

Silicon NPN Transistor

2SC3178 / C3178

850V/2A

DATASHEET

OEM – Fujitsu

Source: Fujitsu Databook 1983

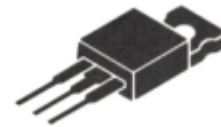
FUJITSU
MICROELECTRONICS

2SC3178

**SILICON HIGH SPEED RING EMITTER
NPN POWER TRANSISTORS 2 AMP, 850 VOLT**

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector to Emitter Voltage	V_{CE0}	850	V
Collector to Base Voltage	V_{CB0}	1200	V
Emitter to Base Voltage	V_{EB0}	7	V
Collector Current-Continuous	I_C	2	A
Collector Current-Pulsed $P_w \leq 25 \mu s$, $D.R. \leq 50\%$	I_{CP}	4	A
Base Current-Continuous	I_B	1	A
Collector Power Dissipation ($T_C = 25^\circ C$)	P_C	60	W
Junction Temperature	T_j	+150	$^\circ C$
Storage Temperature Range	T_{stg}	-55 ~ +150	$^\circ C$



ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$)

Parameter	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 1mA, I_E = 0$	1200	—	—	V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 1mA, I_C = 0$	7	—	—	V
Collector to Emitter Sustaining Voltage	$V_{(BR)CEO}$	$I_C = 10mA, R_{BE} = \infty \Omega$	850	—	—	V
Collector to Emitter Sustaining Voltage	$V_{CEX(SUS)}$	$I_C = 2.5A, I_{B2} = -0.3A, L = 1mH(*1)$	900	—	—	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 1000V, I_E = 0$	—	—	100	μA
Collector Cutoff Current	I_{CBO}	$V_{CB} = 1000V, I_E = 0, T_C = 100^\circ C$	—	—	1	mA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 6V, I_C = 0$	—	—	100	μA
DC Current Gain	h_{FE}	$V_{CE} = 5V, I_C = 1A(*2)$	10	15	30	—
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 1A, I_B = 0.2A(*2)$	—	0.3	1.5	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$		—	1.0	2.0	V
Output Capacitance	C_{ob}	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	60	—	pF
Gain Bandwidth Product	f_T	$V_{CE} = 10V, I_C = 0.2A$	—	15	—	MHz
Rise Time	t_r	$V_{CC} = 400V(*1)$ $I_C = 1A, I_{B1} = -I_{B2} = 0.3A$	—	0.2	0.5	μs
Storage Time	t_{stg}		—	2.5	3.5	μs
Fall Time	t_f		—	0.07	0.3	μs

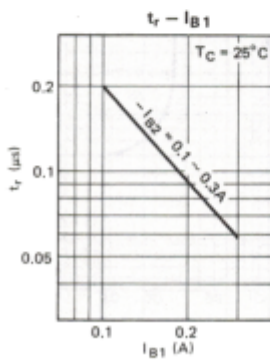
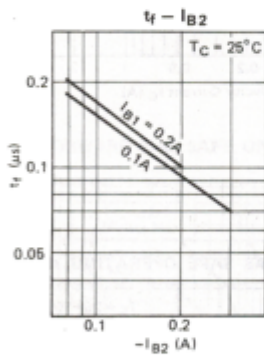
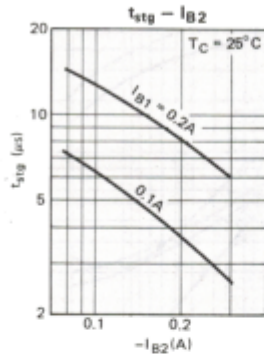
*1 Test Circuit *2 Pulse $P_w \leq 300 \mu s$, Duty Ratio $\leq 6\%$

PACKAGE TYPE: TO-220. See page 5-23 for dimensions.

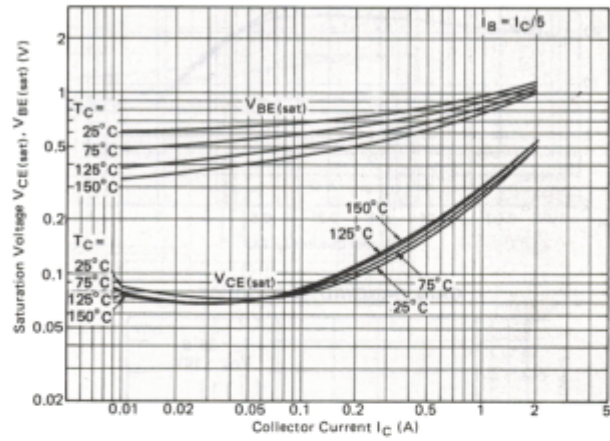
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SWITCHING TIME

