

**KSA636**

**PNP EPITAXIAL SILICON TRANSISTOR**

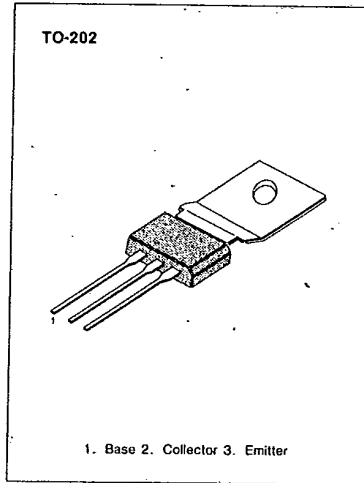
T-33-17

**LOW FREQUENCY POWER AMPLIFIER**

- Complement to KSC1098
- High Collector-Base Voltage  $V_{CB0} = -70V$
- Collector Current  $I_C = -2A$
- Collector Dissipation  $P_C = 10W$  ( $T_C = 25^\circ C$ )

**ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ C$ )**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CB0}$	-70	V
Collector-Emitter Voltage	$V_{CE0}$	-45	V
Emitter-Base Voltage	$V_{EB0}$	-5	V
Collector Current	$I_C$	-2.0	A
Collector Dissipation ( $T_C = 25^\circ C$ )	$P_C$	10	W
Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature	$T_{stg}$	-55 ~ +150	$^\circ C$



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

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	$BV_{CB0}$	$I_C = -500\mu A, I_E = 0$	-70			V
Collector-Emitter Breakdown Voltage	$BV_{CE0}$	$I_C = -10mA, I_B = 0$	-45			V
Emitter-Base Breakdown Voltage	$BV_{EB0}$	$I_E = -500\mu A, I_C = 0$	-5			V
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = -40V, I_E = 0$			-1	$\mu A$
DC Current Gain	$h_{FE}$	$V_{CE} = -5V, I_C = -0.5A$	40		240	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = -1A, I_B = -0.1A$		-0.15	-0.7	V

**$h_{FE}$  CLASSIFICATION**

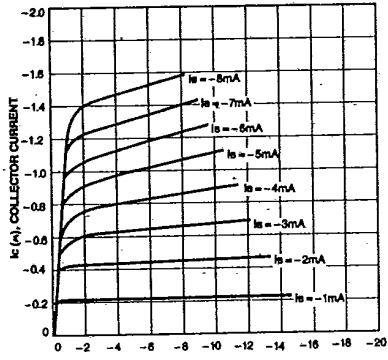
Classification	R	O	Y
$h_{FE}$	40-80	70-140	120-240

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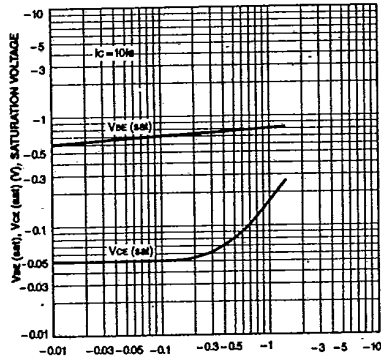
PNP EPITAXIAL SILICON TRANSISTOR

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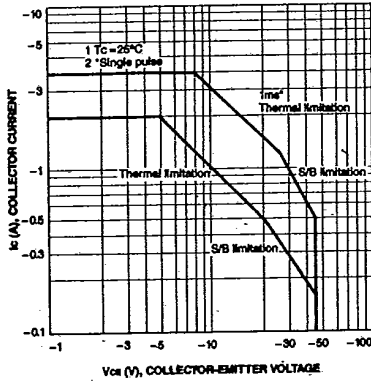
STATIC CHARACTERISTIC



