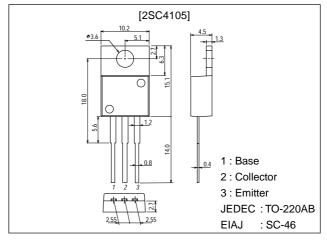
#### **Features**

- · High breakdown voltage and high reliability.
- · Fast switching speed.
- · Wide ASO.
- · Adoption of MBIT process.

## **Package Dimensions**

unit:mm

2010C



### **Specifications**

### Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CBO</sub>		500	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		400	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		7	V
Collector Current	lС		4	Α
Collector Current (Pulse)	I <sub>CP</sub>	PW≤300μs, duty cycle≤10%	8	Α
Base Current	I <sub>B</sub>		1.5	Α
Collector Dissipation	PC		1.75	W
		Tc=25°C	40	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		-55 to +150	°C

#### Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	ICBO	V <sub>CB</sub> =400V, I <sub>E</sub> =0			10	μΑ
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> =5V, I <sub>C</sub> =0			10	μΑ
DC Current Gain	h <sub>FE</sub> 1	V <sub>CE</sub> =5V, I <sub>C</sub> =0.4A	15*		50*	
	h <sub>FE</sub> 2	$V_{CE}=5V$ , $I_{C}=2A$	10			
	h <sub>FE</sub> 3	V <sub>CE</sub> =5V, I <sub>C</sub> =10mA	10			

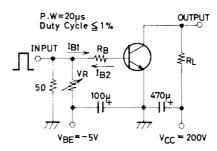
<sup>\*</sup>: The  $h_{FE}1$  of the 2SC4105 is classified as follows. When specifying the  $h_{FE}1$  rank, specify two ranks or more in principle.

15 L 30 20 M 40 30 N 50

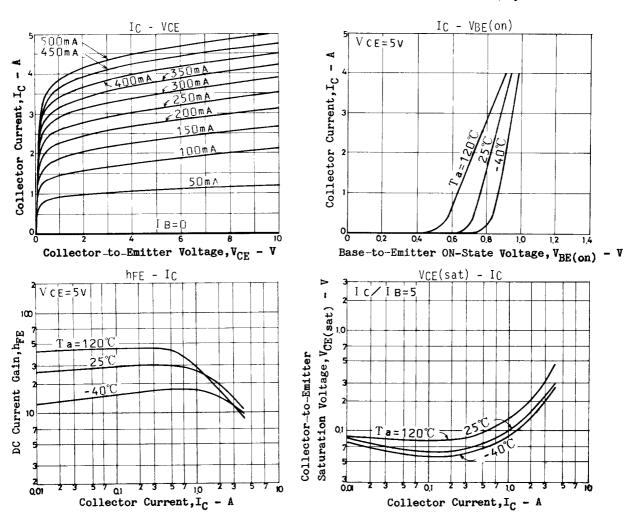
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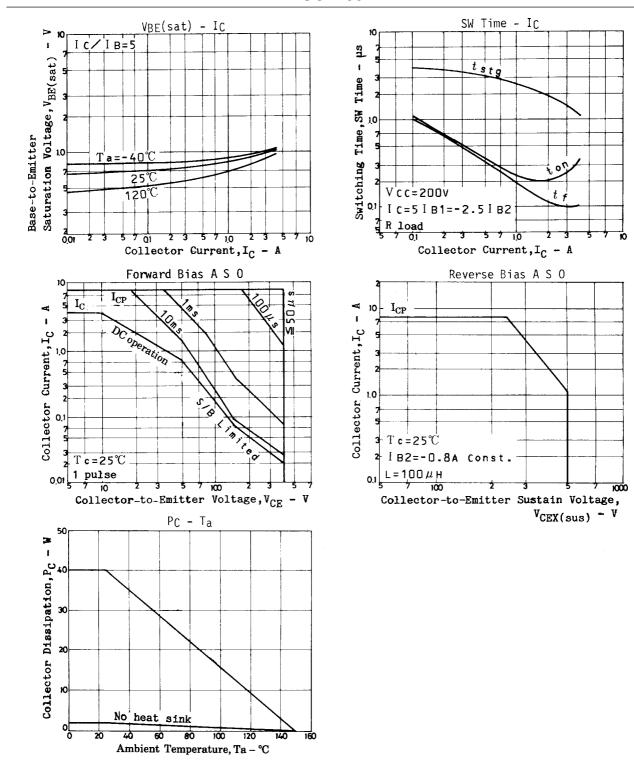
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	Unit
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =2A, I <sub>B</sub> =0.4A			0.8	V
Base-to-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =2A, I <sub>B</sub> =0.4A			1.5	V
Gain-Bandwidth Product	fT	V <sub>CE</sub> =10V, I <sub>C</sub> =0.4A		20		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =10V, f=1MHz		50		pF
Collector-to-Base Breakdown Voltage	V(BR)CBO	I <sub>C</sub> =1mA, I <sub>E</sub> =0	500			V
Collector-to-Emitter Breakdown Voltage	V(BR)CEO	I <sub>C</sub> =5mA, R <sub>BE</sub> =∞	400			V
Emitter-to-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =1mA, I <sub>C</sub> =0	7			V
Collector-to-Emitter Sustain Voltage	VCEX(sus)	I <sub>C</sub> =2A, I <sub>B1</sub> =0.2A, I <sub>B2</sub> =-0.8A, L=1mH, clamped	400			V
Turn-ON Time	t <sub>on</sub>	$I_{C}$ =3A, $I_{B1}$ =0.6A, $I_{B2}$ =-1.2A, $R_{L}$ =66.6 $\Omega$ , $V_{CC}$ =200 $V$			0.5	μs
Storage Time	t <sub>stg</sub>	$I_{C}$ =3A, $I_{B1}$ =0.6A, $I_{B2}$ =-1.2A, $R_{L}$ =66.6 $\Omega$ , $V_{CC}$ =200 $V$			2.5	μs
Fall Time	t <sub>f</sub>	$I_{C}$ =3A, $I_{B1}$ =0.6A, $I_{B2}$ =-1.2A, $R_{L}$ =66.6 $\Omega$ , $V_{CC}$ =200 $V$			0.3	μs

### **Switching Time Test Circuit**



Unit (resistance :  $\Omega$ , capacitance : F)





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