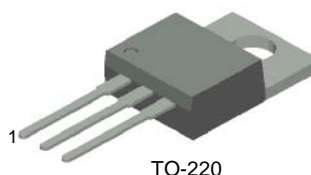


# KSC5502

## NPN Planar Silicon Transistor

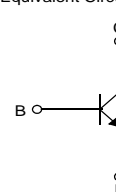
### High Voltage Power Switch Mode Application

- Small Variance in Storage Time
- Wide Safe Operating Area
- Suitable for Electronic Ballast Application



1.Base 2.Collector 3.Emitter

Equivalent Circuit



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

Symbol	Parameter	Value	Units
$BV_{CBO}$	Collector-Base Voltage	1200	V
$BV_{CEO}$	Collector-Emitter Voltage	600	V
$BV_{EBO}$	Emitter-Base Voltage	12	V
$I_C$	Collector Current (DC)	2	A
$I_{CP}$	Collector Current (Pulse)**	4	A
$I_B$	Base Current (DC)	1	A
$I_{BP}$	Collector Current (Pulse)**	2	A
$P_C$	Collector Dissipation( $T_C=25^\circ\text{C}$ )	50	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Junction Temperature Range	- 65 ~ 150	$^\circ\text{C}$
EAS	Avalanche Energy( $T_J=25^\circ\text{C}$ )	2.5	mJ

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

\*\* Pulse Test : Pulse Width = 5ms, Duty Cycle  $\leq$  10%

### Thermal Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$R_{\theta Jc}$	Thermal Resistance, Junction to Case	2.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	85	$^\circ\text{C}/\text{W}$

### Ordering Information

Part Number	Marking	Package	Packing Method
KSC5502TU	J5502	TO-220	TUBE

**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	$I_C=1\text{mA}, I_E=0$	1200	1350		V	
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C=5\text{mA}, I_B=0$	600	750		V	
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E=500\mu\text{A}, I_C=0$	12	13.2		V	
$I_{CES}$	Collector Cut-off Current	$V_{CES}=1200\text{V}, V_{BE}=0$	$T_C=25^\circ\text{C}$			100	$\mu\text{A}$
			$T_C=125^\circ\text{C}$			500	
$I_{CEO}$	Collector Cut-off Current	$V_{CE}=600\text{V}, I_B=0$	$T_C=25^\circ\text{C}$			100	$\mu\text{A}$
			$T_C=125^\circ\text{C}$			500	
$I_{EBO}$	Emitter Cut-off Current	$V_{EB}=12\text{V}, I_C=0$			10	$\mu\text{A}$	
$h_{FE}$	DC Current Gain	$V_{CE}=1\text{V}, I_C=0.2\text{A}$	$T_C=25^\circ\text{C}$	15	28	40	
			$T_C=125^\circ\text{C}$	8	27		
		$V_{CE}=1\text{V}, I_C=1\text{A}$	$T_C=25^\circ\text{C}$	4	8.7		
			$T_C=125^\circ\text{C}$	3	6.6		
		$V_{CE}=2.5\text{V}, I_C=0.5\text{A}$	$T_C=25^\circ\text{C}$	12	20	30	
			$T_C=125^\circ\text{C}$	6	16		
$V_{CE}(\text{sat})$	Collector-Emitter Saturation Voltage	$I_C=0.2\text{A}, I_B=0.02\text{A}$	$T_C=25^\circ\text{C}$		0.09	0.8	V
			$T_C=125^\circ\text{C}$		0.13	1.1	V
		$I_C=0.4\text{A}, I_B=0.08\text{A}$	$T_C=25^\circ\text{C}$		0.08	0.6	V
			$T_C=125^\circ\text{C}$		0.12	1.0	V
		$I_C=1\text{A}, I_B=0.2\text{A}$	$T_C=25^\circ\text{C}$		0.19	1.5	V
			$T_C=125^\circ\text{C}$		0.35	3.0	V
$V_{BE}(\text{sat})$	Base-Emitter Saturation Voltage	$I_C=0.4\text{A}, I_B=0.08\text{A}$	$T_C=25^\circ\text{C}$		0.77	1.0	V
			$T_C=125^\circ\text{C}$		0.65	0.9	V
		$I_C=1\text{A}, I_B=0.2\text{A}$	$T_C=25^\circ\text{C}$		0.83	1.2	V
			$T_C=125^\circ\text{C}$		0.70	1.0	V
$C_{ib}$	Input Capacitance	$V_{EB}=8\text{V}, I_C=0, f=1\text{MHz}$		410	500	pF	
$C_{ob}$	Output Capacitance	$V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$		20	100	pF	

