

# 2SC3509

Silicon NPN Triple-Diffused Planar Darlington Type

High Breakdown Voltage, High Speed Switching

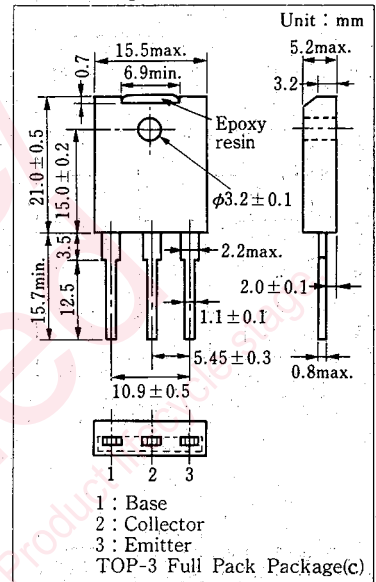
### ■ Features

- High speed switching
- High collector-base voltage ( $V_{CB0}$ )
- Good linearity of DC current gain ( $h_{FE}$ )
- "Full Pack" package for simplified mounting on a heat sink with one screw

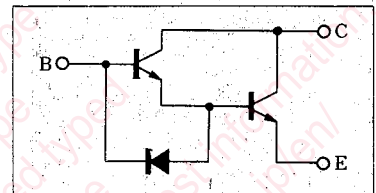
### ■ Absolute Maximum Ratings ( $T_c=25^\circ\text{C}$ )

Item	Symbol	Value	Unit
Collector-base voltage	$V_{CB0}$	900	V
Collector-emitter voltage	$V_{CEO}$	800	V
Emitter-base voltage	$V_{EBO}$	7	V
Peak collector current	$I_{CP}$	20	A
Collector current	$I_C$	10	A
Base current	$I_{BP}$	8	A
	$I_B$	4	A
Collector power dissipation	$T_c=25^\circ\text{C}$	100	W
	$T_a=25^\circ\text{C}$	3	
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 ~ +150	$^\circ\text{C}$

### ■ Package Dimensions



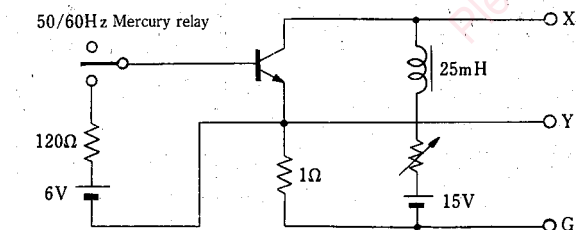
### ■ Inner Circuit

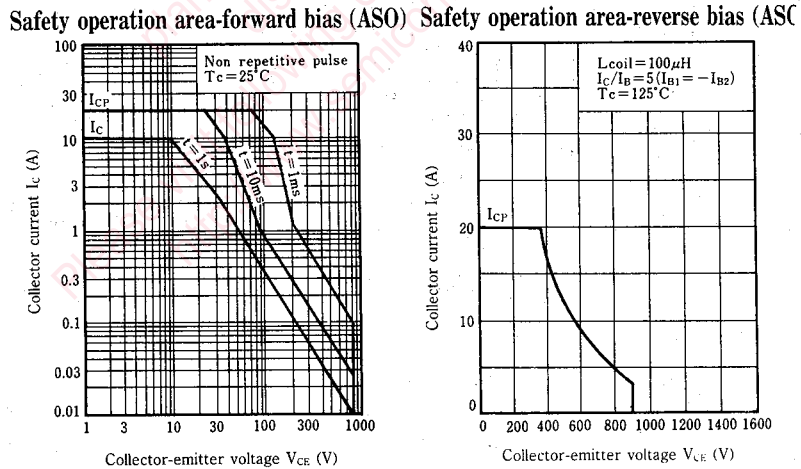
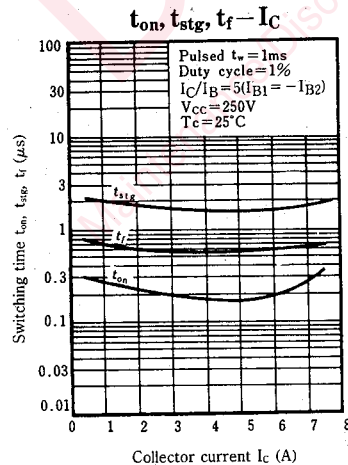
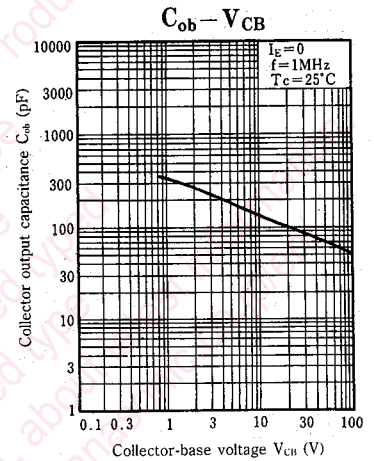
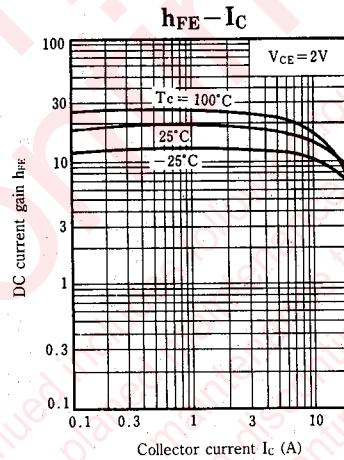
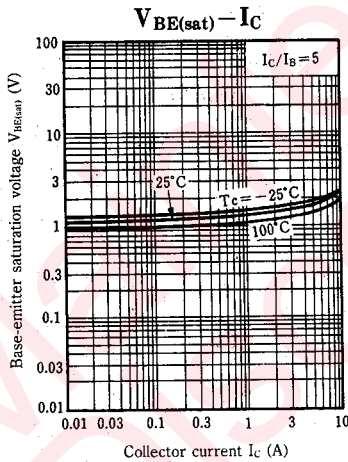
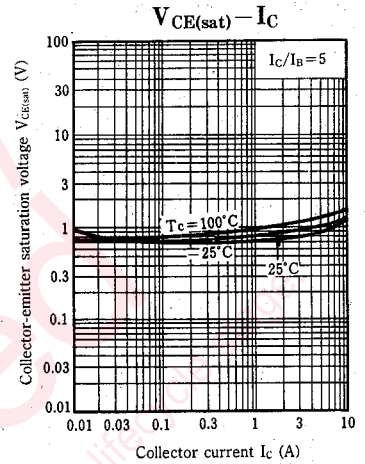
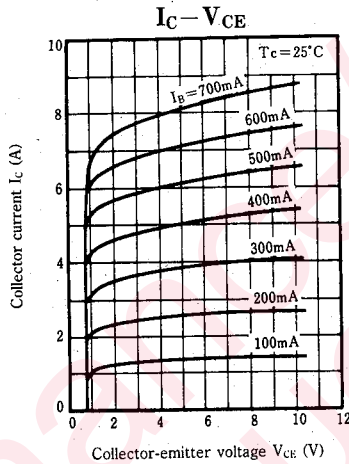
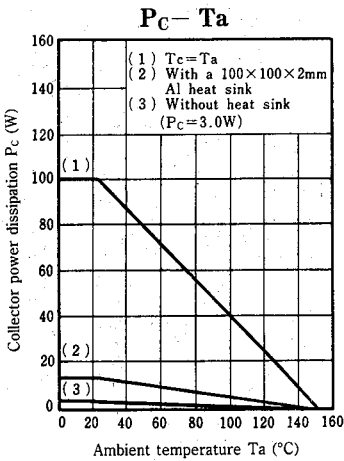


