January 1990
Edition 1.1

FUJITSU

PRODUCT PROFILE

2SA1043, 2SA1044, 2SC2433, 2SC2434

Silicon High Speed Power Transistor

DESCRIPTION

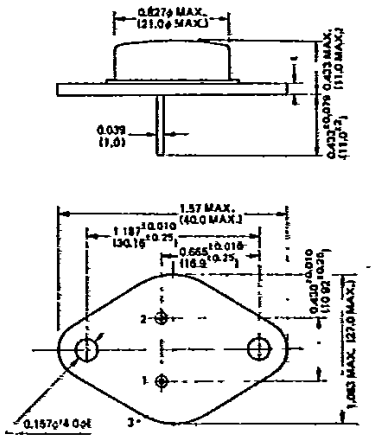
This series are silicon PNP/NPN planer general purpose, high power switching transistors fabricated with Fujitsu's unique Ring Emitter Transistor (RET) technology. RET devices are constructed with multiple emitters connected through diffused ballast resistors which provide uniform current density. This structure permits the design of high power transistors with superior switching characteristics and frequency response in high current applications.

This series are especially well-suited for high speed/high voltage switching systems or other applications where large SOA is required.

Features

	2SA1043, 2SA1044	2SC2433, 2SC2434
★ f_T :	60MHz (typ.)	80MHz (typ.)
★ t_r :	0.20 μs (typ.)	0.28 μs (typ.)
★ t_s :	0.24 μs (typ.)	0.70 μs (typ.)
★ t_f :	0.08 μs (typ.)	0.15 μs (typ.)
★ Excellent Safe Operating Area:		2SA1043–2SC2433
★ Complements:		2SA1044–2SC2434

OUTLINE DIMENSION
JEDEC TO–3



1: Base 2: Emitter 3: Collector (Case)
Dimension in inches and (millimeters)

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value		Value		Unit
		2SA1043	2SA1044	2SC2433	2SC2434	
Collector to Base Voltage	V_{CBO}	-120	-70	120	70	V
Emitter to Base Voltage	V_{EBO}	-5	-5	5	5	V
Collector to Emitter Voltage	V_{CEO}	-120	-70	120	70	V
Collector Current	I_C	-30	-30	30	30	A
Base Current	I_B	-10	-10	10	10	A
Collector Power Dissipation (T_C = 25°C)	P_C	150	150	150	150	W
Junction Temperature	T_J	+175		+175		°C
Storage Temperature Range	T_{stg}	-65 ~ +175		-65 ~ +175		°C

ELECTRICAL CHARACTERISTICS (T_a = 25°C)

2SA1043, 2SA1044

Parameter	Symbol	Test Conditions	Limits						Unit
			2SA1043			2SA1044			
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Collector Cutoff Current	I_{CBO}	V_{CB} = −120V, I_E = 0	—	—	−50	—	—	—	−50
Collector Cutoff Current	I_{CBO}	V_{CB} = −70V, I_E = 0	—	—	—	—	—	−50	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = −4V, I_C = 0	—	—	−50	—	—	−50	μA
Collector Cutoff Current	I_{CEO}	V_{CE} = −120V, I_B = 0	—	—	−1	—	—	—	mA
Collector Cutoff Current	I_{CEO}	V_{CE} = −70V, I_B = 0	—	—	—	—	—	−1	mA
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = −50 μA, I_E = 0	−120	—	—	−70	—	—	V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = −1mA, I_C = 0	−5	—	—	−5	—	—	V
Collector to Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = −10mA, R_{BE} = ∞Ω	−120	—	—	−70	—	—	V
DC Current Gain	h_{FE1}	V_{CE} = −5V, I_C = −3A *	35	—	200	35	—	200	—
DC Current Gain	h_{FE2}	V_{CE} = −5V, I_C = −30A *	7	—	—	10	—	—	—
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = −15A, I_B = −1.5A*	—	−0.7	−1.5	—	−0.5	−1.5	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$		—	−1.2	−2.0	—	−1.1	−2.0	V
Gain-Bandwidth Product	f_T	V_{CE} = −10V, I_C = −2A	—	60	—	—	60	—	MHz
Output Capacitance	C_{ob}	V_{CB} = −10V, I_E = 0, f = 1MHz	—	600	—	—	700	—	pF
Rise Time	t_r	I_C = −15A, R_L = 2Ω I_{B1} = −I_{B2} = −1.5A	—	0.20	0.8	—	0.20	0.8	μs
Storage Time	t_{stg}		—	0.24	1.0	—	0.24	1.0	μs
Fall Time	t_f		—	0.08	0.8	—	0.08	0.8	μs