\* Pulse Test : Pulse Width = 5ms, Duty Cycle  $\leq 10\%$

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

Symbol	Parameter	Test Condition	Min	Typ.	Max.	Units		
$V_{CE(DSAT)}$	Dynamic Saturation Voltage	$I_C=0.4\text{A}, I_{B1}=80\text{mA}$ $V_{CC}=300\text{V}$	@ 1 $\mu\text{s}$		11		V	
			@ 3 $\mu\text{s}$		8		V	
		$I_C=1\text{A}, I_{B1}=200\text{mA}$ $V_{CC}=300\text{V}$	@ 1 $\mu\text{s}$		23		V	
			@ 3 $\mu\text{s}$		13		V	
RESISTIVE LOAD SWITCHING (D.C $\leq$ 10%, Pulse Width=20s)								
$t_{ON}$	Turn On Time	$I_C=0.4\text{A}, I_{B1}=80\text{mA}$ $I_{B2}=0.2\text{A}, V_{CC}=300\text{V}$ $R_L = 750\Omega$	$T_C=25^\circ\text{C}$		250	350	ns	
			$T_C=125^\circ\text{C}$		260		ns	
$t_{OFF}$	Turn Off Time		$T_C=25^\circ\text{C}$		3.3	4.0	$\mu\text{s}$	
			$T_C=125^\circ\text{C}$		3.8		$\mu\text{s}$	
$t_{ON}$	Turn On Time	$I_C=1\text{A}, I_{B1}=160\text{mA}$ $I_{B2}=160\text{mA},$ $V_{CC}=300\text{V}$ $R_L = 300\Omega$	$T_C=25^\circ\text{C}$		220	450	ns	
			$T_C=125^\circ\text{C}$		250		ns	
$t_{OFF}$	Turn Off Time		$T_C=25^\circ\text{C}$		4.3	5.0	$\mu\text{s}$	
			$T_C=125^\circ\text{C}$		5.0		$\mu\text{s}$	
INDUCTIVE LOAD SWITCHING ( $V_{CC}=15\text{V}$ )								
$t_{STG}$	Storage Time	$I_C=0.4\text{A}, I_{B1}=80\text{mA}$ $I_{B2}=0.2\text{A}, V_Z=300\text{V}$ $L_C=200\mu\text{H}$	$T_C=25^\circ\text{C}$		1.4	2.0	$\mu\text{s}$	
			$T_C=125^\circ\text{C}$		1.7		$\mu\text{s}$	
$t_F$	Fall Time		$T_C=25^\circ\text{C}$		130	200	ns	
			$T_C=125^\circ\text{C}$		80		ns	
$t_C$	Cross-over Time		$T_C=25^\circ\text{C}$		210	350	ns	
			$T_C=125^\circ\text{C}$		130		ns	
$t_{STG}$	Storage Time		$I_C=0.8\text{A}, I_{B1}=160\text{mA}$ $I_{B2}=160\text{mA},$ $V_{CC}=300\text{V}$ $L_C=200\mu\text{H}$	$T_C=25^\circ\text{C}$		4.9	5.5	$\mu\text{s}$
				$T_C=125^\circ\text{C}$		5.3		$\mu\text{s}$
$t_F$	Fall Time	$T_C=25^\circ\text{C}$			170	250	ns	
		$T_C=125^\circ\text{C}$			340		ns	
$t_C$	Cross-over Time	$T_C=25^\circ\text{C}$			300	600	ns	
		$T_C=125^\circ\text{C}$			810		ns	

