

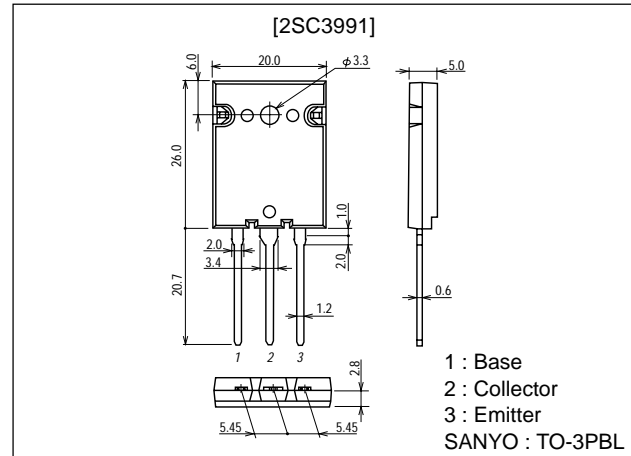
**2SC3991****500V/50A Switching Regulator Applications****Features**

- High breakdown voltage, high reliability.
- Fast switching speed ($t_f=0.1\mu s$ typ).
- Wide ASO.
- Adoption of MBIT process.

Package Dimensions

unit:mm

2048B

**Specifications****Absolute Maximum Ratings** at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CB0}		800	V
Collector-to-Emitter Voltage	V_{CEO}		500	V
Emitter-to-Base Voltage	V_{EBO}		7	V
Collector Current	I_C		50	A
Collector Current (Pulse)	I_{CP}	$PW \leq 300\mu s$, duty cycle $\leq 10\%$	70	A
Base Current	I_B		14	A
Collector Dissipation	P_C		3.5	W
		$T_C = 25^\circ C$	300	W
Junction Temperature	T_J		150	$^\circ C$
Storage Temperature	T_{stg}		-55 to +150	$^\circ C$

Electrical Characteristics at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CB0}	$V_{CB} = 500V$, $I_E = 0$			10	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 5V$, $I_C = 0$			10	μA
DC Current Gain	h_{FE1}^*	$V_{CE} = 5V$, $I_C = 4.8A$	15		50	
	h_{FE2}	$V_{CE} = 5V$, $I_C = 24A$	8			

* : The h_{FE1} of the 2SC3991 is classified as follows.When specifying the h_{FE1} rank, specify two ranks or more in principle.

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Rank	L	M	N
h_{FE}	15 to 30	20 to 40	30 to 50