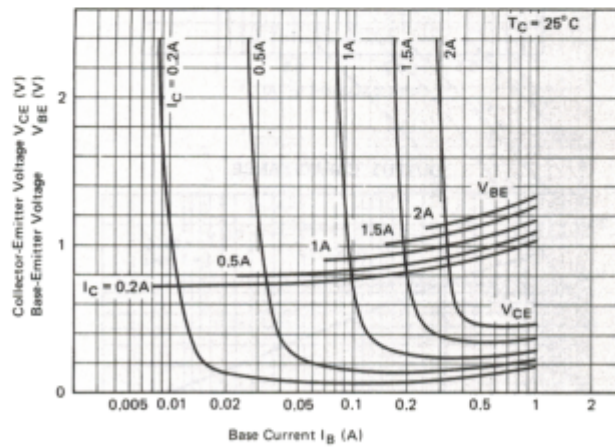
$V_{CC} = 400V$
 $I_C = 1A$
 $P_W = 50 \mu s$
 Duty ratio = 1%

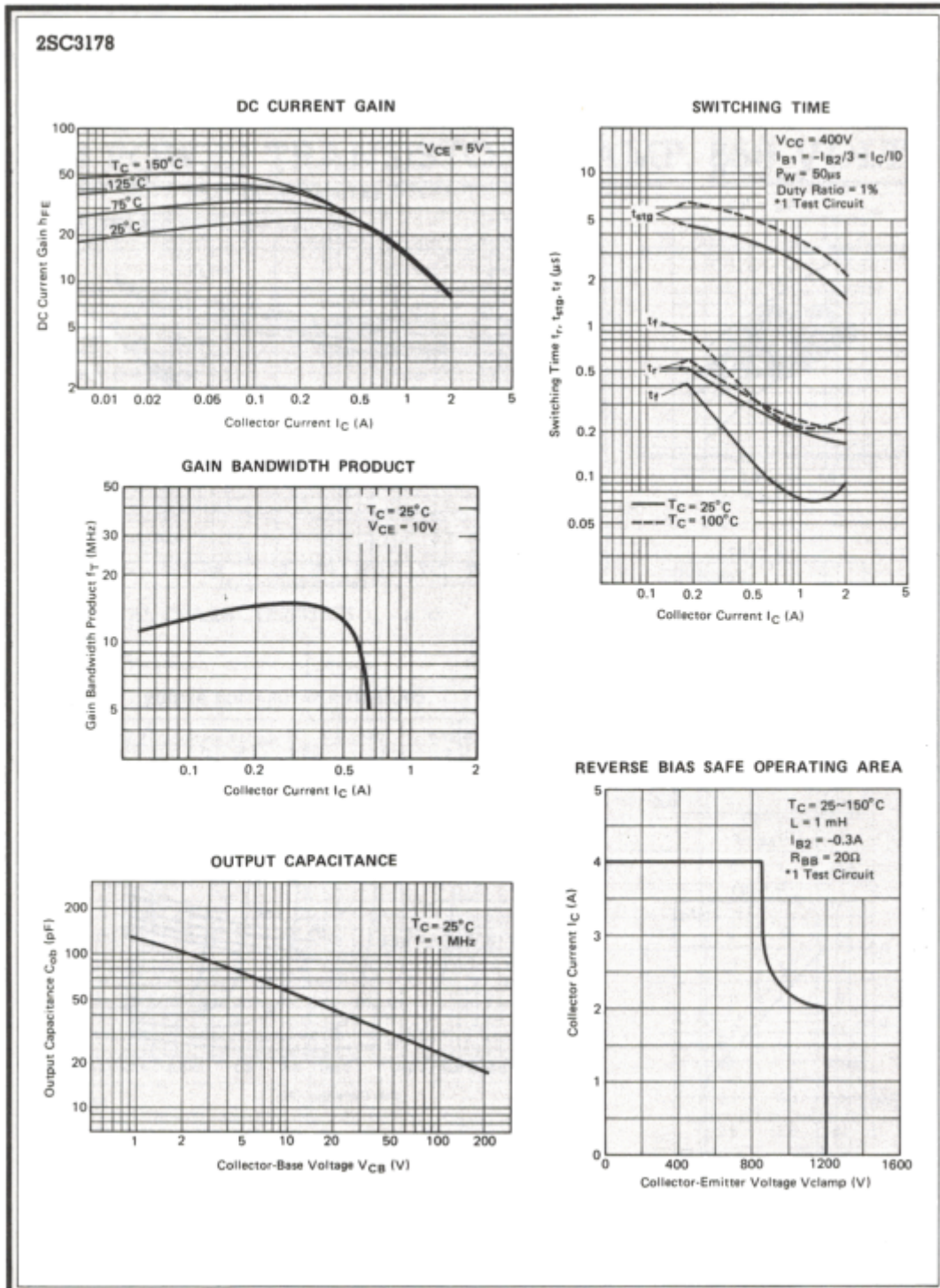


SATURATION VOLTAGE

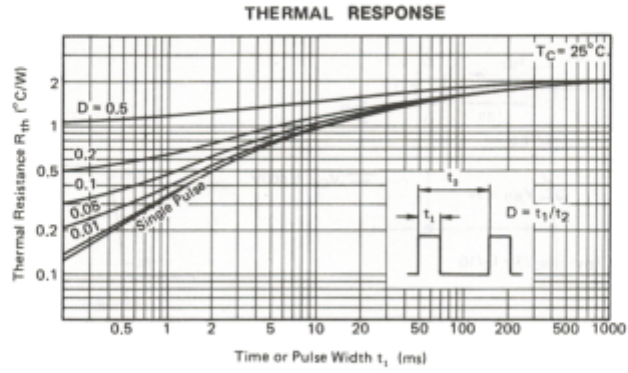


COLLECTOR SATURATION REGION

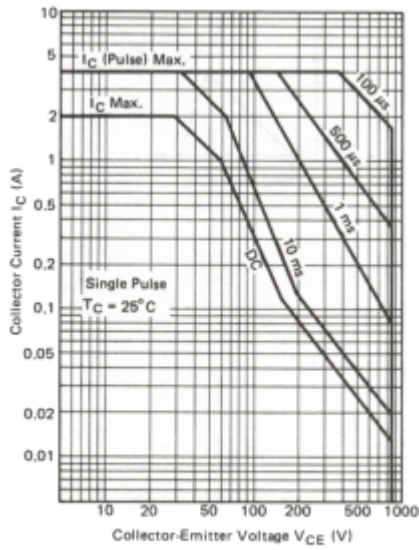




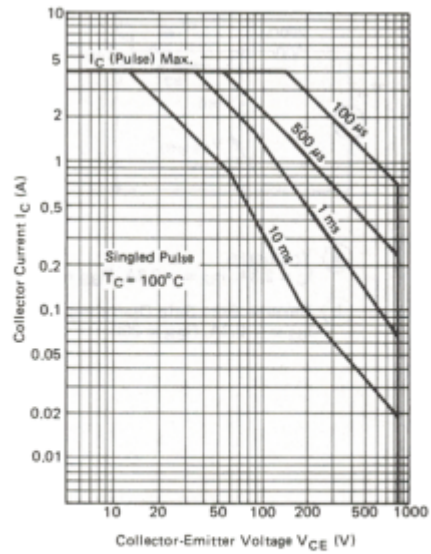
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FORWARD BIAS SAFE OPERATING AREA

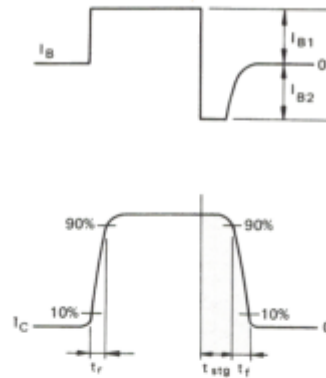
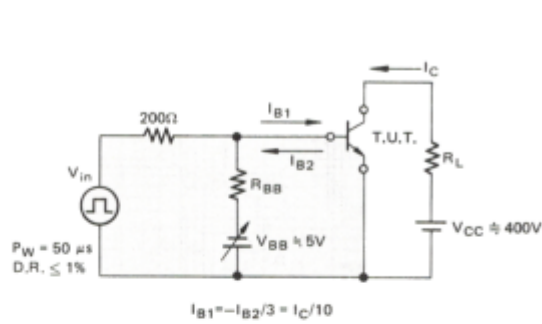


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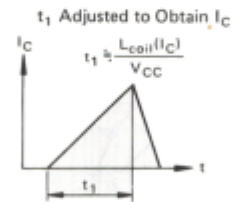
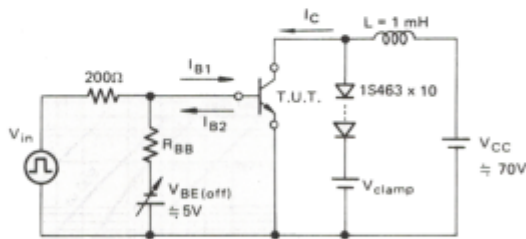


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TEST CIRCUIT USED FOR MEASUREMENT OF SWITCHING TIME (RESISTIVE)



TEST CIRCUIT USED FOR MEASUREMENT OF VCEX(SUS) AND REVERSE BIAS SAFE OPERATING AREA



- (a) $V_{CEX(SUS)}$
 $I_C = 2.5A, I_{B2} = -0.3A, R_{BB} = 20\Omega, V_{clamp} = 900V$
- (b) Reverse Bias Safe Operating Area
 $I_{B2} = -0.3A, R_{BB} = 20\Omega$

TRANSISTOR PACKAGING INFORMATION

