T-33-13

January 1990
Edition 1.1

FUJITSU

PRODUCT PROFILE

2SC3846

Silicon High Speed Power Transistor

2SC3846 800V, 6A

ABSOLUTE MAXIMUM RATINGS

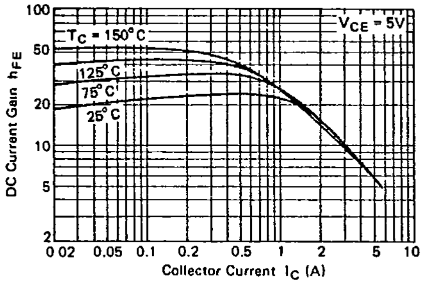
Parameter	Symbol	Conditions	Rating	Unit
Storage Temperature Range	T_{stg}		-55 ~ +150	°C
Junction Temperature	T_j		+150	°C
Collector to Base Voltage	V_{CBO}		1200	V
Emitter to Base Voltage	V_{EBO}		7	V
Collector to Emitter Voltage	V_{CEO}		800	V
Collector Current	I_C		6	A
	I_{CM}	$P_W \leqq 25\mu s$, D.R. $\leqq 50\%$	10	
Base Current	I_B		3	A
Collector Power Dissipation	P_C	$T_C = 25°C$	80	W

ELECTRICAL CHARACTERISTICS ($T_a = 25°C$)

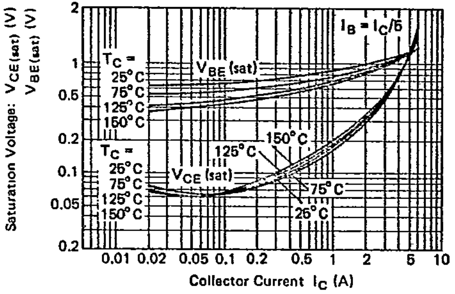
Parameter	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 1mA$, $I_E = 0$	1200	–	–	V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 1mA$, $I_C = 0$	7	–	–	V
Collector to Emitter Sustaining Voltage	$V_{(BR)CEO}$	$I_C = 10mA$, $R_{BE} = \infty\Omega$	800	–	–	V
Collector to Emitter Sustaining Voltage	$V_{CEX(SUS)}$	$I_C = 5A$, $I_{B2} = -0.6A$, $L = 1mA^{*}$	900	–	–	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 1000V$, $I_E = 0$	–	–	100	μA
		$V_{CB} = 1000V$, $I_E = 0$, $T_a = 100°C$	–	–	1	mA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 6V$, $I_C = 0$	–	–	100	μA
DC Currentt Gain	h_{FE}	$V_{CE} = 5V$, $I_C = 2A^{**}$	10	15	30	–
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 2A$, $I_B = 0.4A^{**}$	–	0.3	1.5	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$		–	1.0	2.0	V
Output Capacitance	C_{ob}	$V_{CB} = 10V$, $I_E = 0$, $f = 1MHz$	–	120	–	pF
Gain Bandwidth Product	f_T	$V_{CE} = 10V$, $I_C = 0.5A$	–	15	–	MHz
Rise Time	t_r	$V_{CC} = 400V$ $I_C = 2A$, $3I_{B1} = -I_{B2} = 0.6A^{*}$	–	0.20	0.5	μs
Storage Time	t_{stg}		–	2.50	3.5	μs
Fall Time	t_f		–	0.07	0.3	μs

