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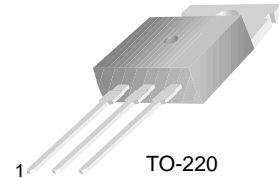


# KSC2333

KSC2333

## High Speed Switching Application

- Low Collector Saturation Voltage
- Specified of Reverse Biased SOA With Inductive Load



TO-220  
1.Base 2.Collector 3.Emmitter

## NPN Epitaxial Silicon Transistor

### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CBO}$	Collector-Base Voltage	500	V
$V_{CEO}$	Collector-Emitter Voltage	400	V
$V_{EBO}$	Emitter-Base Voltage	7	V
$I_C$	Collector Current (DC)	2	A
$I_{CP}$	*Collector Current (Pulse)	4	A
$I_B$	Base Current (DC)	1	A
$P_C$	Collector Dissipation ( $T_C=25^\circ\text{C}$ )	15	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	- 55 ~ 150	$^\circ\text{C}$

\* $PW \leq 350\mu\text{s}$ , Duty Cycles  $\leq 10\%$

### Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Units
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 0.5\text{A}$ , $I_B = 0.1\text{A}$ , $L = 1\text{mH}$	400		V
$V_{CEX(sus)1}$	Collector-Emitter Sustaining Voltage	$I_C = 0.5\text{A}$ , $I_{B1} = -I_{B2} = 0.1\text{A}$ $T_C = 125^\circ\text{C}$ , $L = 180\mu\text{H}$ , clamped	450		V
$V_{CEX(sus)2}$	Collector-Emitter Sustaining Voltage	$I_C = 1\text{A}$ , $I_{B1} = 0.2\text{A}$ , $-I_{B2} = 0.2\text{A}$ $T_C = 125^\circ\text{C}$ , $L = 180\mu\text{H}$ , clamped	400		V
$I_{CBO}$	Collector Cut-off Current	$V_{CB} = 400\text{V}$ , $I_E = 0$		10	$\mu\text{A}$
$I_{CER}$	Collector Cut-off Current	$V_{CE} = 400\text{V}$ , $R_{BE} = 51\Omega$ , $T_C = 125^\circ\text{C}$		1	mA
$I_{CEX1}$	Collector Cut-off Current	$V_{CE} = 400\text{V}$ , $V_{BE(off)} = -5\text{V}$		10	$\mu\text{A}$
$I_{CEX2}$	Collector Cut-off Current	$V_{CE} = 400\text{V}$ , $V_{BE(off)} = -5\text{V}$ @ $T_C = 125^\circ\text{C}$		1	mA
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = 5\text{V}$ , $I_C = 0$		10	$\mu\text{A}$
$h_{FE1}$ $h_{FE2}$	* DC Current Gain	$V_{CE} = 5\text{V}$ , $I_C = 0.1\text{A}$ $V_{CE} = 5\text{V}$ , $I_C = 0.5\text{A}$	20 10	80	
$V_{CE(sat)}$	* Collector-Emitter Saturation Voltage	$I_C = 0.5\text{A}$ , $I_B = 0.1\text{A}$		1	V
$V_{BE(sat)}$	* Base-Emitter Saturation Voltage	$I_C = 0.5\text{A}$ , $I_B = 0.1\text{A}$		1.2	V
$t_{ON}$	Turn ON Time	$V_{CC} = 150\text{V}$ , $I_C = 0.5\text{A}$		1	$\mu\text{s}$
$t_{STG}$	Storage Time	$I_{B1} = -I_{B2} = 0.1\text{A}$		2.5	$\mu\text{s}$
$t_F$	Fall Time	$R_L = 300\Omega$		1	$\mu\text{s}$