## Typical Characteristics

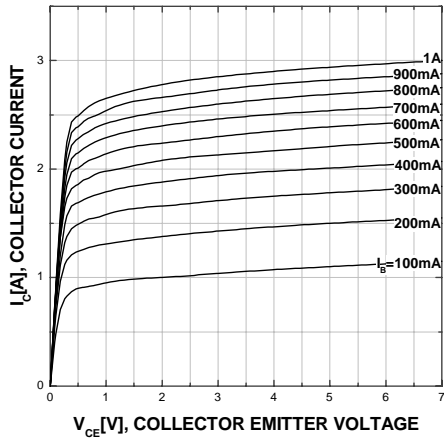


Figure 1. Static Characteristic

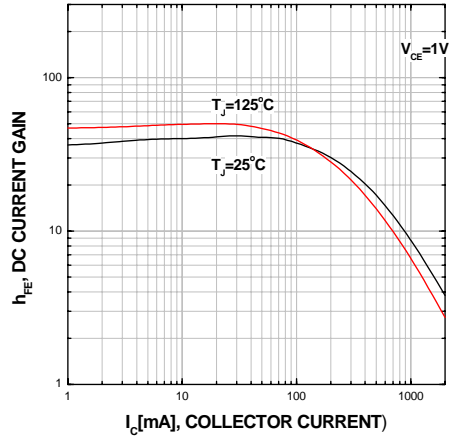


Figure 2. DC current Gain

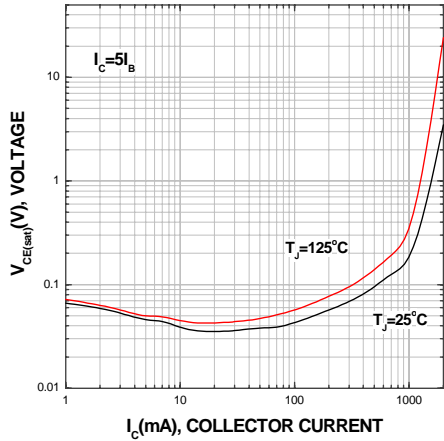


Figure 3. Collector-Emitter Saturation Voltage

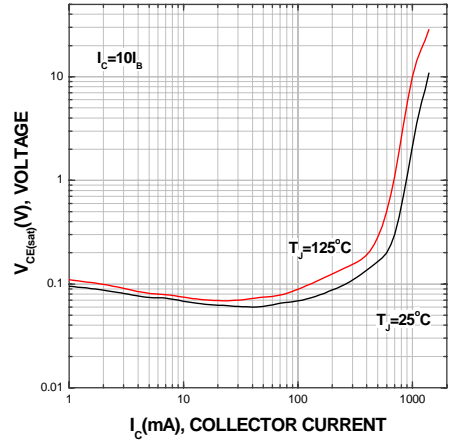


Figure 4. Collector-Emitter Saturation Voltage

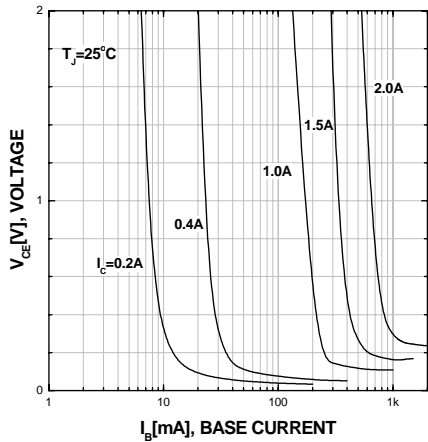


Figure 5. Typical Collector Saturation Voltage

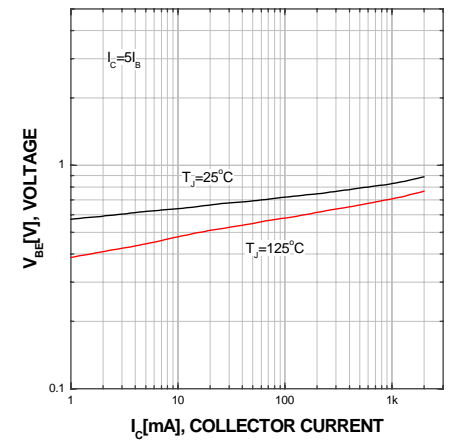


Figure 6. Base-Emitter Saturation Voltage

## Typical Characteristics (Continued)

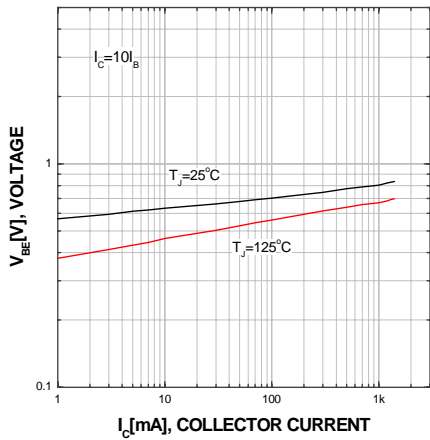


