

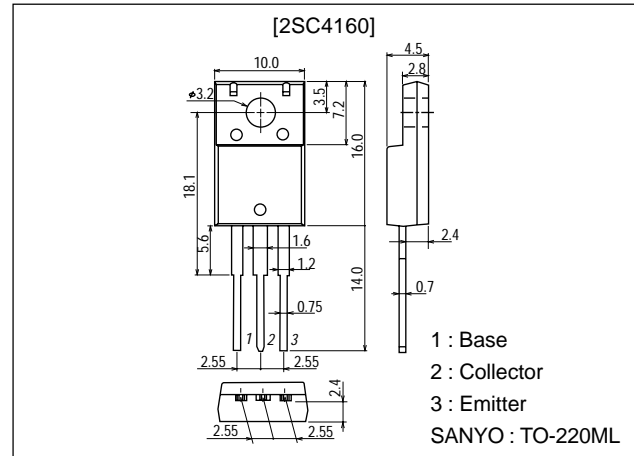
**2SC4160****400V/4A Switching Regulator Applications****Features**

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

Package Dimensions

unit:mm

2041A

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CB0}		500	V
Collector-to-Emitter Voltage	V_{CEO}		400	V
Emitter-to-Base Voltage	V_{EBO}		7	V
Collector Current	I_C		4	A
Collector Current (Pulse)	I_{CP}	$PW \leq 300\mu s$, duty cycle $\leq 10\%$	8	A
Base Current	I_B		1.5	A
Collector Dissipation	P_C		2	W
		$T_c=25^\circ C$	25	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_{CBO}	$V_{CB}=400V$, $I_E=0$			10	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=5V$, $I_C=0$			10	μA
DC Current Gain	h_{FE1}^*	$V_{CE}=5V$, $I_C=0.4A$	15		50	
	h_{FE2}	$V_{CE}=5V$, $I_C=2A$	10			
	h_{FE3}	$V_{CE}=5V$, $I_C=10mA$	10			

* : The h_{FE1} of the 2SC4160 is classified as follows.When specifying the h_{FE1} rank, specify two or more ranks in principle.

Continued on next page.

