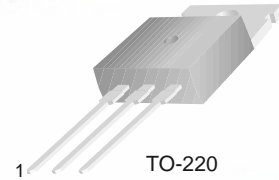


**FAIRCHILD**  
SEMICONDUCTOR™

## KSC5039

### High Voltage Power Switch Switching Application



1.Base 2.Collector 3.Emitter

### NPN Silicon Transistor

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

Symbol	Parameter	Value	Units
$V_{CBO}$	Collector-Base Voltage	800	V
$V_{CEO}$	Collector-Emitter Voltage	400	V
$V_{EBO}$	Emitter-Base Voltage	7	V
$I_C$	Collector Current (DC)	5	A
$I_{CP}$	Collector Current (Pulse)	10	A
$I_B$	Base Current	3	A
$P_C$	Collector Dissipation ( $T_C=25^\circ\text{C}$ )	70	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	- 65 ~ 150	$^\circ\text{C}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 1\text{mA}, I_E = 0$	800			V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 5\text{mA}, I_B = 0$	400			V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_C = 1\text{mA}, I_C=0$	7			V
$I_{CBO}$	Collector Cut-off Current	$V_{CB} = 500\text{V}, I_E = 0$			10	$\mu\text{A}$
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = 7\text{V}, I_C = 0$			10	$\mu\text{A}$
$h_{FE}$	* DC Current Gain	$V_{CE} = 5\text{V}, I_C = 0.3\text{A}$	10			
$V_{CE}(\text{sat})$	* Collector-Emitter Saturation Voltage	$I_C = 2.5\text{A}, I_B = 0.5\text{A}$			1.5	V
$V_{BE}(\text{sat})$	* Base-Emitter Saturation Voltage	$I_C = 2.5\text{A}, I_B = 0.5\text{A}$			2.0	V
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 5\text{V}, I_C = 0.1\text{A}$		10		MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{V}, f = 1\text{MHz}$		40		pF
$t_{ON}$	Turn ON Time	$V_{CC} = 150\text{V}, I_C = 2.5\text{A}$			1	$\mu\text{s}$
$t_{STG}$	Storage Time	$I_{B1} = -I_{B2} = 0.5\text{A}$			3	$\mu\text{s}$
$t_F$	Fall Time	$R_L = 60\Omega$			0.8	$\mu\text{s}$