Figure 7. Base-Emitter Saturation Voltage

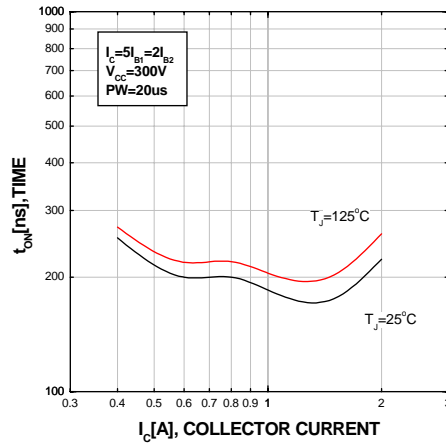


Figure 8. Resistive Switching Time,  $t_{on}$

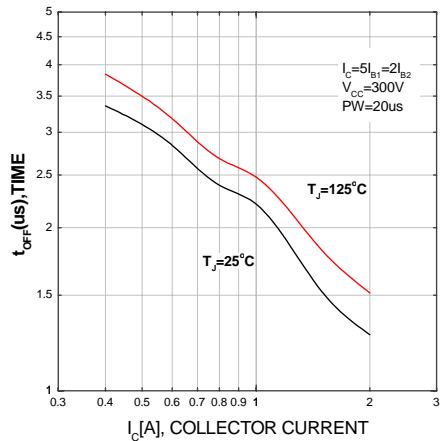


Figure 9. Resistive Switching Time,  $t_{off}$

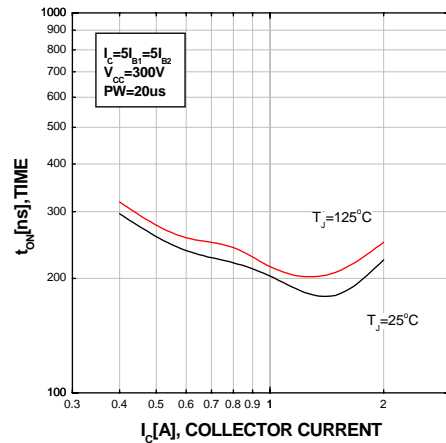


Figure 10. Resistive Switching Time,  $t_{on}$

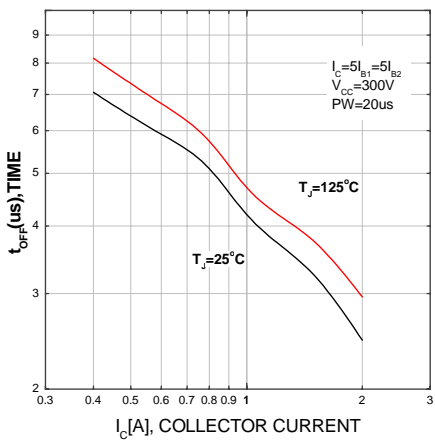


Figure 11. Resistive Switching Time,  $t_{off}$

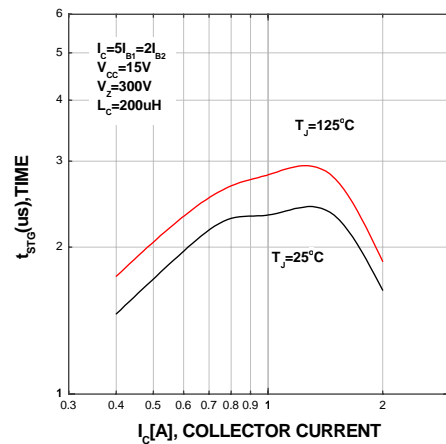


Figure 12. Inductive Switching Time,  $t_{STG}$

Typical Characteristics (Continued)