\* Pulse Test:  $PW \leq 350\mu\text{s}$ , Duty Cycles  $\leq 2\%$  Pulsed

## $h_{FE}$ Classification

Classification	R	O	Y
$h_{FE1}$	20 ~ 40	30 ~ 60	40 ~ 80

# Typical Characteristics

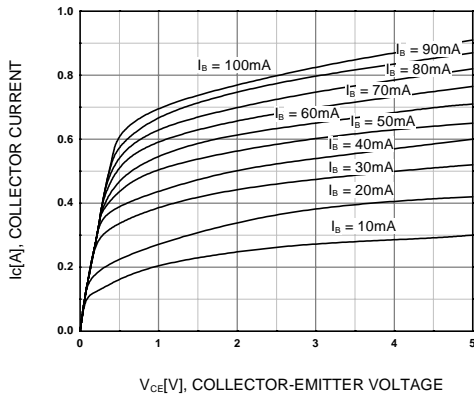


Figure 1. Static Characteristic

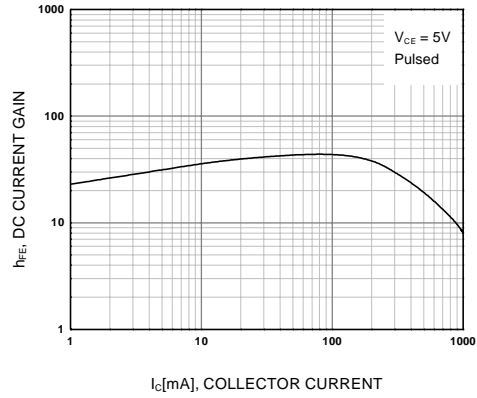


Figure 2. DC current Gain

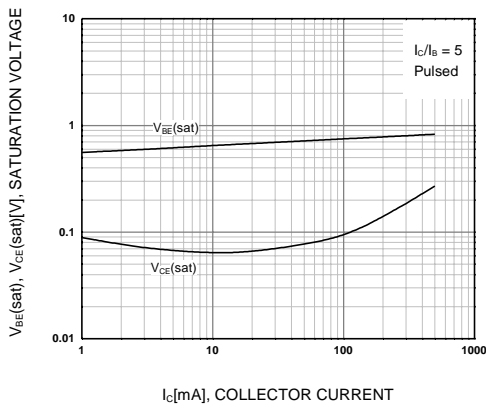


Figure 3. Collector-Emitter Saturation Voltage  
Base-Emitter Saturation Voltage

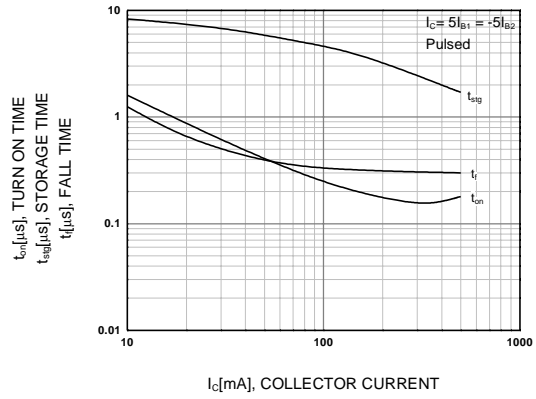


Figure 4. Turn On, Storage and Fall Time  
vs Collector Current

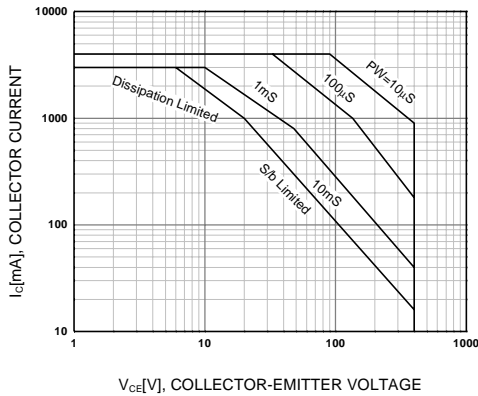


Figure 5. Forward Bias Safe Operating Area

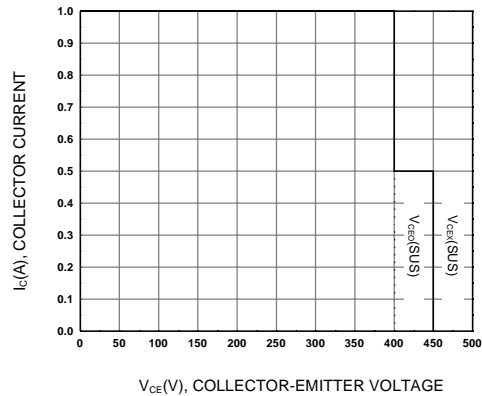


Figure 6. Reverse Bias Safe Operating Area

### Typical characteristics (Continued)

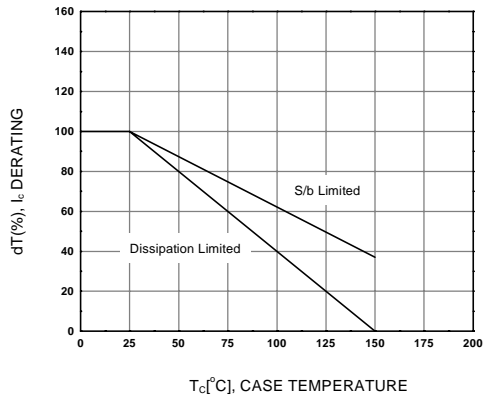


Figure 7. Derating Curve of Safe Operating Areas

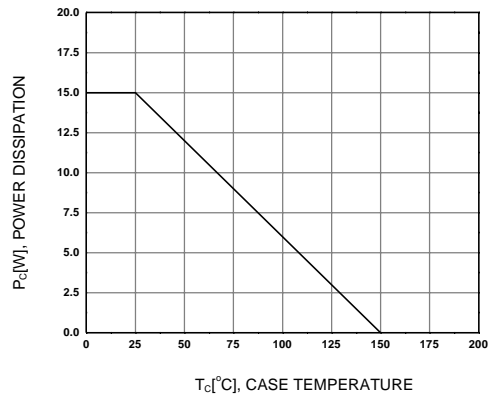


Figure 8. Power Derating



- NOTES:
- A) REFERENCE JEDEC, TO-220, VARIATION AB
  - B) ALL DIMENSIONS ARE IN MILLIMETERS.
  - C) DIMENSIONS COMMON TO ALL PACKAGE SUPPLIERS EXCEPT WHERE NOTED [ ].
  - D) LOCATION OF MOLDED FEATURE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
  - E) DOES NOT COMPLY JEDEC STANDARD VALUE.
  - F) "A1" DIMENSIONS AS BELOW:  
SINGLE GAUGE = 0.51 - 0.61  
DUAL GAUGE = 1.10 - 1.45
  - G) DRAWING FILE NAME: TO220B03REV9
  - H) PRESENCE IS SUPPLIER DEPENDENT
  - I) SUPPLIER DEPENDENT MOLD LOCKING HOLES IN HEATSINK.

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