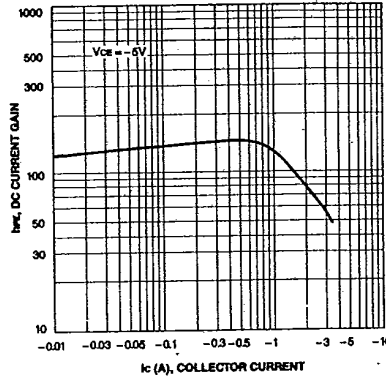
BASE-EMITTER SATURATION VOLTAGE  
COLLECTOR-EMITTER SATURATION VOLTAGE



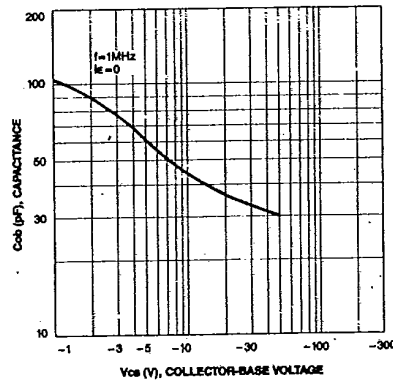
SAFE OPERATING AREA



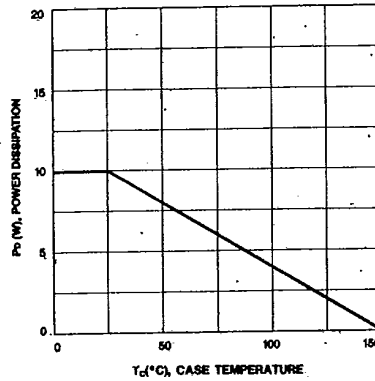
DC CURRENT GAIN



COLLECTOR OUTPUT CAPACITANCE



POWER DERATING



3

**KSA940**

**PNP EPITAXIAL SILICON TRANSISTOR**

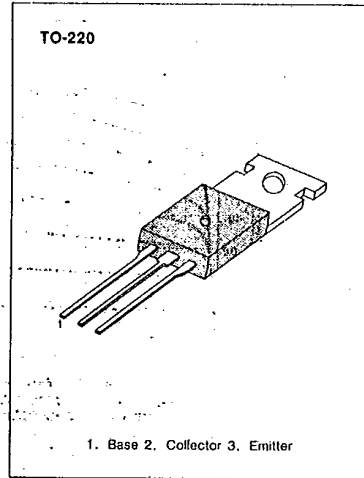
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**POWER AMPLIFIER  
VERTICAL DEFLECTION OUTPUT**

• Complement to KSC2073

**ABSOLUTE MAXIMUM RATINGS (T<sub>c</sub> = 25°C)**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-150	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-150	V
Emitter-Base Voltage	V <sub>EB0</sub>	-5	V
Collector Current	I <sub>c</sub>	-1.5	A
Base Current	I <sub>b</sub>	-0.5	A
Collector Dissipation (T <sub>a</sub> = 25°C)	P <sub>c</sub>	1.5	W
Collector Dissipation (T <sub>c</sub> = 25°C)	P <sub>c</sub>	25	W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C



**ELECTRICAL CHARACTERISTICS (T<sub>c</sub> = 25°C)**

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> = -120V, I <sub>E</sub> = 0			-10	μA
Emitter Cutoff Current	I <sub>EB0</sub>	V <sub>EB</sub> = -5V, I <sub>C</sub> = 0			-10	μA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = -10V, I <sub>C</sub> = -500mA	40	75	140	
Collector-Emitter Saturation Voltage	V <sub>CE (sat)</sub>	I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA			-1.5	V
Base-Emitter On Voltage	V <sub>BE (on)</sub>	V <sub>CE</sub> = -10V, I <sub>C</sub> = -500mA	-0.65	-0.75	-0.85	V
Current Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = -10V, I <sub>C</sub> = -500mA		4		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> = -10V, I <sub>E</sub> = 0 f = 1MHz		55		pF

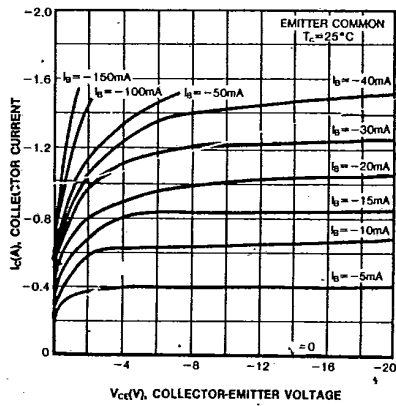


**KSA940**

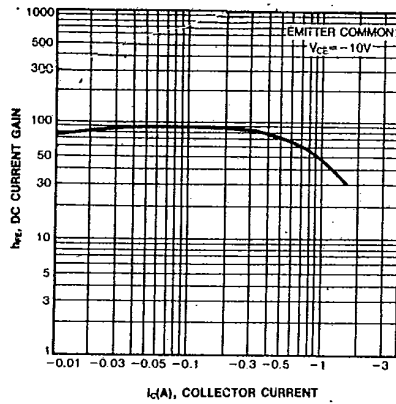
**PNP EPITAXIAL SILICON TRANSISTOR**

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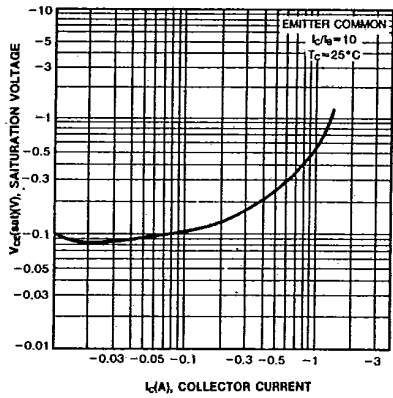
STATIC CHARACTERISTIC