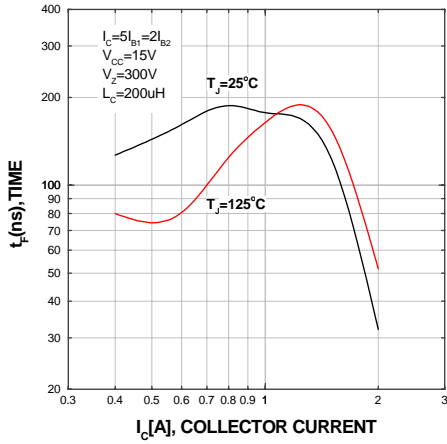


Figure 13. Inductive Switching Time,  $t_f$

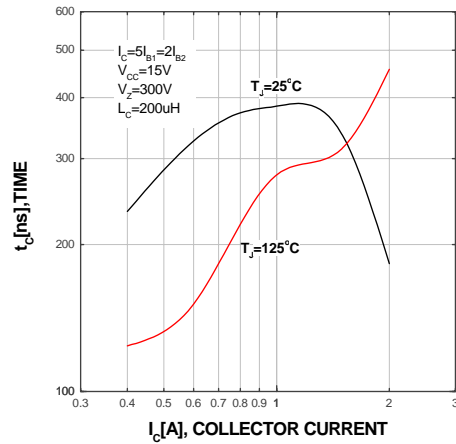


Figure 14. Inductive Switching Time,  $t_c$

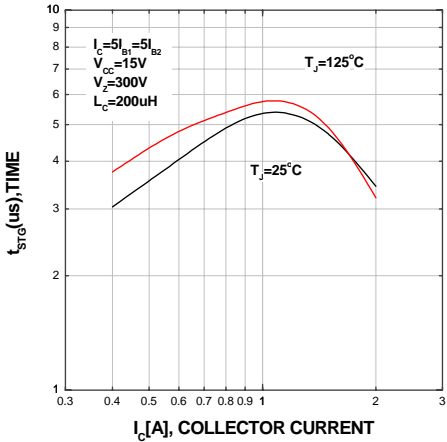


Figure 15. Inductive Switching Time,  $t_{STG}$

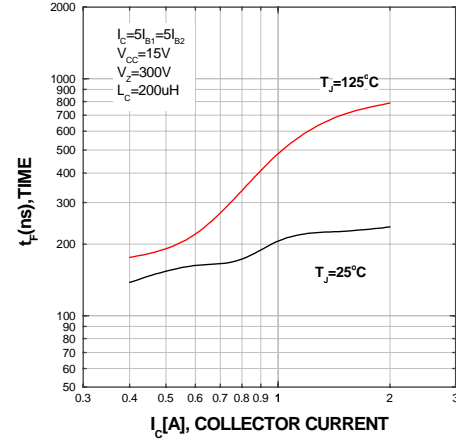


Figure 16. Inductive Switching Time,  $t_f$

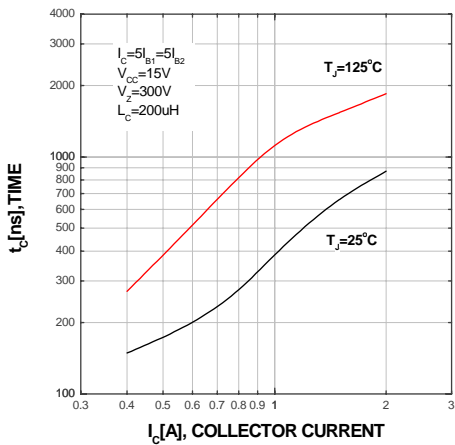


Figure 17. Inductive Switching Time,  $t_c$

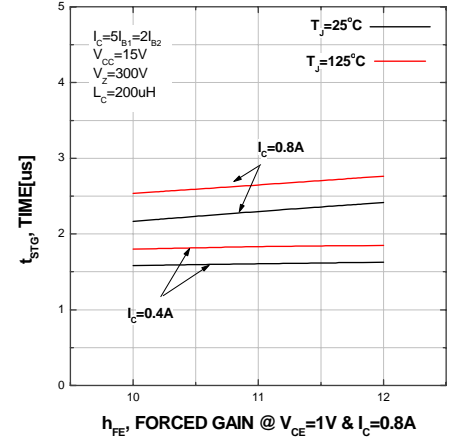


Figure 18. Inductive Switching Time,  $t_{STG}$

