

TOSHIBA Transistor Silicon PNP Epitaxial Type

# 2SA2060

High-Speed Switching Applications  
 DC-DC Converter Applications  
 Strobe Applications

- High DC current gain:  $h_{FE} = 200$  to  $500$  ( $I_C = -0.5$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = -0.2$  V (max)
- High-speed switching:  $t_f = 90$  ns (typ.)

### Maximum Ratings (Ta = 25°C)

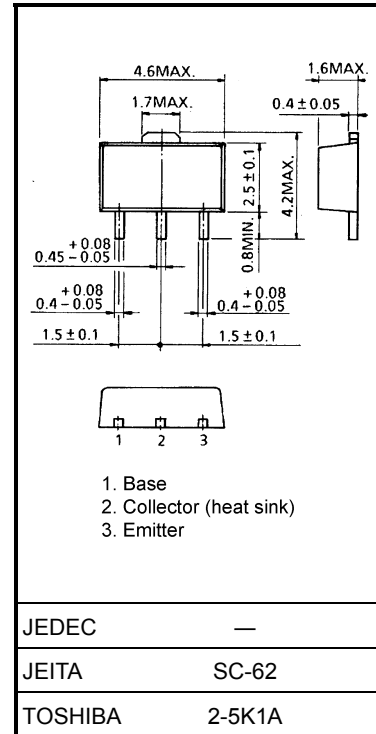
Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-50	V
Collector-emitter voltage	$V_{CEO}$	-50	V
Emitter-base voltage	$V_{EBO}$	-7	V
Collector current	DC	$I_C$	-2.0
	Pulse	$I_{CP}$	-3.5
Base current	$I_B$	-200	mA
Collector power dissipation	t = 10 s	$P_C$	2.5
	DC	(Note 1)	1.0
Junction temperature	$T_j$	150	°C
Storage temperature range	$T_{stg}$	-55 to 150	°C

Note 1: Mounted on an FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm<sup>2</sup>)

### Electrical Characteristics (Ta = 25°C)

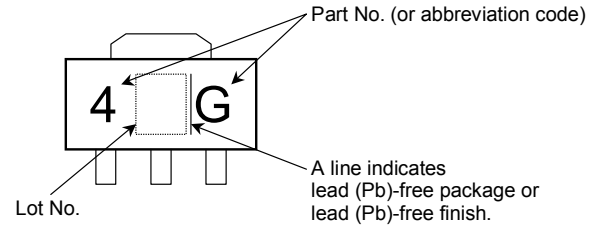
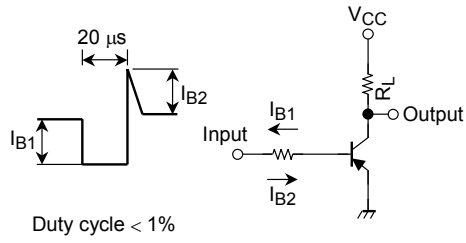
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = -50$ V, $I_E = 0$	—	—	-100	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -7$ V, $I_C = 0$	—	—	-100	nA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -10$ mA, $I_B = 0$	-50	—	—	V
DC current gain	$h_{FE}(1)$	$V_{CE} = -2$ V, $I_C = -0.3$ A	200	—	500	
	$h_{FE}(2)$	$V_{CE} = -2$ V, $I_C = -1.0$ A	100	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -1.0$ A, $I_B = -0.033$ A	—	—	-0.2	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -1.0$ A, $I_B = -0.033$ A	—	—	-1.1	V
Collector output capacitance	$C_{ob}$	$V_{CB} = -10$ V, $I_E = 0$ , f = 1 MHz	—	20	—	pF
Switching time	Rise time	See Figure 1 circuit diagram. $V_{CC} \approx -30$ V, $R_L = 30$ Ω $-I_{B1} = I_{B2} = -33$ mA	—	60	—	ns
	Storage time		—	250	—	
	Fall time		—	90	—	

