

KSC5020**NPN SILICON TRANSISTOR**

T-33-11

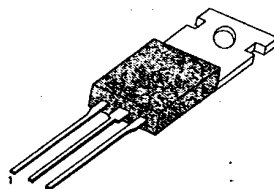
HIGH VOLTAGE, HIGH QUALITYHIGH SPEED SWITCHING: $t_f = 0.1 \mu s$

• WIDE SOA

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

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	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	$^\circ C$
Storage Temperature	T_{stg}	-55~150	$^\circ C$

TO-220



1. Base 2. Collector 3. Emitter

3

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

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	$V_{CEX(sus)}$	$I_C = 1.5 \text{ A}, I_{B1} = -I_{B2} = 0.6 \text{ A}$ $L = 2 \text{ mH}$, 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}	$V_{CE} = 5 \text{ V}, I_C = 0.3 \text{ A}$	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_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	$5 I_{B1} = -2.5 I_{B2} = I_C = 2 \text{ A}$			3	μs
Fall Time	t_f	$R_L = 100 \Omega$			0.3	μs

 h_{FE} CLASSIFICATION

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

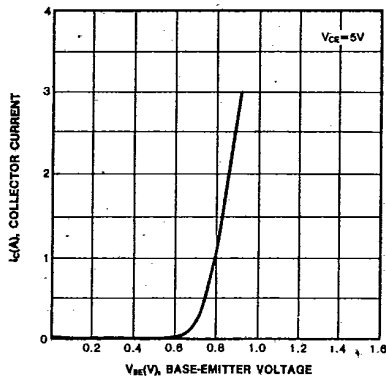
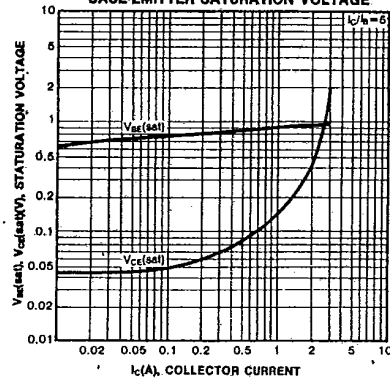


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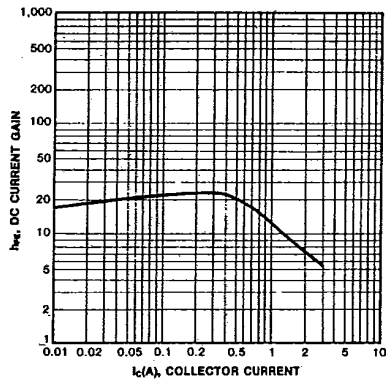
NPN SILICON TRANSISTOR

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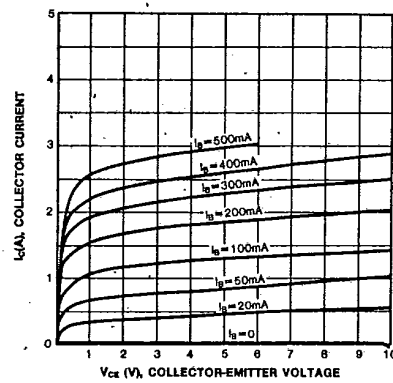
BASE-EMITTER ON VOLTAGE

COLLECTOR-EMITTER SATURATION VOLTAGE
BASE-EMITTER SATURATION VOLTAGE

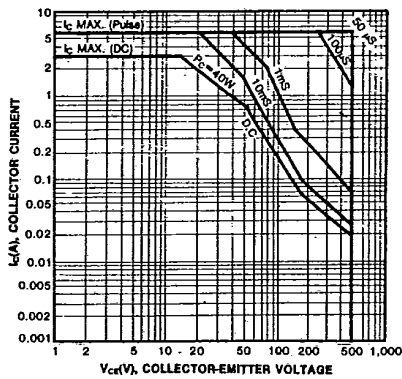
DC CURRENT GAIN



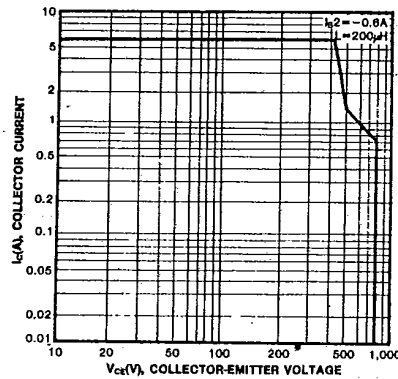
STATIC CHARACTERISTIC



FORWARD BIAS SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA

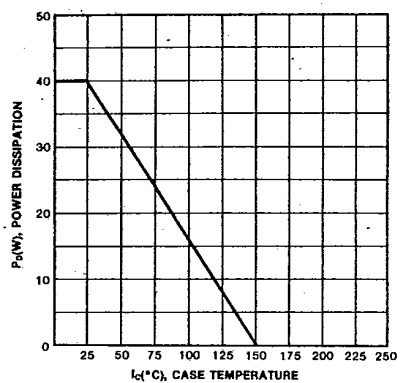


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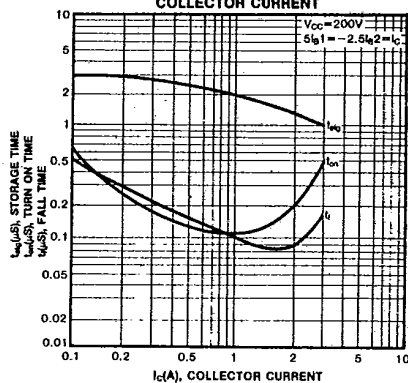
NPN SILICON TRANSISTOR

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POWER DERATING



TURN ON, STORAGE AND FALL TIME vs. COLLECTOR CURRENT



KSC5021**NPN SILICON TRANSISTOR**

T-33-11

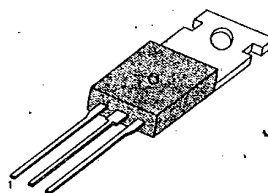
HIGH VOLTAGE AND HIGH RELIABILITYHIGH SPEED SWITCHING: $t_f = 0.1 \mu s$ (Typ)

WIDE SOA

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

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	$^\circ C$
Storage Temperature	T_{stg}	-55~150	$^\circ C$

TO-220



1. Base 2. Collector 3. Emitter

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

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



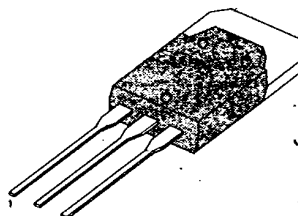
KSC5022**NPN SILICON TRANSISTOR****HIGH VOLTAGE AND HIGH RELIABILITY**

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

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

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	$^\circ C$
Storage Temperature	T_{stg}	-55~150	$^\circ C$

TO-3P



1. Base 2. Collector 3. Emitter

3

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

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

 h_{FE} (1) CLASSIFICATION

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



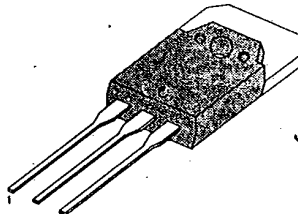
KSC5023**NPN SILICON TRANSISTOR**

T-33-13

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

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	$^\circ C$
Storage Temperature	T_{stg}	-55~150	$^\circ C$

TO-3P



1. Base 2. Collector 3. Emitter

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

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