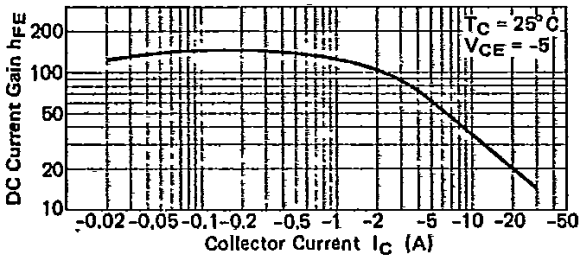
2SC2433, 2SC2434

Parameter	Symbol	Test Conditions	Limits						Unit
			2SC2433			2SC2432			
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Collector Cutoff Current	I_{CBO}	V_{CB} = 120V, I_E = 0	—	—	50	—	—	—	μA
Collector Cutoff Current	I_{CBO}	V_{CB} = 70V, I_E = 0	—	—	—	—	—	50	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 4V, I_C = 0	—	—	50	—	—	50	μA
Collector Cutoff Current	I_{CEO}	V_{CE} = 120V, I_B = 0	—	—	1	—	—	—	mA
Collector Cutoff Current	I_{CEO}	I_{CE} = 70V, I_B = 0	—	—	—	—	—	1	mA
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 50 μA, I_E = 0	120	—	—	70	—	—	V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 1mA, I_C = 0	5	—	—	5	—	—	V
Collector to Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 10mA, R_{BE} = ∞Ω	120	—	—	70	—	—	V
DC Current Gain	h_{FE1}	V_{CE} = 5V, I_C = 3A *	35	—	200	35	—	200	—
DC Current Gain	h_{FE2}	V_{CE} = 5V, I_C = 30A *	7	—	—	10	—	—	—
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 15A, I_B = 1.5A*	—	0.5	1.5	—	0.5	1.5	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$		—	1.2	2.0	—	1.2	2.0	V
Gain-Bandwidth Product	f_T	V_{CE} = 10V, I_C = 2A	—	80	—	—	80	—	MHz
Output Capacitance	C_{ob}	V_{CB} = 10V, I_E = 0, f = 1MHz	—	350	—	—	350	—	pF
Rise Time	t_r	I_C = 15A, R_L = 2Ω I_{B1} = −I_{B2} = 1.5A	—	0.28	0.8	—	0.28	0.8	μs
Storage Time	t_{stg}		—	0.70	1.0	—	0.70	1.0	μs
Fall Time	t_f		—	0.15	0.8	—	0.15	0.8	μs