## Typical Characteristics (Continued)

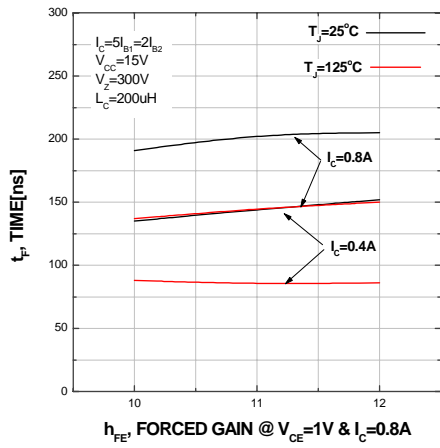


Figure 19. Inductive Switching Time,  $t_F$

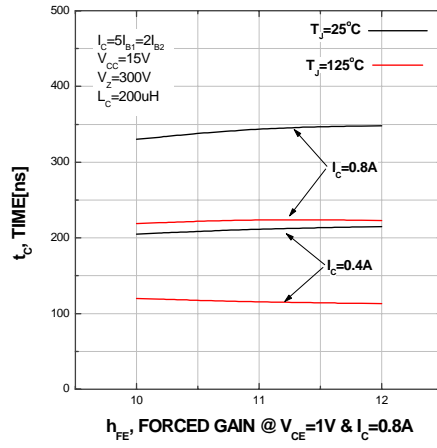


Figure 20. Inductive Switching Time,  $t_C$

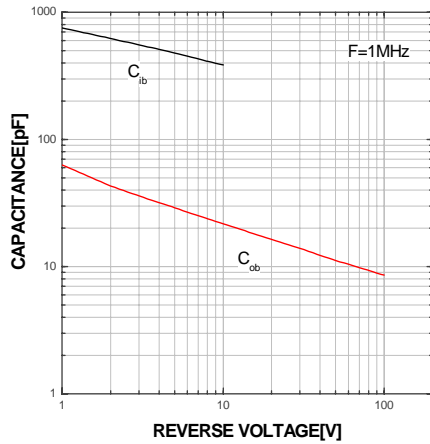


Figure 21. Capacitance

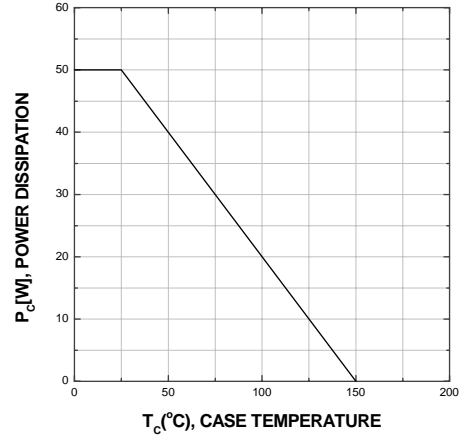


Figure 22. Power Derating



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## PRODUCT STATUS DEFINITIONS

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