

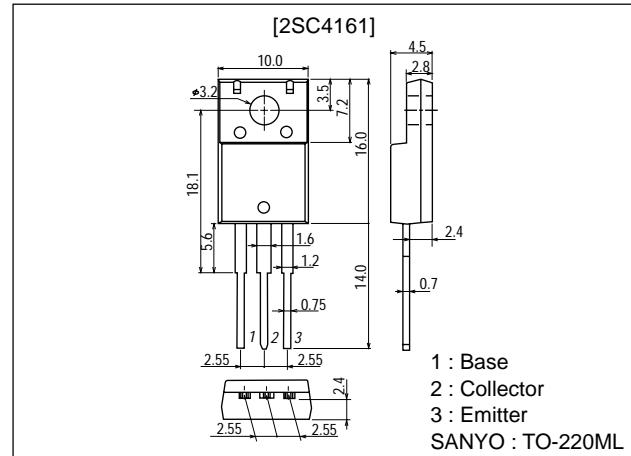
**2SC4161****400V/7A Switching Regulator Applications****Features**

- High breakdown voltage, high reliability.
- High-speed switching ( $t_f=0.1\mu s$  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	$I_C$		7	A
Collector Current (Pulse)	$I_{CP}$	$PW \leq 300\mu s$ , duty cycle $\leq 10\%$	14	A
Base Current	$I_B$		3	A
Collector Dissipation	$P_C$		2	W
		$T_c=25^\circ C$	30	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	$\mu A$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=5V$ , $I_C=0$			10	$\mu A$

Continued on next page.

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# 2SC4161

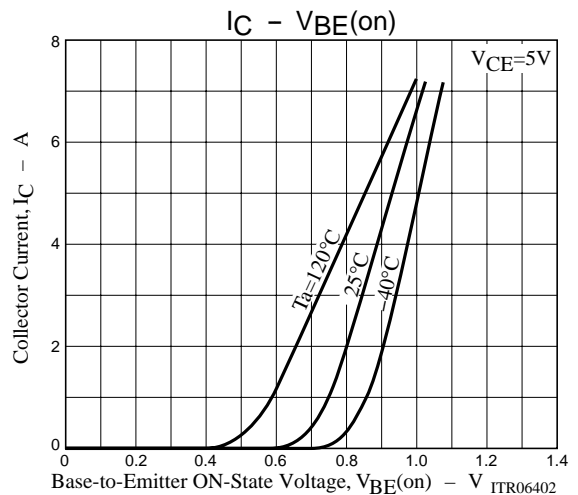
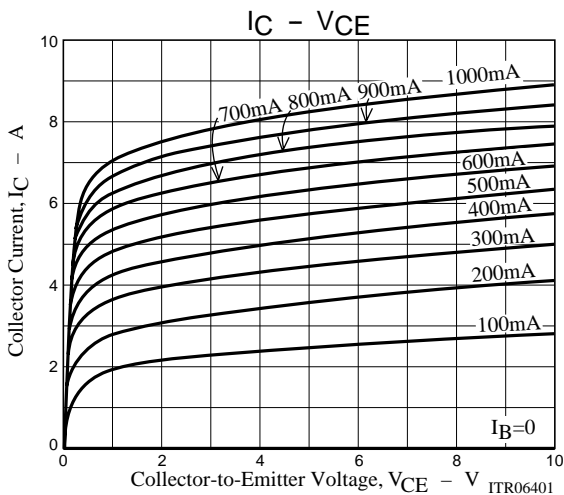
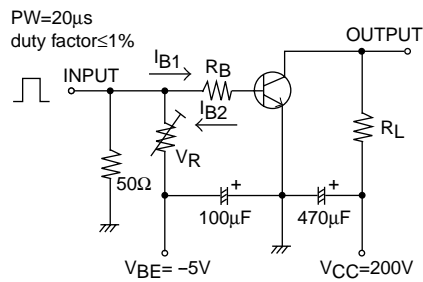
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC Current Gain	$h_{FE1}$	$V_{CE}=5V, I_C=0.8A$	15*		50*	
	$h_{FE2}$	$V_{CE}=5V, I_C=4A$	10			
	$h_{FE3}$	$V_{CE}=5V, I_C=10mA$	10			
Gain-Bandwidth Product	$f_T$	$V_{CE}=10V, I_C=0.8A$		20		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=10V, f=1MHz$		80		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=4A, I_B=0.8A$			0.8	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=4A, I_B=0.8A$			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	$V_{CEX(sus)}$	$I_C=3A, I_{B1}=0.3A, I_{B2}=-1.2A, L=1mH, \text{clamped}$	400			V
Turn-ON Time	$t_{on}$	$I_C=5A, I_{B1}=1A, I_{B2}=-2A, R_L=40\Omega, V_{CC}=200V$			0.5	$\mu s$
Storage Time	$t_{stg}$	$I_C=5A, I_{B1}=1A, I_{B2}=-2A, R_L=40\Omega, V_{CC}=200V$			2.5	$\mu s$
Fall Time	$t_f$	$I_C=5A, I_{B1}=1A, I_{B2}=-2A, R_L=40\Omega, V_{CC}=200V$			0.3	$\mu s$

