

KSC5020**NPN SILICON TRANSISTOR**

T-33-11

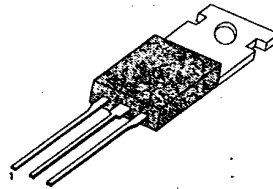
HIGH VOLTAGE, HIGH QUALITYHIGH SPEED SWITCHING: $t_r=0.1\mu\text{s}$

• WIDE SOA

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CB0}	800	V
Collector-Emitter Voltage	V_{CE0}	500	V
Emitter-Base Voltage	V_{EB0}	7	V
Collector Current (DC)	I_C	3	A
Collector Current (Pulse)	I_C	6	A
Base Current (DC)	I_B	1	A
Collector Dissipation	P_C	40	W
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55~150	$^\circ\text{C}$

TO-220



1. Base 2. Collector 3. Emitter

3

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

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CB0}	$I_C=1\text{mA}, I_E=0$	800			V
Collector Emitter Breakdown Voltage	BV_{CE0}	$I_C=5\text{mA}, R_{BE}=\infty$	500			V
Emitter Base Breakdown Voltage	BV_{EB0}	$I_E=1\text{mA}, I_C=0$	7			V
Collector Emitter Sustaining Voltage	$V_{CEX(SUS)}$	$I_C=1.5\text{A}, I_B1=-I_B2=0.6\text{A}$ $L=2\text{mH}, \text{Clamped}$	500			V
Collector Cutoff Current	I_{CBO}	$V_{CB}=500\text{V}, I_E=0$			10	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=5\text{V}, I_C=0$			10	μA
DC Current Gain	h_{FE1}	$V_{CE}=5\text{V}, I_C=0.3\text{A}$	15		50	
	h_{FE2}	$V_{CE}=5\text{V}, I_C=1.5\text{A}$	8			
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=1.5\text{A}, I_B=0.3\text{A}$			1	V
Base Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=1.5\text{A}, I_B=0.3\text{A}$			1.5	V
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}, f=1\text{MHz}$		50		pF
Current Gain Bandwidth Product	f_r	$V_{CE}=10\text{V}, I_C=0.3\text{A}$		18		MHz
Turn On Time	t_{on}	$V_{CC}=200\text{V}$			0.5	μs
Storage Time	t_s	$5I_B1=-2.5I_B2=I_C=2\text{A}$			3	μs
Fall Time	t_f	$R_L=100\text{ohm}$			0.3	μs