\* Plus test: PW=300 $\mu\text{s}$ , Duty Cycle=2% Pulsed



# Typical Characteristics

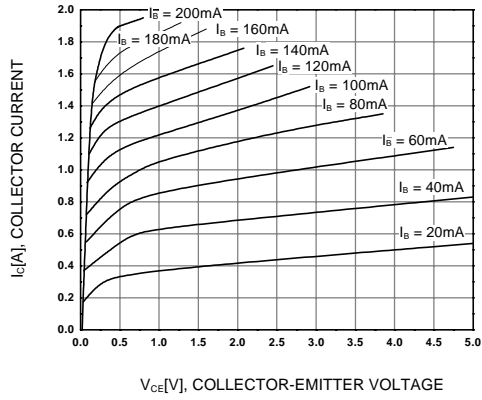


Figure 1. Static Characteristic

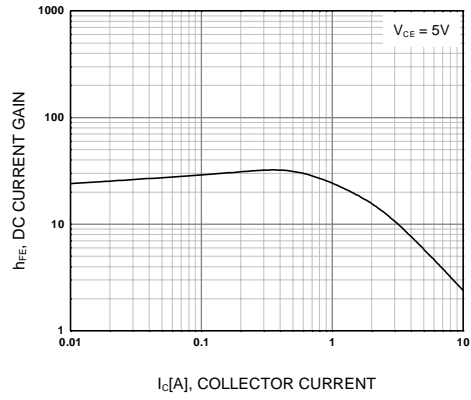


Figure 2. DC current Gain

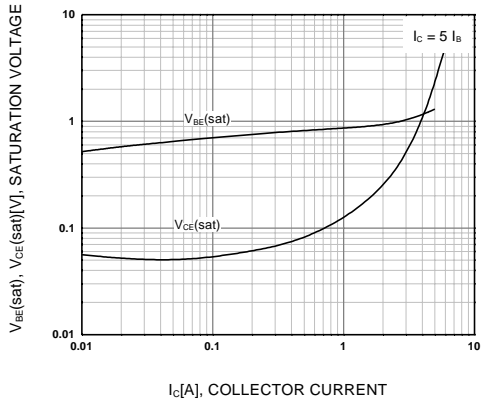


Figure 3. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

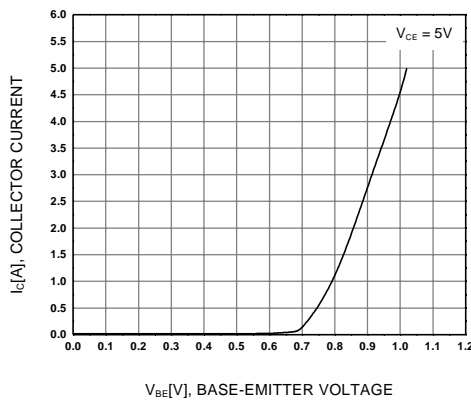


Figure 4. Base-Emitter On Voltage

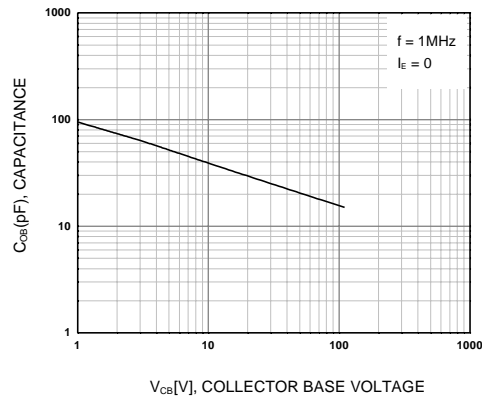


Figure 5. Collector Output Capacitance

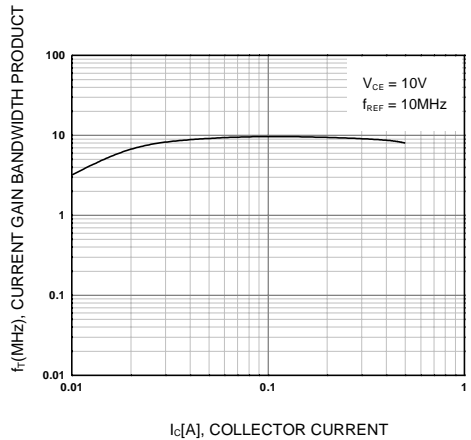


Figure 6. Current Gain Bandwidth Product

Typical Characteristics (Continued)