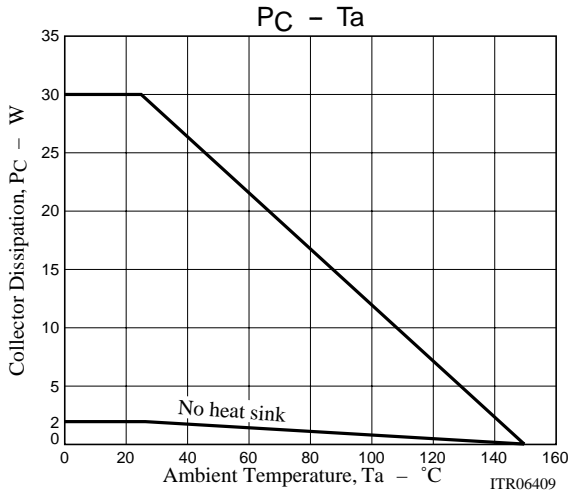
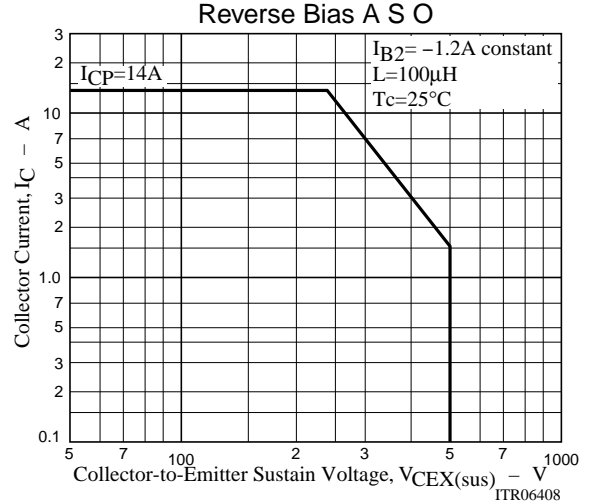
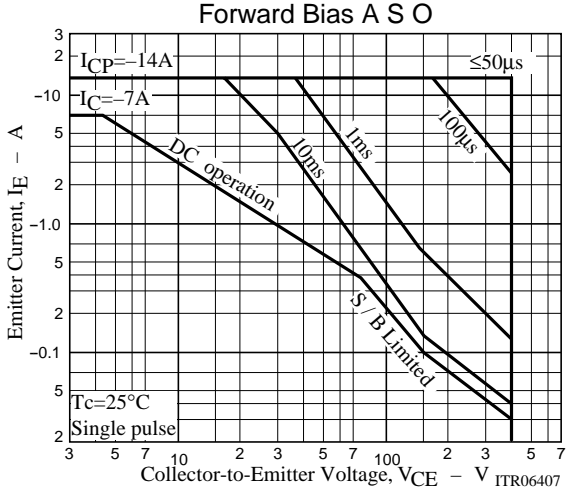
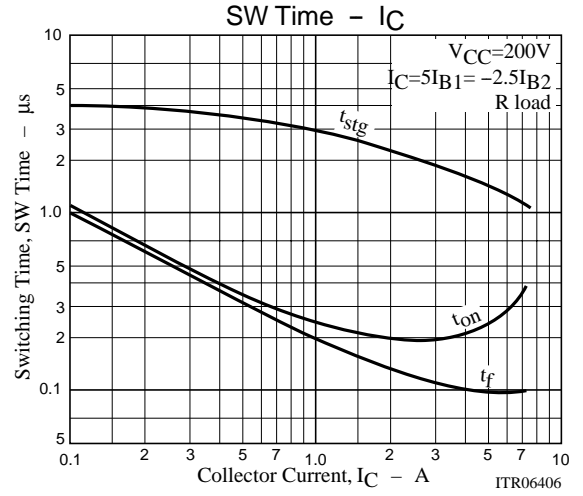
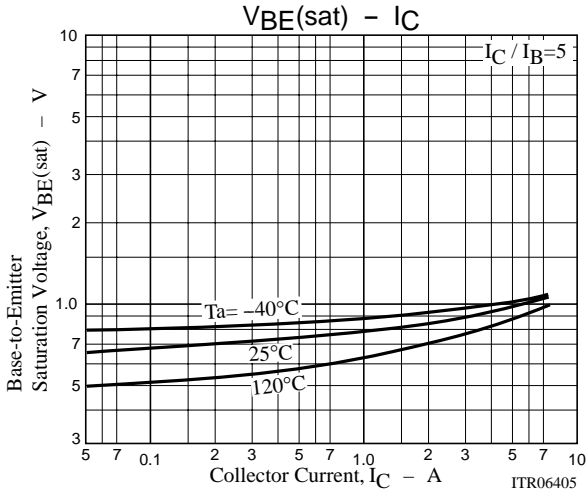
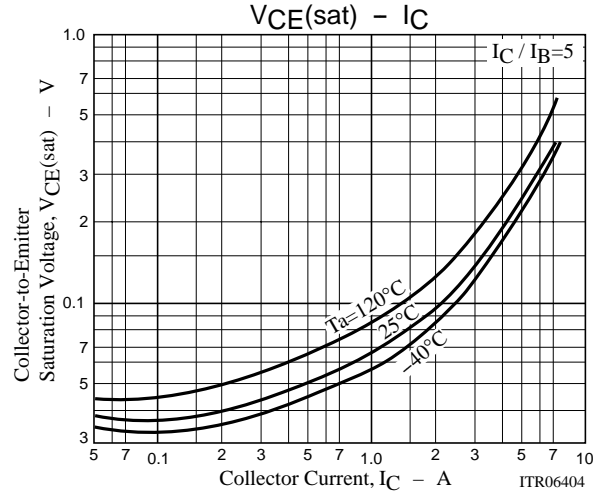
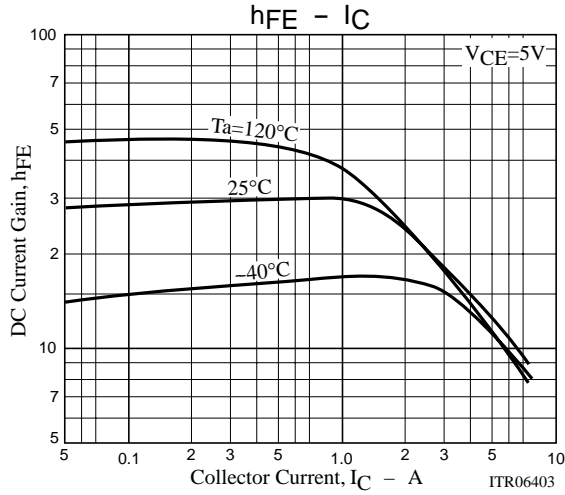
\* : The  $h_{FE1}$  of the 2SC4161 is classified as follows. When specifying the  $h_{FE1}$  rank, specify two ranks or more in principle.

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

## Switching Time Test Circuit



# 2SC4161



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