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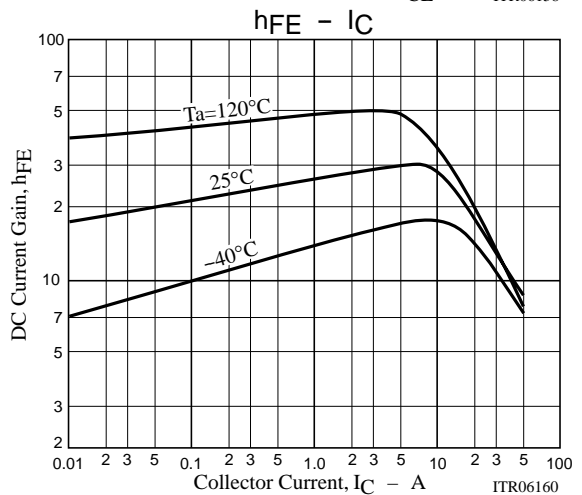
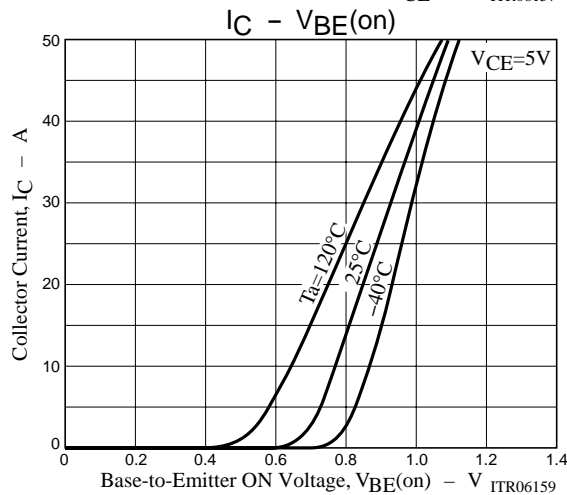
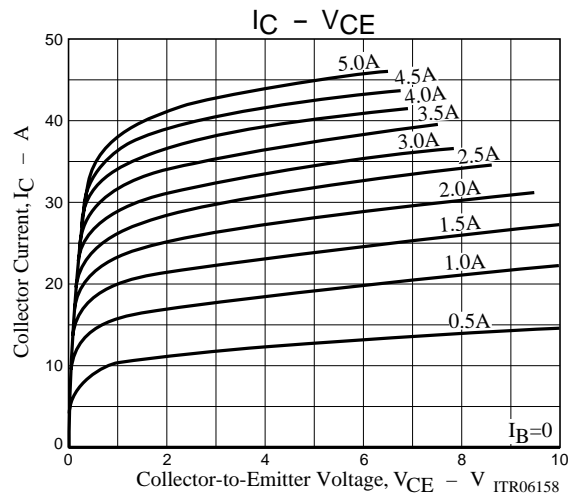
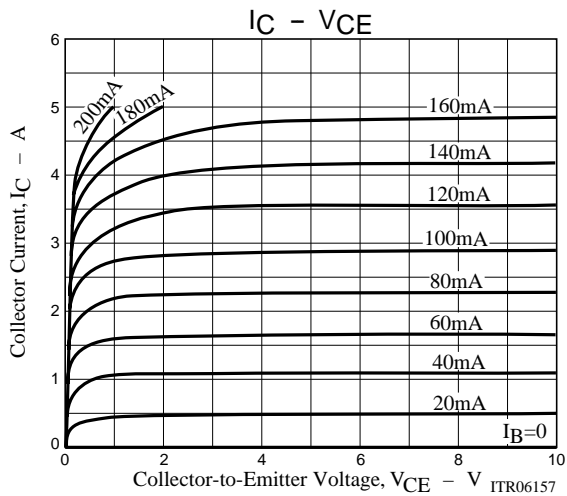
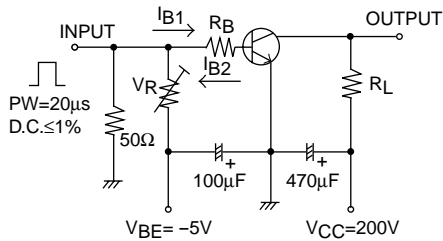
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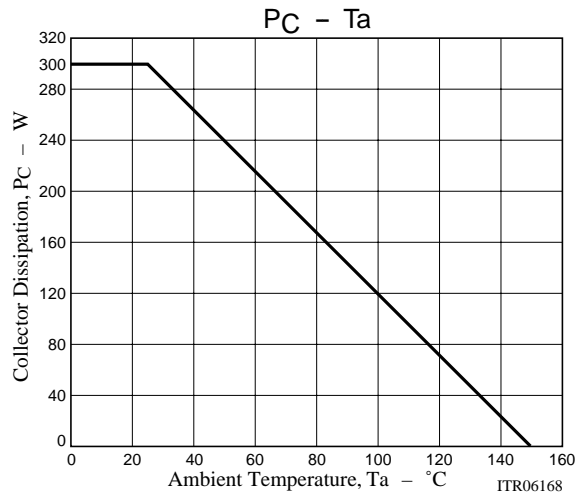
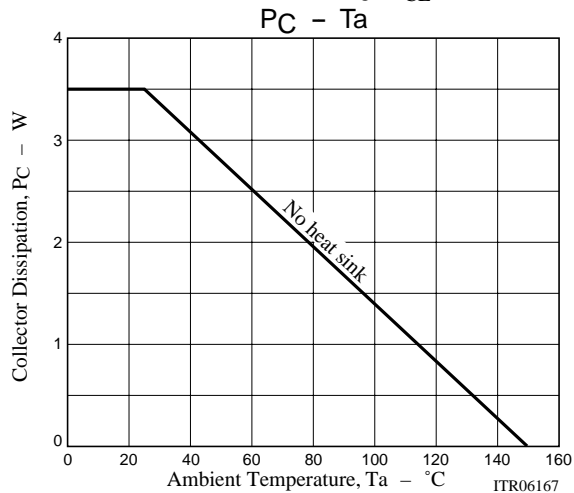
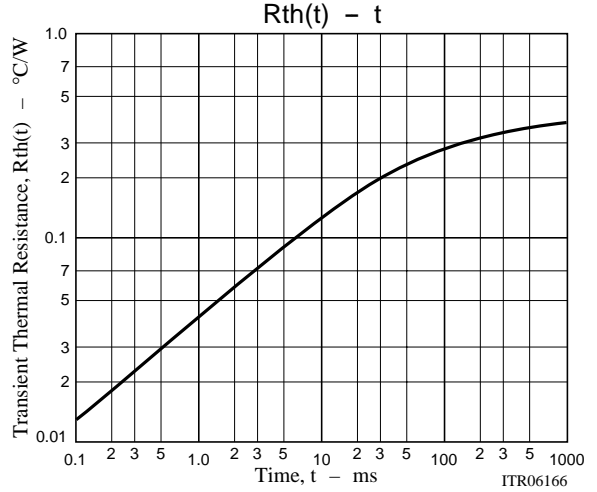
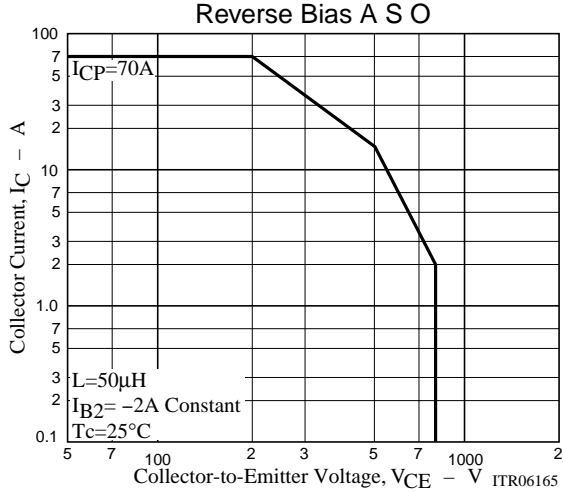
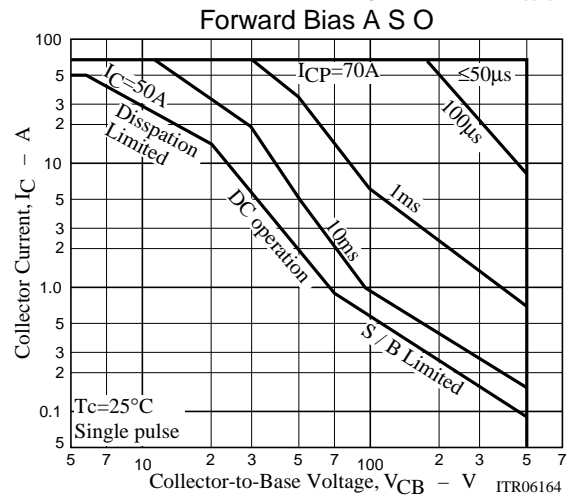
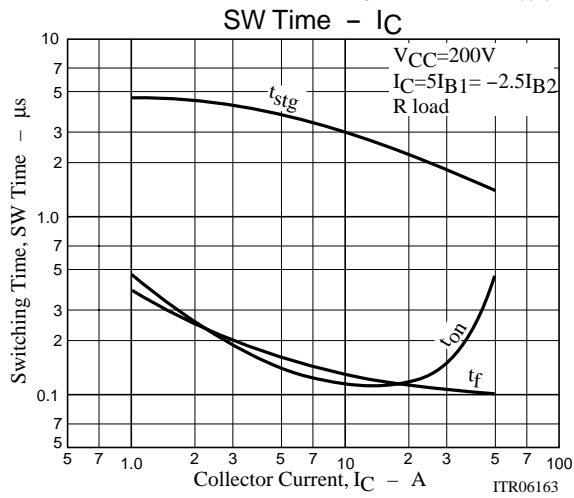
