

T-33-13
T-33-23

January 1990
Edition 1.1



PRODUCT PROFILE

2SA1041, 2SA1042, 2SC2431, 2SC2432
Silicon High Speed Power Transistor

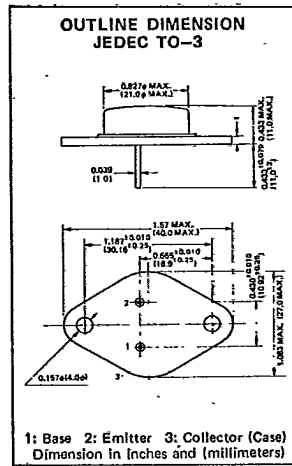
DESCRIPTION

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

- | | |
|----------------------------------|---------------------|
| 2SA1041, 2SA1042 | 2SC2431, 2SC2432 |
| * f_T : 60MHz (typ.) | 80MHz (typ.) |
| * t_r : 0.15 μ s (typ.) | 0.20 μ s (typ.) |
| * t_f : 0.24 μ s (typ.) | 0.70 μ s (typ.) |
| * t_t : 0.08 μ s (typ.) | 0.12 μ s (typ.) |
| * Excellent Safe Operating Area: | 2SA1041-2SC2431 |
| * Complements: | 2SA1042-2SC2432 |



ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value		Value		Unit
		2SA1041	2SA1042	2SC2431	2SC2432	
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	-15	-15	15	15	A
Base Current	I_B	-5	-5	5	5	A
Collector Power Dissipation ($T_C = 25^\circ C$)	P_C	100	100	100	100	W
Junction Temperature	T_j	+175		+175		$^\circ C$
Storage Temperature Range	T_{stg}	-65 ~ +175		-65 ~ +175		$^\circ C$

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2SA1041, 2SA1042, 2SC2431, 2SC2432

ELECTRICAL CHARACTERISTICS (T_a = 25°C)

2SA1041, 2SA1042

Parameter	Symbol	Test Conditions	Limits						Unit
			2SA1041			2SA1042			
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Collector Cutoff Current	I _{CEO}	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}	V _{CE} = -70V, I _B = 0	-	-	-	-	-	-1	mA
Collector to Base Breakdown Voltage	V _{(BR)CBO}	I _C = -50μA, 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} = ∞	-120	-	-	-70	-	-	V
DC Current Gain	h _{FE1}	V _{CE} = -5V, I _C = -1.5A *	35	-	200	35	-	200	-
DC Current Gain	h _{FE2}	V _{CE} = -5V, I _C = -15A *	7	-	-	10	-	-	-
Collector to Emitter Saturation Voltage	V _{CE(sat)}	I _C = -7A, I _B = -0.7A *	-	-0.6	-1.5	-	-0.6	-1.5	V
Base to Emitter Saturation Voltage	V _{BE(sat)}	I _C = -7A, I _B = -0.7A *	-	-1.2	-1.8	-	-1.2	-1.8	V
Gain-Bandwidth Product	f _T	V _{CE} = -10V, I _C = -1A	-	60	-	60	-	-	MHz
Output Capacitance	C _{ob}	V _{CB} = -10V, I _E = 0, f = 1MHz	-	350	-	350	-	-	pF
Rise Time	t _r	I _C = -7.5A, R _L = 4Ω	-	0.15	0.8	-	0.15	0.8	μs
Storage Time	t _{stg}	I _{B1} = -I _{B2} = -0.75A	-	0.24	1.0	-	0.24	1.0	μs
Fall Time	t _f	I _{B1} = -I _{B2} = -0.75A	-	0.08	0.8	-	0.08	0.8	μs