 h_{FE} CLASSIFICATION

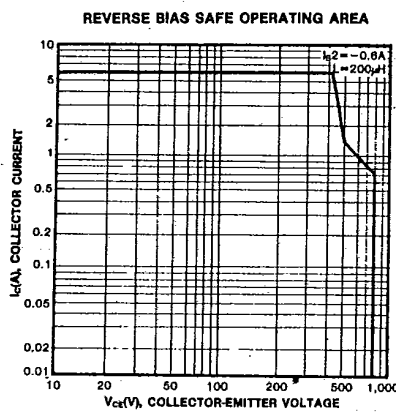
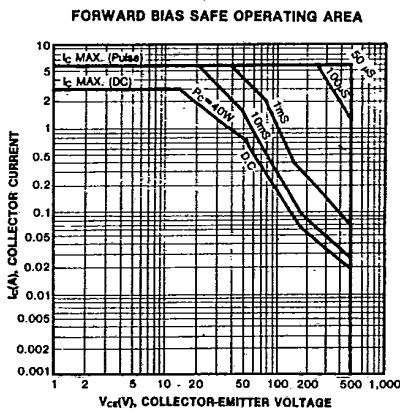
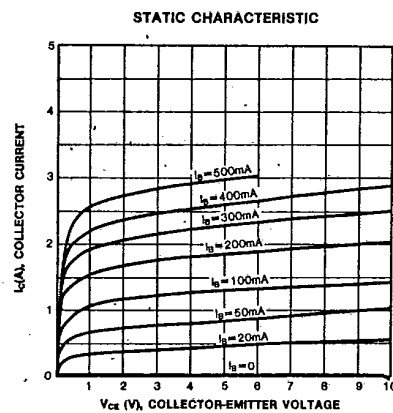
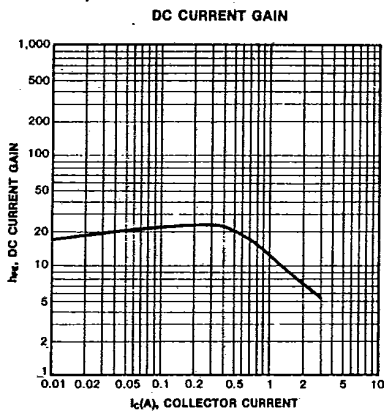
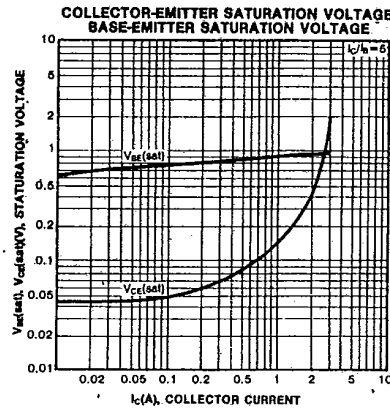
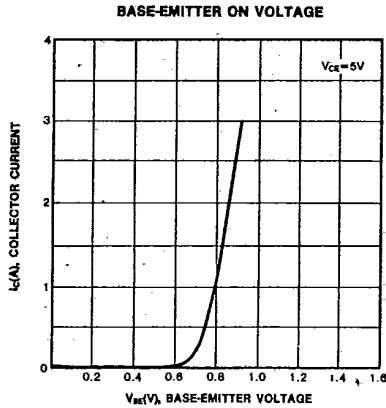
Classification	R	O	Y
h_{FE1}	15-30	20-40	30-50



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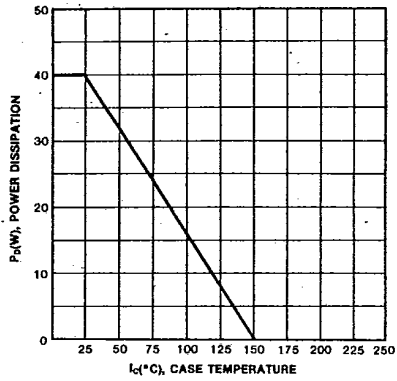


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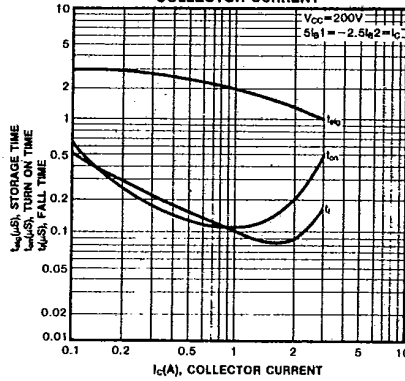
NPN SILICON TRANSISTOR

T-33-11

POWER DERATING



TURN ON, STORAGE AND FALL TIME vs. COLLECTOR CURRENT



3

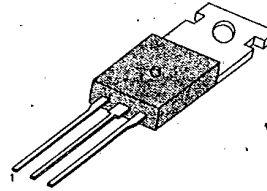
KSC5021**NPN SILICON TRANSISTOR**

T-33-11

HIGH VOLTAGE AND HIGH RELIABILITYHIGH SPEED SWITCHING: $t_t = 0.1 \mu\text{s}$ (Typ)
WIDE SOA**ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)**

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	800	V
Collector-Emitter Voltage	V_{CEO}	500	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	5	A
Collector Current (Pulse)	I_C	10	A
Base Current	I_B	2	A
Collector Dissipation	P_C	50	W
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55~150	$^\circ\text{C}$