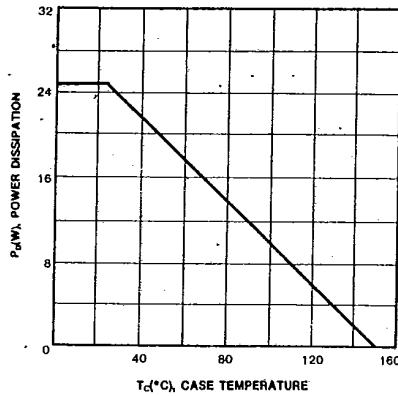
DC CURRENT GAIN



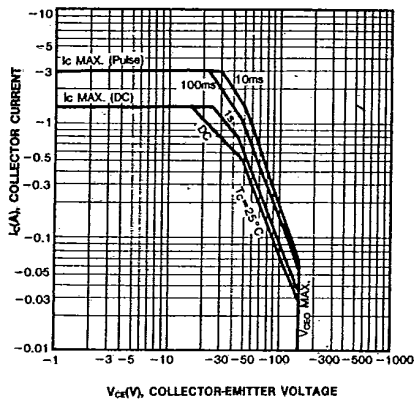
COLLECTOR-EMITTER SATURATION VOLTAGE



POWER DERATING



SAFE OPERATION AREA



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## KSA1010

## PNP EPITAXIAL SILICON TRANSISTOR

HIGH SPEED HIGH VOLTAGE SWITCHING  
INDUSTRIAL USE

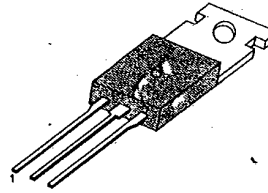
• Complement to KSC2334

ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CB0}$	-100	V
Collector-Emitter Voltage	$V_{CE0}$	-100	V
Emitter-Base Voltage	$V_{EB0}$	-7	V
Collector Current (DC)	$I_C$	-7	A
Collector Current (Pulse)	$I_C$	-15	A
Base Current (DC)	$I_B$	-3.5	A
Collector Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_C$	40	W
Collector Dissipation ( $T_a = 25^\circ\text{C}$ )	$P_C$	1.5	W
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-95~150	$^\circ\text{C}$

\*  $PW \leq 300\mu\text{s}$ , Duty Cycle  $\leq 10\%$ 

TO-220



1. Base 2. Collector 3. Emitter

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

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Emitter Sustaining Voltage	$V_{CE0}(\text{sus})$	$I_C = -5\text{A}$ , $I_B1 = -0.5\text{A}$ , $L = 1\text{mH}$	-100		V
Collector Emitter Sustaining Voltage	$V_{CEX}(\text{sus})1$	$I_C = -5\text{A}$ , $I_B1 = -I_B2 = -0.5\text{A}$ $V_{BE}(\text{off}) = 5\text{V}$ , $L = 180\mu\text{H}$ Clamped	-100		V
Collector Emitter Sustaining Voltage	$V_{CEX}(\text{sus})2$	$I_C = -10\text{A}$ , $I_B1 = -1\text{A}$ $I_B2 = 0.5\text{A}$ , $V_{BE}(\text{off}) = 5\text{V}$ $L = 180\mu\text{H}$ , Clamped	-100		V
Collector Cutoff Current	$I_{CB0}$	$V_{CB} = -100\text{V}$ , $I_E = 0$		-10	$\mu\text{A}$
Collector Cutoff Current	$I_{CER}$	$V_{CE} = -100\text{V}$ , $R_{BE} = 51\Omega$ $T_a = 125^\circ\text{C}$		-1	$\text{mA}$
Collector Cutoff Current	$I_{CEX1}$	$V_{CE} = -100\text{V}$ , $V_{BE}(\text{off}) = 1.5\text{V}$		-10	$\mu\text{A}$
Collector Cutoff Current	$I_{CEX2}$	$V_{CE} = -100\text{V}$ , $V_{BE}(\text{off}) = 1.5\text{V}$ $T_a = 125^\circ\text{C}$		-1	$\text{mA}$
Emitter Cutoff Current	$I_{EB0}$	$V_{EB} = -5\text{V}$ , $I_C = 0$		-10	$\mu\text{A}$
*DC Current Gain	$h_{FE1}$	$V_{CE} = -5\text{V}$ , $I_C = -0.5\text{A}$	40	200	
	$h_{FE2}$	$V_{CE} = -5\text{V}$ , $I_C = -3\text{A}$	40	200	
	$h_{FE3}$	$V_{CE} = -5\text{V}$ , $I_C = -5\text{A}$	20		
*Collector-Emitter Saturation Voltage	$V_{CE}(\text{sat})$	$I_C = -5\text{A}$ , $I_B = -0.5\text{A}$		-0.6	V
*Base-Emitter Saturation Voltage	$V_{BE}(\text{sat})$	$I_C = -5\text{A}$ , $I_B = -0.5\text{A}$		-1.5	V
Turn On Time	$t_{on}$	$I_C = -5\text{A}$ , $R_L = 10\Omega$		0.5	$\mu\text{s}$
Storage Time	$t_s$	$I_B1 = -I_B2 = -0.5\text{A}$		1.5	$\mu\text{s}$
Fall Time	$t_f$	$V_{CC} = -50\text{V}$		0.5	$\mu\text{s}$