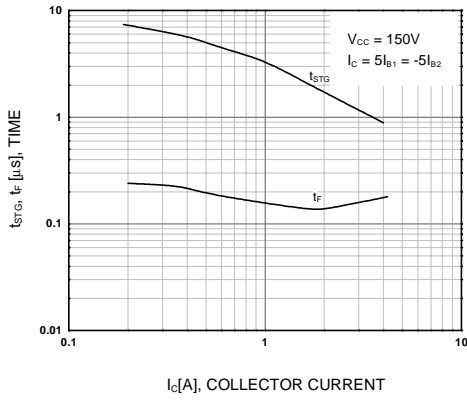


Figure 7. Switching Time

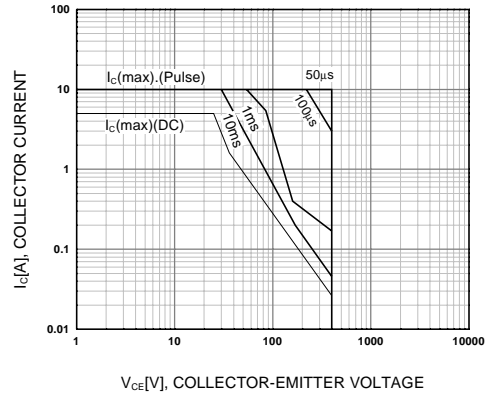


Figure 8. Safe Operating Area

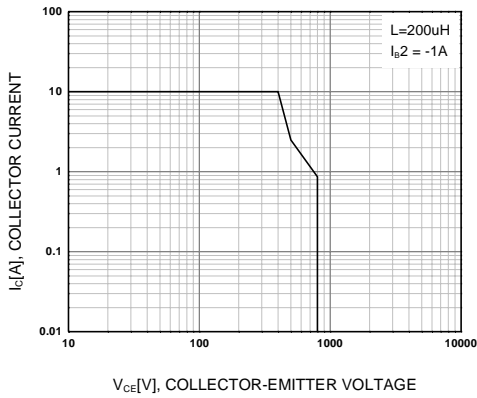


Figure 9. Reverse Bias Safe Operating Area

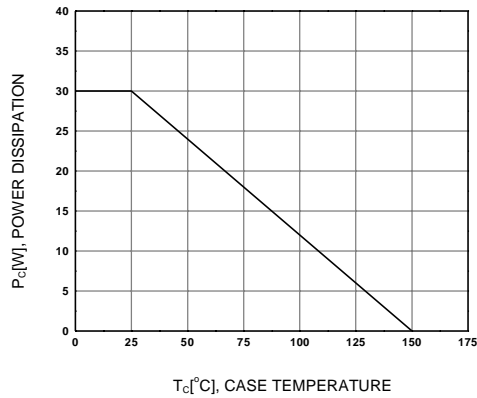
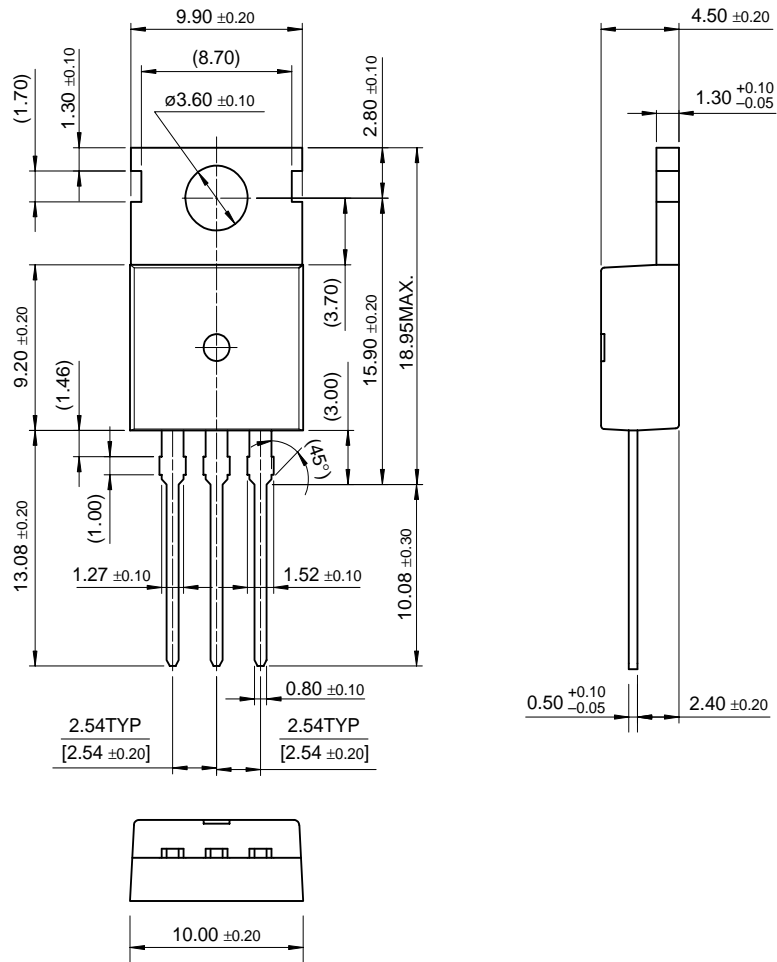


Figure 10. Power Derating

# Package Demensions

## TO-220



Dimensions in Millimeters

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CROSSVOLT™	POPT™	UHC™
E <sup>2</sup> CMOS™	PowerTrench®	VCX™
FACT™	QFET™	
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