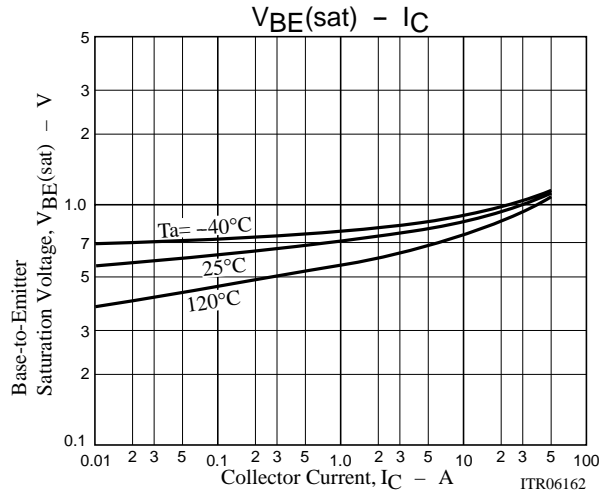
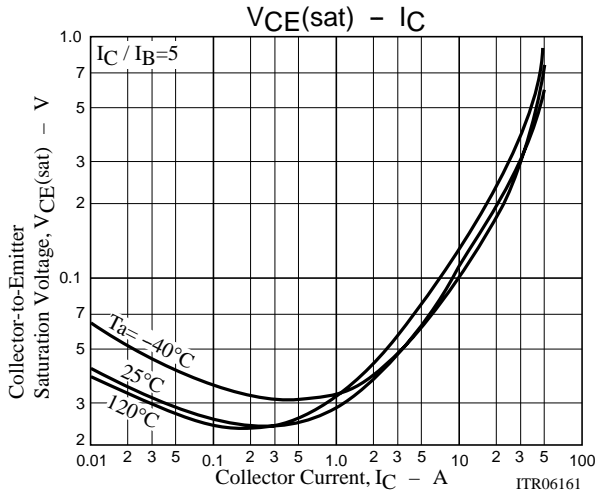
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gain-Bandwidth Product	f_T	$V_{CE}=10V, I_C=4.8A$		18		MHz
Output Capacitance	C_{ob}	$V_{CB}=10V, f=1MHz$		560		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=24A, I_B=4.8A$			1.0	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=24A, I_B=4.8A$			1.5	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=1mA, I_E=0$	800			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=10mA, R_{BE}=\infty$	500			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=1mA, I_C=0$	7			V
Collector-to-Emitter Sustain Voltage	$V_{CEX(sus)}$	$I_C=15A, I_{B1}=-I_{B2}=-2A, L=100\mu H, \text{clamped}$	500			V
Turn-ON Time	t_{on}	$V_{CC}=200V, 5I_{B1}=-2.5I_{B2}=I_C=26A, R_L=7.7\Omega$			0.5	μs
Storage Time	t_{stg}	$V_{CC}=200V, 5I_{B1}=-2.5I_{B2}=I_C=26A, R_L=7.7\Omega$			3.0	μs
Fall Time	t_f	$V_{CC}=200V, 5I_{B1}=-2.5I_{B2}=I_C=26A, R_L=7.7\Omega$			0.3	μs

Switching Time Test Circuit



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