2SC2431, 2SC2432

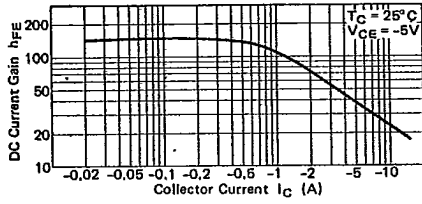
Parameter	Symbol	Test Conditions	Limits						Unit
			2SC2431			2SC2432			
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Collector Cutoff Current	I _{CEO}	V _{CB} = 120V, I _E = 0	-	-	50	-	-	-	μA
Collector Cutoff Current	I _{CBO}	V _{CB} = 70V, I _E = 0	-	-	-	-	-	50	μA
Emitter Cutoff Current	I _{EBO}	V _{EB} = 4V, I _C = 0	-	-	50	-	-	50	μA
Collector Cutoff Current	I _{CEO}	V _{CE} = 120V, I _B = 0	-	-	1	-	-	-	mA
Collector Cutoff Current	I _{CEO}	V _{CE} = 70A, 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} = ∞	120	-	-	70	-	-	V
DC Current Gain	h _{FE1}	V _{CE} = 5V, I _C = 1.5A *	35	-	200	35	-	200	-
DC Current Gain	h _{FE2}	V _{CE} = 5V, I _C = 15A *	7	-	-	10	-	-	-
Collector to Emitter Saturation Voltage	V _{CE(sat)}	I _C = 7A, I _B = 0.7A *	-	0.4	1.5	-	0.4	1.5	V
Base to Emitter Saturation Voltage	V _{BE(sat)}	I _C = 7A, I _B = 0.7A *	-	1.2	1.8	-	1.2	1.8	V
Gain-Bandwidth Product	f _T	V _{CE} = 10V, I _C = 1A	-	80	-	80	-	-	MHz
Output Capacitance	C _{ob}	V _{CB} = 10V, I _E = 0, f = 1MHz	-	200	-	200	-	-	pF
Rise Time	t _r	I _C = 7.5A, R _L = 4Ω	-	0.20	0.8	-	0.20	0.8	μs
Storage Time	t _{stg}	I _{B1} = -I _{B2} = 0.75A	-	0.70	1.0	-	0.70	1.0	μs
Fall Time	t _f	I _{B1} = -I _{B2} = 0.75A	-	0.12	0.8	-	0.12	0.8	μs

* Pulsed P_W ≤ 300 μ, Duty Ratio ≤ 6%

2SA1041, 2SA1042, 2SC2431, 2SC2432

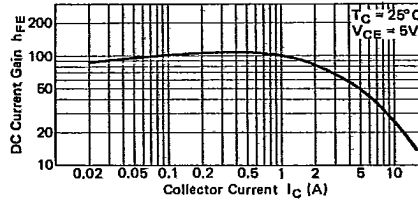
2SA1041, 2SA1042

DC CURRENT GAIN

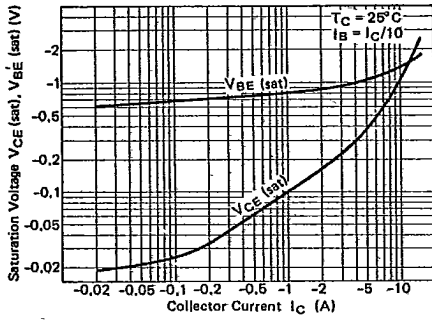


2SC2431, 2SC2432

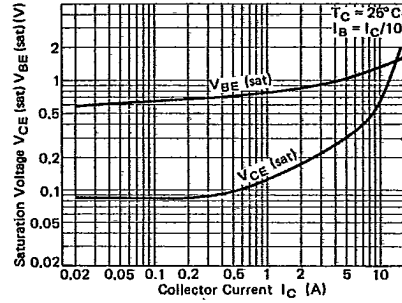
DC CURRENT GAIN



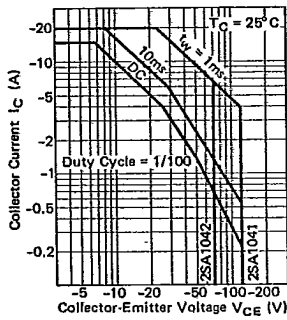
SATURATION VOLTAGE



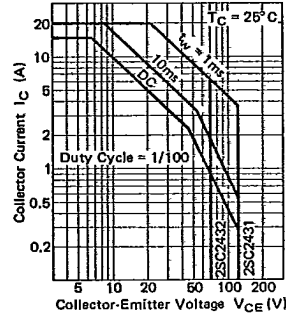
SATURATION VOLTAGE



SAFE OPERATING AREAS



SAFE OPERATING AREAS



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