### ■ Electrical Characteristics ( $T_c=25^\circ\text{C}$ )

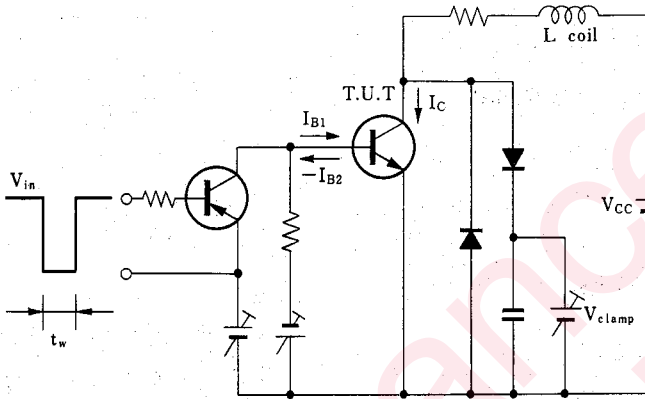
Item	Symbol	Condition	min.	typ.	max.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB}=900\text{V}, I_E=0$			100	$\mu\text{A}$
Emitter cutoff current	$I_{EBO}$	$V_{EB}=7\text{V}, I_C=0$			1	mA
Collector-emitter voltage	$V_{CEO(sus)}$ *	$I_C=0.5\text{A}, L=50\text{mH}$	800			V
DC current gain	$h_{FE}$	$V_{CE}=2\text{V}, I_C=5\text{A}$	7			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=5\text{A}, I_B=1\text{A}$			1.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=5\text{A}, I_B=1\text{A}$			2.5	V
Transition frequency	$f_T$	$V_{CE}=10\text{V}, I_C=0.5\text{A}, f=1\text{MHz}$		15		MHz
Turn-on time	$t_{on}$	$I_C=5\text{A}$			0.5	$\mu\text{s}$
Storage time	$t_{stg}$	$I_{B1}=1\text{A}, I_{B2}=-1\text{A}$			3	$\mu\text{s}$
Collector current fall time	$t_f$	$V_{CC}=250\text{V}$			0.7	$\mu\text{s}$

\*  $V_{CEO(sus)}$  Test method

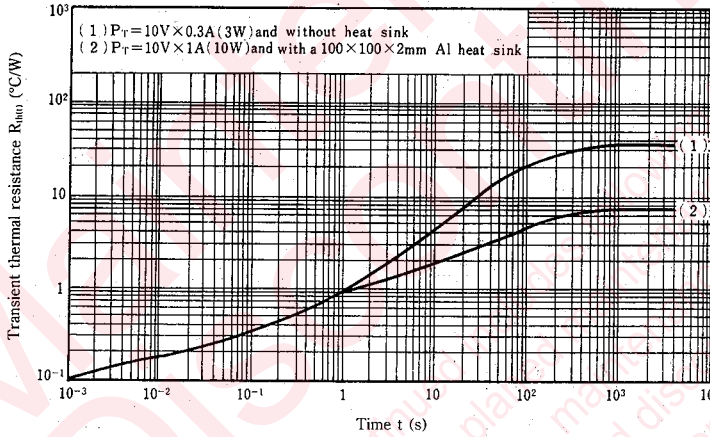




Measurement circuit of reverse bias ASO



$R_{th}(t) - t$



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