Unit: mm

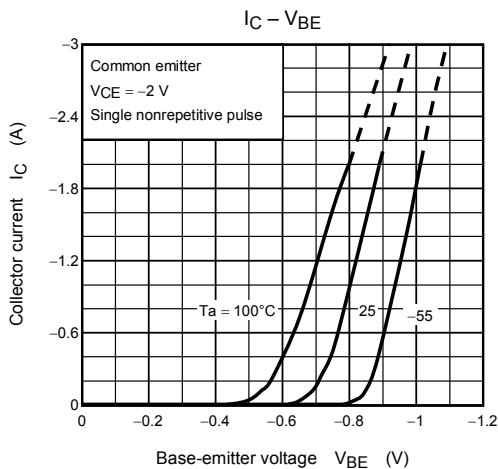
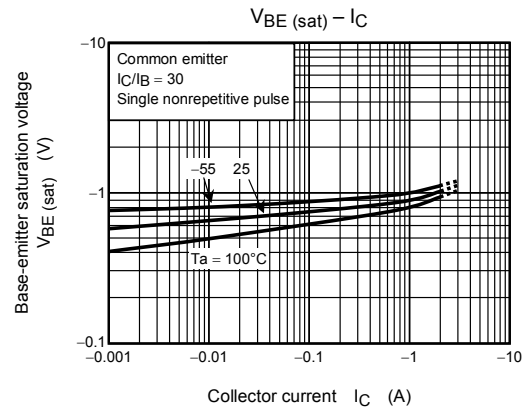
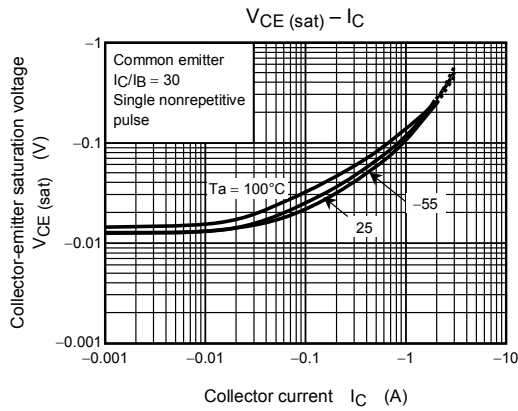
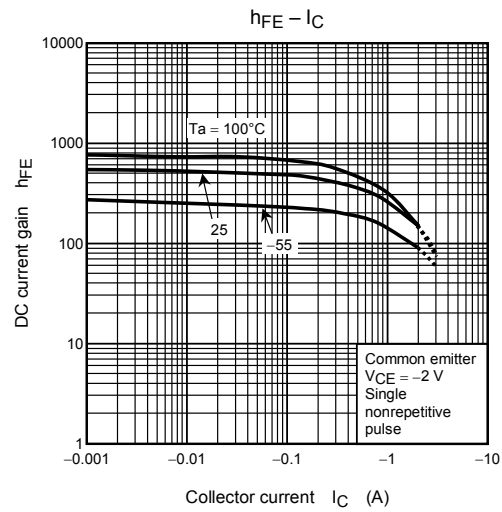
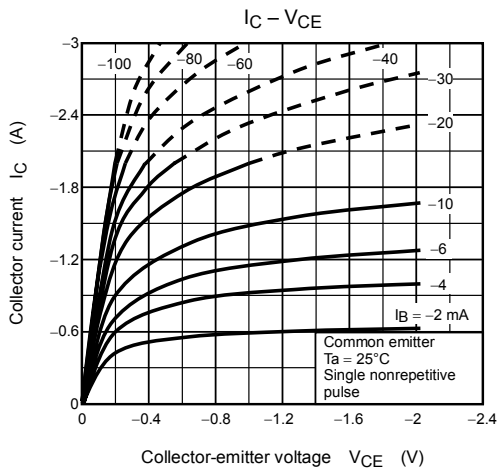


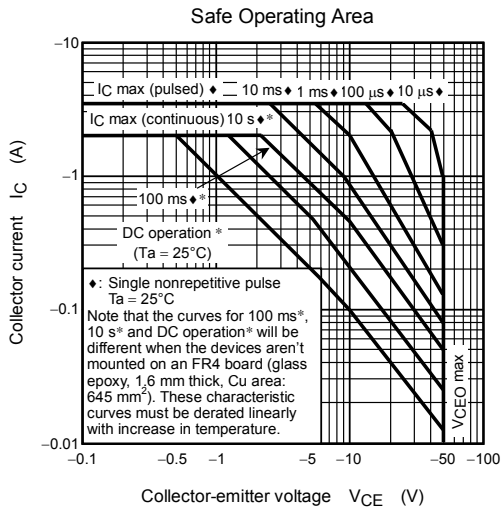
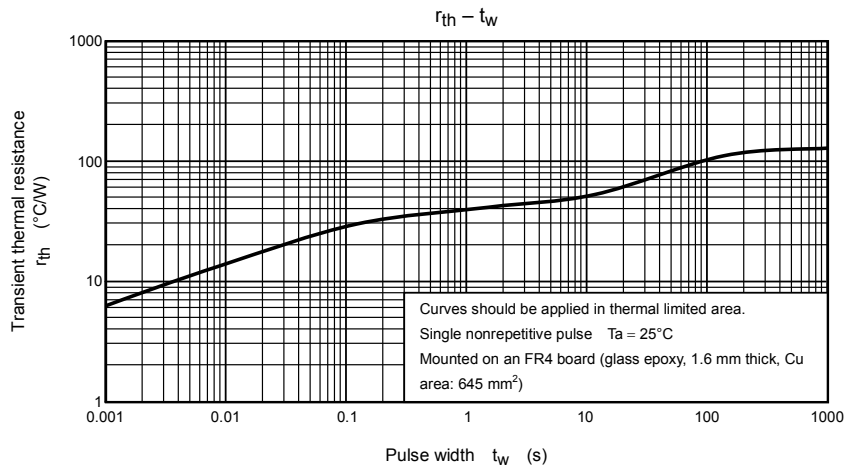
Weight: 0.05 g (typ.)

**Marking**



**Figure 1 Switching Time Test Circuit & Timing Chart**





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