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

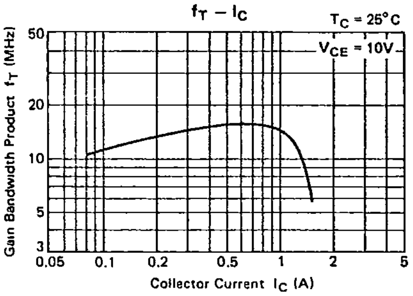
$h_{FE} - I_C$



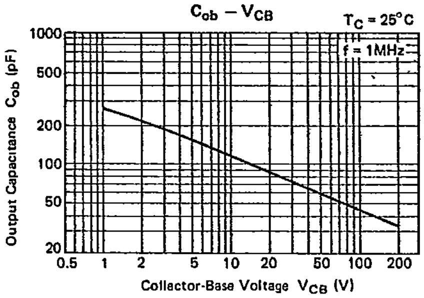
V_{CE} (sat), V_{BE} (sat) $- I_C$



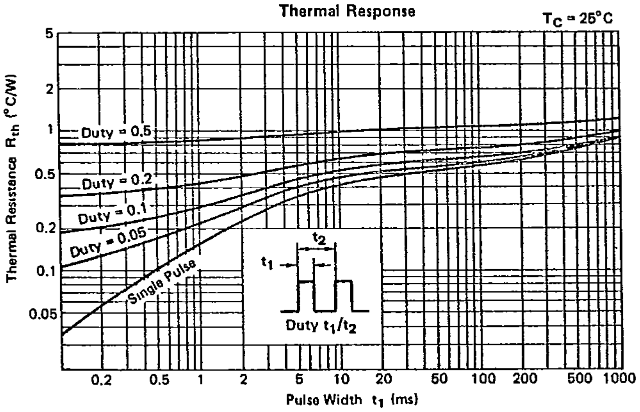
$f_T - I_C$

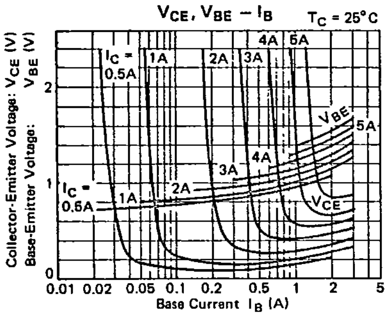


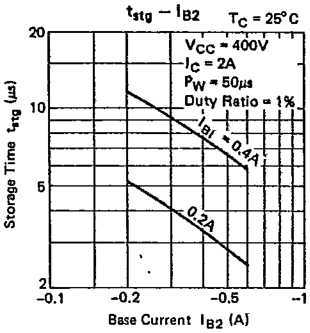
$C_{ob} - V_{CB}$



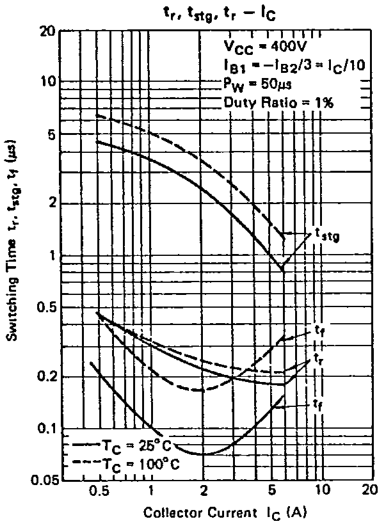
Thermal Response

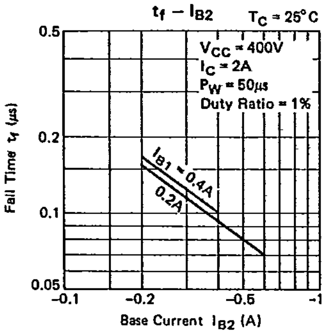


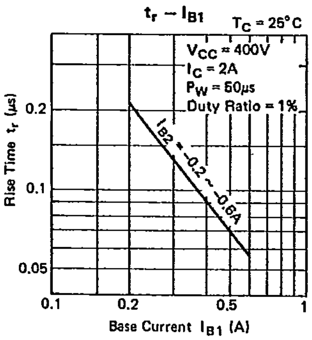




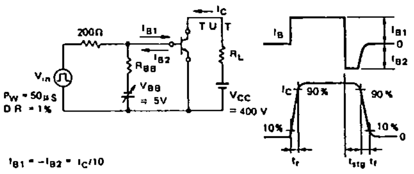
2



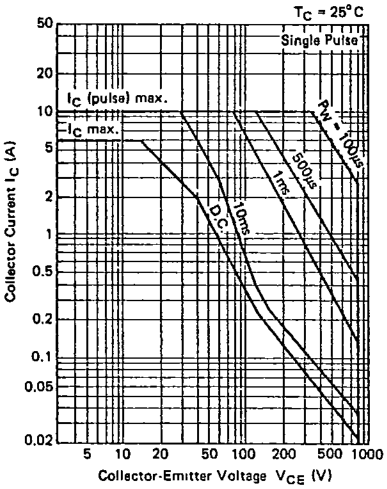




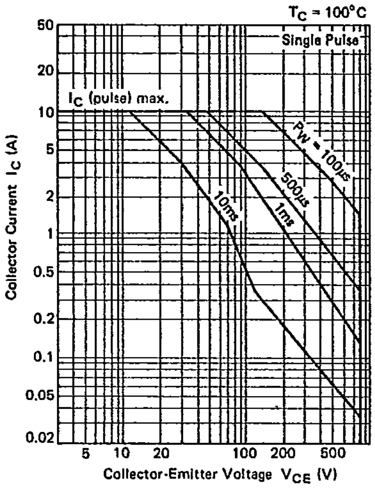
Test Circuit for Switching Time



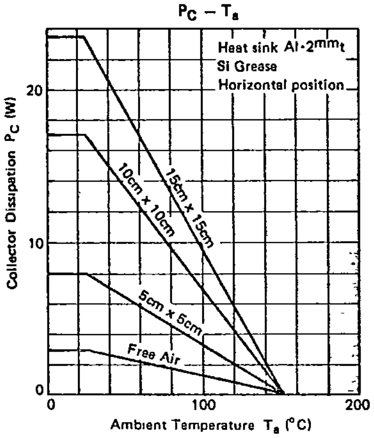
Forward Bias Safe Operating Area – 1



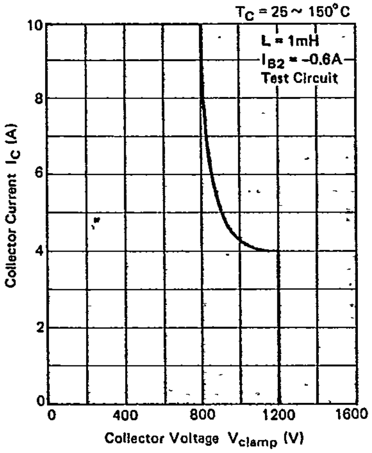
Forward Bias Safe Operating Area – 2



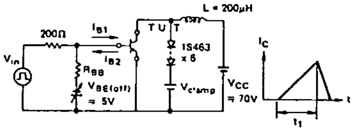
$P_C - T_a$



Reverse Bias Safe Operating Area