TO-220



1. Base 2. Collector 3. Emitter

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

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	$I_C = 1\text{mA}, I_E = 0$	800			V
Collector Emitter Breakdown Voltage	BV_{CEO}	$I_C = 5\text{mA}, R_{BE} = \infty$	500			V
Emitter Base Breakdown Voltage	BV_{EBO}	$I_E = 1\text{mA}, I_C = 0$	7			V
Collector Emitter Sustaining Voltage	$V_{CEX(SUS)}$	$I_C = 2.5\text{A}, I_{B1} = -I_{B2} = 1\text{A}$ $L = 1\text{mH}$, Clamped	500			V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 500\text{V}, I_E = 0$			10	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 5\text{V}, I_C = 0$			10	μA
DC Current Gain	h_{FE1}	$V_{CE} = 5\text{V}, I_C = 0.6\text{A}$	15		50	
	h_{FE2}	$V_{CE} = 5\text{V}, I_C = 3\text{A}$	8			
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 3\text{A}, I_B = 0.6\text{A}$			1	V
Base Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 3\text{A}, I_B = 0.6\text{A}$			1.5	V
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$		80		pF
Current Gain Bandwidth Product	f_T	$V_{CE} = 10\text{V}, I_C = 0.6\text{A}$		18		MHz
Turn On Time	t_{on}	$V_{CC} = 200\text{V}$			0.5	μs
Storage Time	t_S	$5I_{B1} = -2.5I_{B2} = I_C = 4\text{A}$			3	μs
Fall Time	t_f	$RL = 50\Omega$			0.3	μs

 h_{FE} (1) CLASSIFICATION

Classification	R	O	Y
$h_{FE} 1$	15-30	20-40	30-50

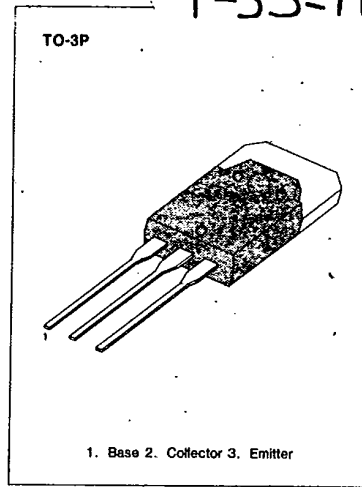


KSC5022**NPN SILICON TRANSISTOR****HIGH VOLTAGE AND HIGH RELIABILITY**

HIGH SPEED SWITCHING: $t_r = 0.1 \mu\text{s}$ (Typ)
WIDE SOA

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CB0}	800	V
Collector-Emitter Voltage	V_{CE0}	500	V
Emitter-Base Voltage	V_{EB0}	7	V
Collector Current (DC)	I_C	4	A
Collector Current (Pulse)	I_C	8	A
Base Current	I_B	1.5	A
Collector Dissipation	P_C	80	W
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55~150	$^\circ\text{C}$



3

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

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CB0}	$I_C = 1\text{mA}, I_E = 0$	800			V
Collector Emitter Breakdown Voltage	BV_{CE0}	$I_C = 5\text{mA}, R_{BE} = \infty$	500			V
Emitter Base Breakdown Voltage	BV_{EB0}	$I_E = 1\text{mA}, I_C = 0$	7			V
Collector Emitter Sustaining Voltage	$V_{CE(sus)}$	$I_C = 1.5\text{A}, I_{B1} = -I_{B2} = 0.6\text{A}$ $L = 1\text{mH}$, Clamped	500			V
Collector Cutoff Current	I_{CB0}	$V_{CB} = 500\text{V}, I_E = 0$			10	μA
Emitter Cutoff Current	I_{EB0}	$V_{EB} = 5\text{V}, I_C = 0$			10	μA
DC Current Gain	h_{FE1}	$V_{CE} = 5\text{V}, I_C = 0.3\text{A}$	15		50	
	h_{FE2}	$V_{CE} = 5\text{V}, I_C = 1.5\text{A}$	8			
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 1.5\text{A}, I_B = 0.3\text{A}$			1	V
Base Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 1.5\text{A}, I_B = 0.3\text{A}$			1.5	V
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$		50		pF
Current Gain Bandwidth Product	f_T	$V_{CE} = 10\text{V}, I_C = 0.3\text{A}$		18		MHz
Turn On Time	t_{on}	$V_{CC} = 200\text{V}$			0.5	μs
Storage Time	t_s	$5I_{B1} = -2.5I_{B2} = I_C = 2\text{A}$			3	μs
Fall Time	t_f	$R_L = 100\Omega$			0.3	μs