* Pulsed $P_W \leqq 300$ μs, Duty Ratio ≦ 6%

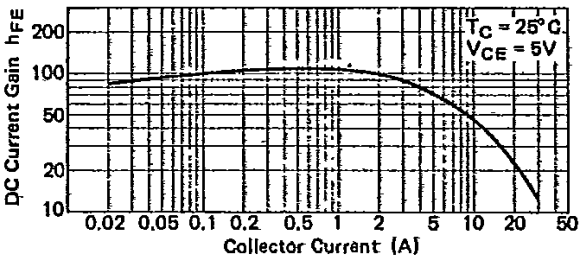
2SC1043, 2SA1044

DC CURRENT GAIN

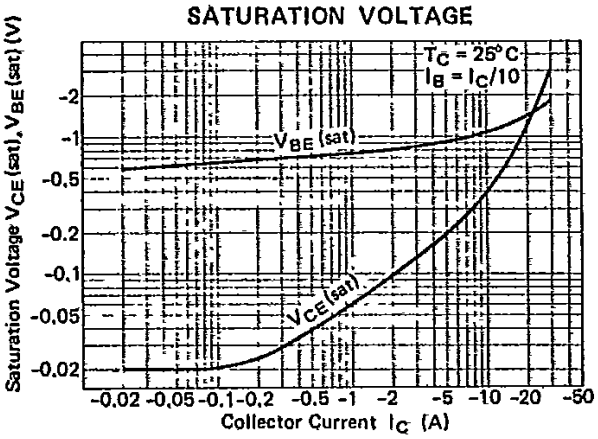


2SC2433, 2SC2434

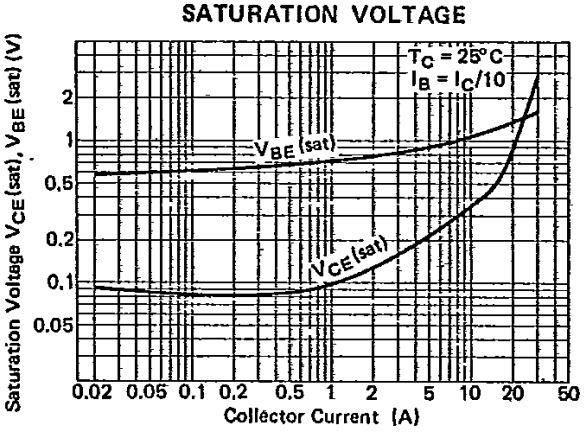
DC CURRENT GAIN



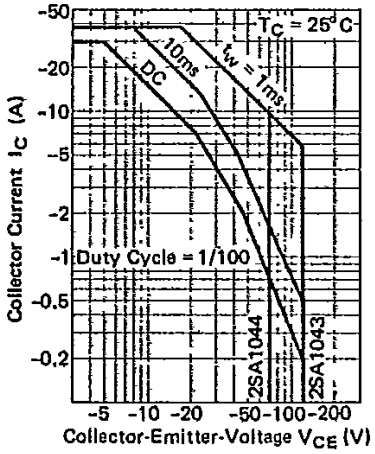
SATURATION VOLTAGE



SATURATION VOLTAGE



SAFE OPERATING AREAS



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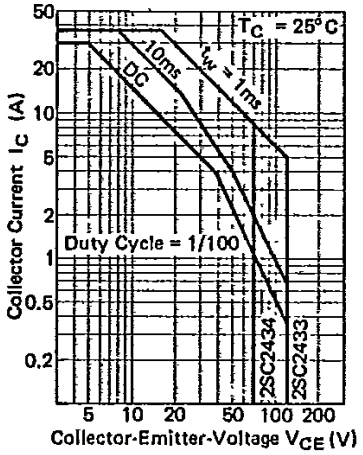
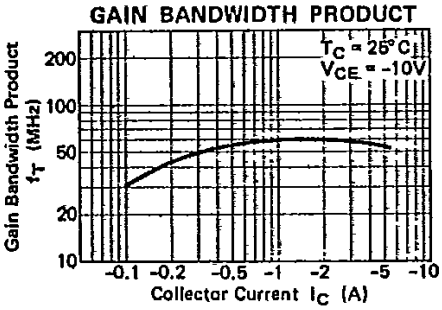
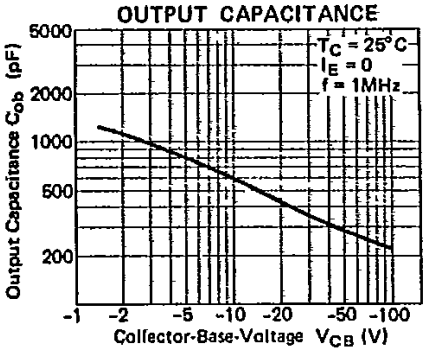


2SA 1043, 2SA1044

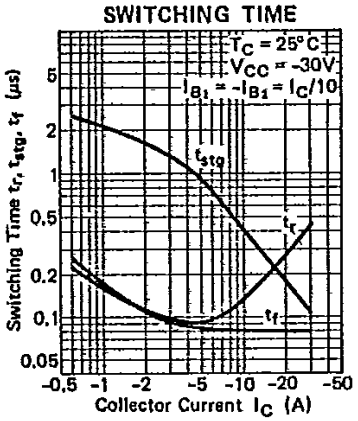
GAIN BANDWIDTH PRODUCT



OUTPUT CAPACITANCE

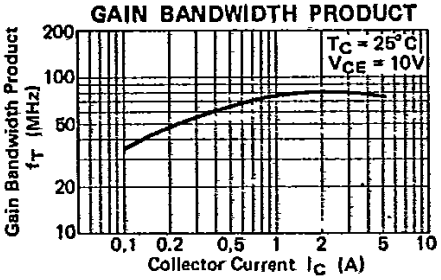


SWITCHING TIME

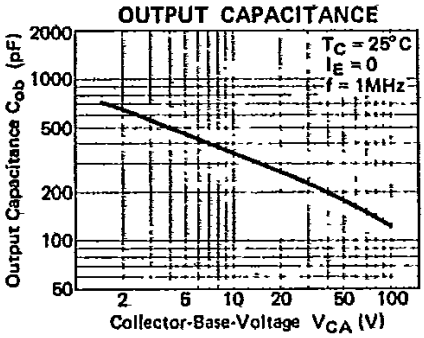


2SC2433, 2SC2434

GAIN BANDWIDTH PRODUCT



OUTPUT CAPACITANCE



SWITCHING TIME