Test Circuit for $V_{CEX(sus)}$ and Reverse Bias Safe Operating Area



$V_{CEX(SUS)}$ V_{clamp} = 900V
I_C = 5A R_{BB} = 10Ω
I_{B2} = –0.6A

$t_1 ≒ \frac{L_{coil}(I_C)}{V_{CC}}$

T-91-20

TO-3PF FULL PLASTIC MOLD POWER TRANSISTORS (RING EMITTER TRANSISTORS)

ELECTRICAL CHARACTERISTICS

Type No.	Maximum Ratings (T_a = 25°C)					Electrical Characteristics (T_a = 25°C)			
	V_{CBO} (V)	V_{CEO} (V)	I_C (A)	I_{CM}* (A)	P_C (W)	V_{CE} (V)	I_C (A)	h_{FE} Min.	t_f (μs) Max.
2SC3842	600	400	10	15	70	5	5	10	0.3
2SC3843	600	450	10	20	75	5	6	10	0.2
2SC3844	600	450	15	20	75	5	10	10	0.3
2SC3845	1200	800	3	6	75	5	1	10	0.3
2SC3846	1200	800	6	10	80	5	2	10	0.3
2SC3847	1200	800	10	20	85	5	4	10	0.3
2SC3947	850	500	5	8	70	5	2.5	10	0.3
2SC3948	850	500	10	15	75	5	5	10	0.3
2SC3949	850	500	15	20	80	5	10	10	0.3

* Pulsed $P_W \leq 25\mu s$, D.R. $\leq$ 50%

- **Package Outline and Terminal Configuration**