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

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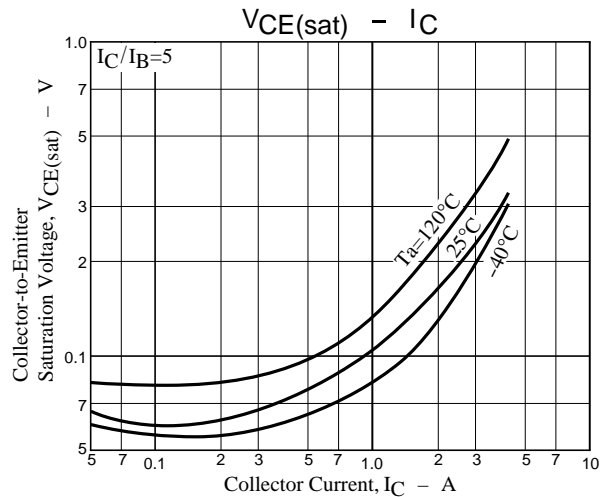
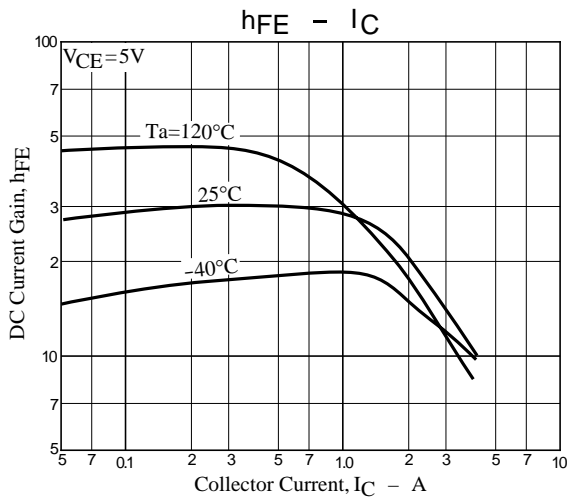
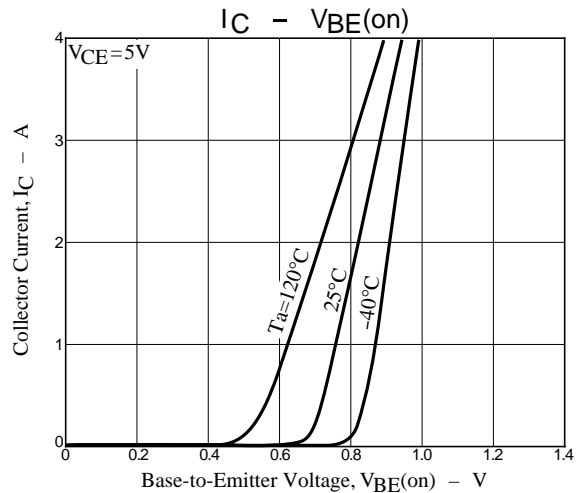
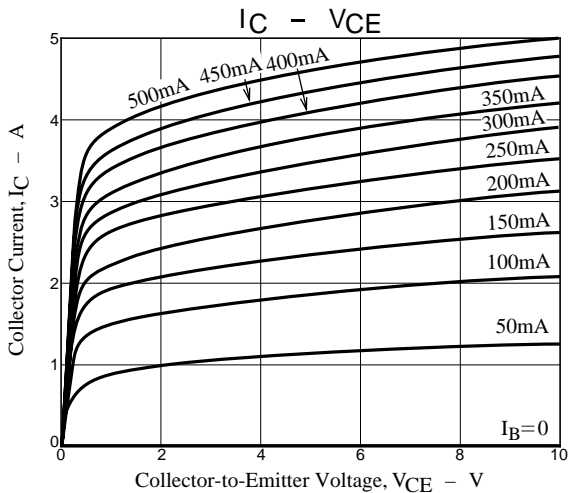
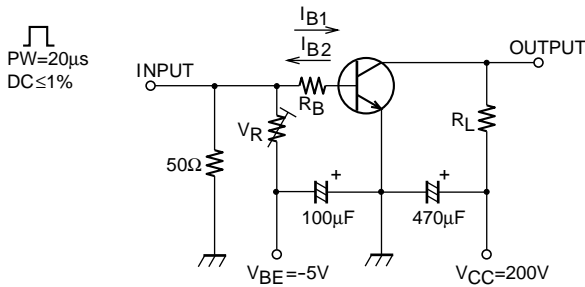
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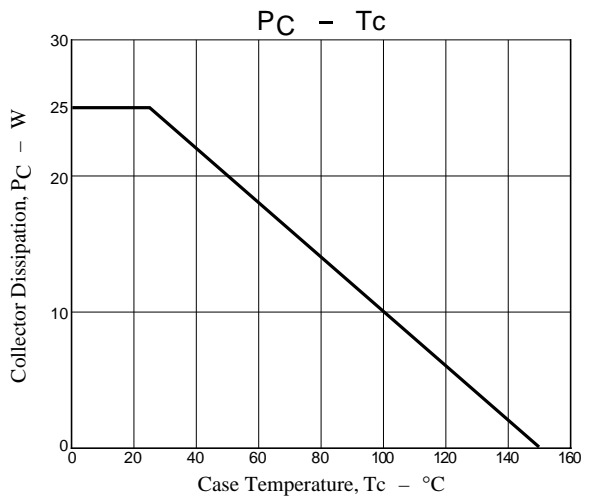
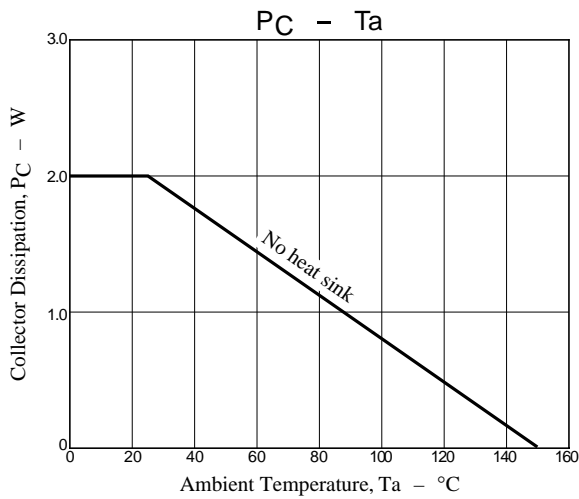
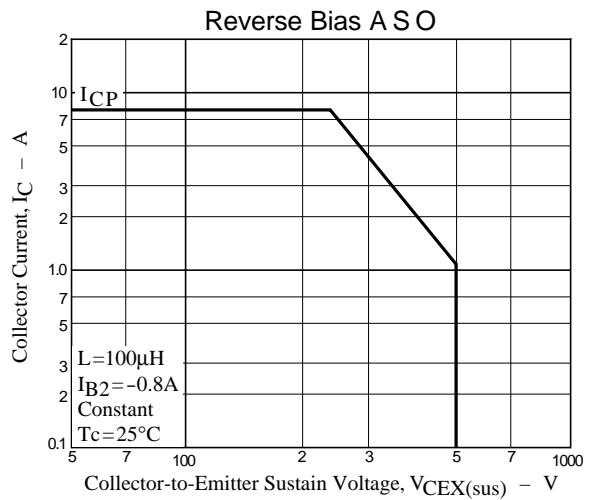
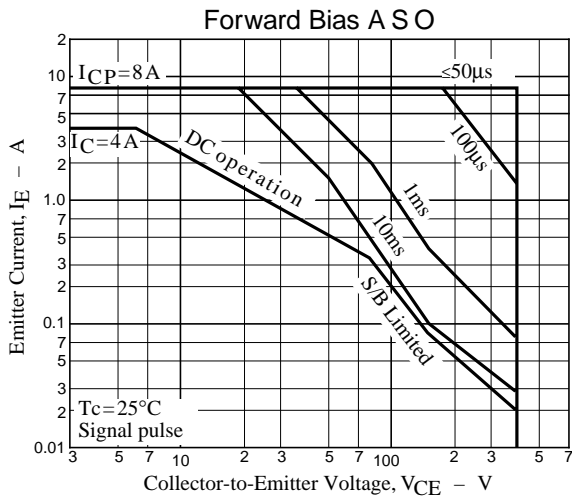
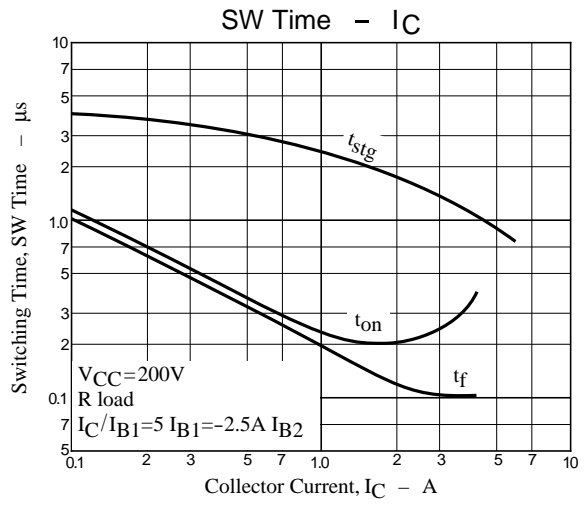
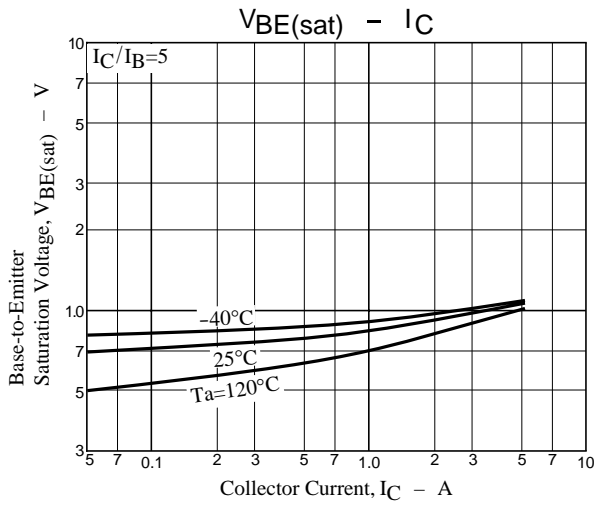
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gain-Bandwidth Product	f_T	$V_{CE}=10V, I_C=0.4A$		20		MHz
Output Capacitance	C_{ob}	$V_{CB}=10V, f=1MHz$		50		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=2A, I_B=0.4A$			0.8	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=2A, I_B=0.4A$			1.5	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=1mA, I_E=0$	500			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=5mA, R_{BE}=\infty$	400			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=1mA, I_C=0$	7			V
Collector-to-Emitter Sustain Voltage	$V_{CEX(sus)}$	$I_C=2A, I_{B1}=0.2A, I_{B2}=-0.8A, L=1mH, \text{clamped}$	400			V
Turn-ON Time	t_{on}	$I_C=3A, I_{B1}=0.6A, I_{B2}=-1.2A, R_L=66.6\Omega, V_{CC}=200V$			0.5	μs
Storage Time	t_{stg}	$I_C=3A, I_{B1}=0.6A, I_{B2}=-1.2A, R_L=66.6\Omega, V_{CC}=200V$			2.5	μs
Fall Time	t_f	$I_C=3A, I_{B1}=0.6A, I_{B2}=-1.2A, R_L=66.6\Omega, V_{CC}=200V$			0.3	μs

Switching Time Test Circuit



2SC4160



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