\* Pulse Test:  $PW \leq 350\mu\text{s}$ , Duty Cycle  $\leq 2\%$  $h_{FE}(2)$  CLASSIFICATION

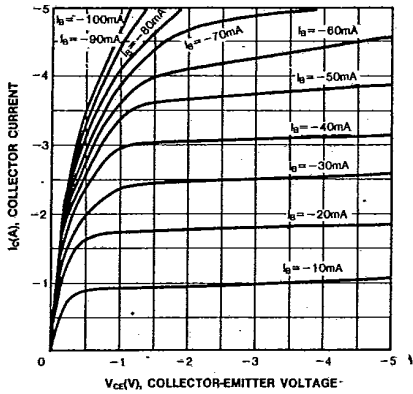
Classification	R	O	Y
$h_{FE}(2)$	40-80	60-120	100-200

KSA1010

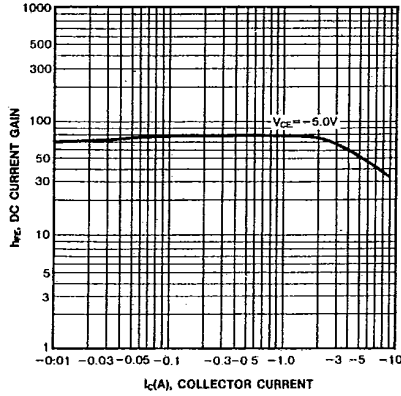
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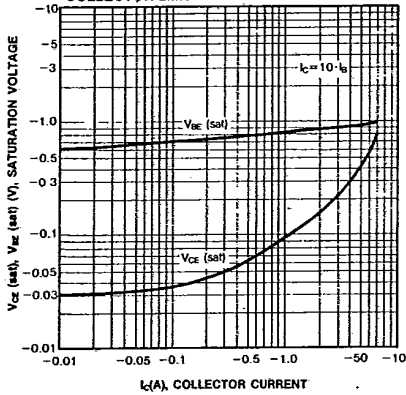
STATIC CHARACTERISTIC



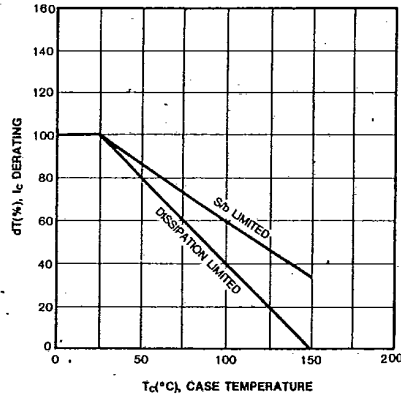
DC CURRENT GAIN



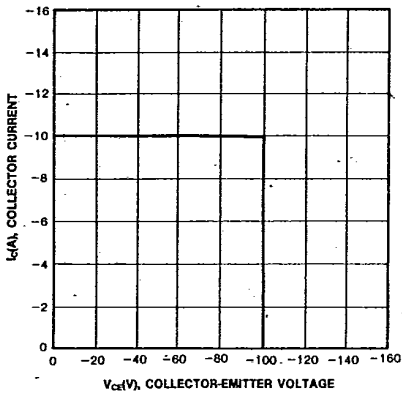
BASE-EMITTER SATURATION VOLTAGE  
COLLECTOR-EMITTER SATURATION VOLTAGE



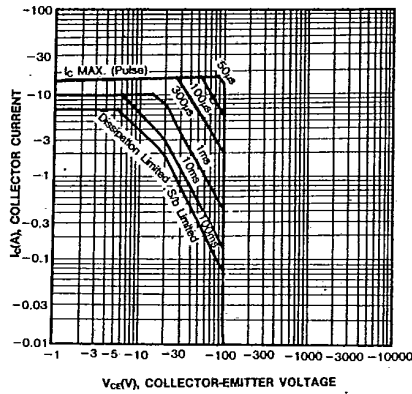
DERATING CURVE OF SAFE OPERATING AREAS



REVERSE BIAS SAFE OPERATING AREAS



SAFE OPERATING AREA



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**KSA1010**

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