 h_{FE} (1) CLASSIFICATION

Classification	R	O	Y
h_{FE1}	15-30	20-40	30-50



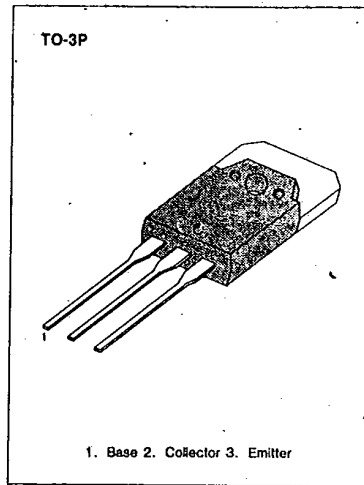
KSC5023**NPN SILICON TRANSISTOR****HIGH VOLTAGE AND HIGH RELIABILITY**

HIGH SPEED SWITCHING: $t_r = 0.1 \mu\text{s}$ (Typ)
WIDE SOA

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

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CB0}	800	V
Collector-Emitter Voltage	V_{CE0}	500	V
Emitter-Base Voltage	V_{EB0}	7	V
Collector Current (DC)	I_C	7	A
Collector Current (Pulse)	I_C	14	A
Base Current	I_B	3	A
Collector Dissipation	P_C	.80	W
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55~150	$^\circ\text{C}$

T-33-13

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

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CB0}	$I_C = 1\text{mA}, I_E = 0$	800			V
Collector Emitter Breakdown Voltage	BV_{CE0}	$I_C = 5\text{mA}, R_{BE} = \infty$	500			V
Emitter Base Breakdown Voltage	BV_{EB0}	$I_E = 1\text{mA}, I_C = 0$	7			V
Collector Emitter Sustaining Voltage	$V_{CEX(SUS)}$	$I_C = 2.5\text{A}, I_B1 = -I_B2 = 1\text{A}$ $L = 1\text{mH}$, Clamped	500			V
Collector Cutoff Current	I_{CB0}	$V_{CB} = 500\text{V}, I_E = 0$			10	μA
Emitter Cutoff Current	I_{EB0}	$V_{EB} = 5\text{V}, I_C = 0$			10	μA
DC Current Gain	h_{FE1}	$V_{CE} = 5\text{V}, I_C = 0.6\text{A}$	15		50	
	h_{FE2}	$V_{CE} = 5\text{V}, I_C = 3\text{A}$	8			
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 3\text{A}, I_B = 0.6\text{A}$			1	V
Base Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 3\text{A}, I_B = 0.6\text{A}$			1.5	V
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$		80		pF
Current Gain Bandwidth Product	f_T	$V_{CE} = 10\text{V}, I_C = 0.6\text{A}$		18		MHz
Turn On Time	t_{on}	$V_{CC} = 200\text{V}$			0.5	μs
Storage Time	t_S	$5I_B1 = -2.5I_B2 = I_C = 4\text{A}$			3	μs
Fall Time	t_f	$R_L = 50\Omega$			0.3	μs

 h_{FE} (1) CLASSIFICATION

Classification	R	O	Y
$h_{FE} 1$	15-30	20-40	30-50

