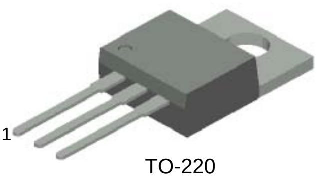
FAIRCHILD SEMICONDUCTOR®

April 2008

KSC5502
NPN Planar Silicon Transistor

High Voltage Power Switch Mode Application

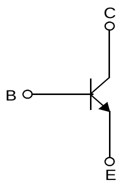
- Small Variance in Storage Time
- Wide Safe Operating Area
- Suitable for Electronic Ballast Application



TO-220

1.Base 2.Collector 3.Emitter

Equivalent Circuit



Absolute Maximum Ratings * T_C=25°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°C)	50	W
T_J	Junction Temperature	150	°C
T_{STG}	Storage Junction Temperature Range	- 65 ~ 150	°C
EAS	Avalanche Energy(T_j=25°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 ≤ 10%

Thermal Characteristics T_a=25°C unless otherwise noted

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	85	°C/W

Ordering Information

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

Electrical Characteristics * T_C=25°C unless otherwise noted

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

* Pulse Test : Pulse Width = 5ms, Duty Cycle ≤ 10%

Electrical Characteristics T_C=25°C unless otherwise noted

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

Typical Characteristics

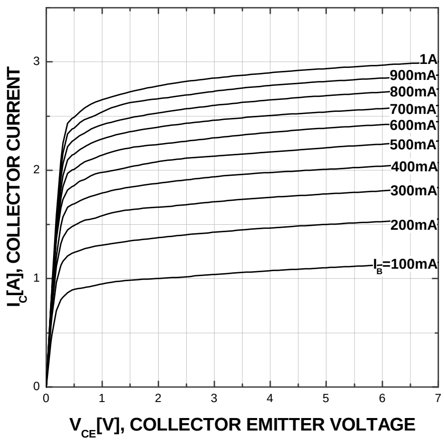


Figure 1. Static Characteristic

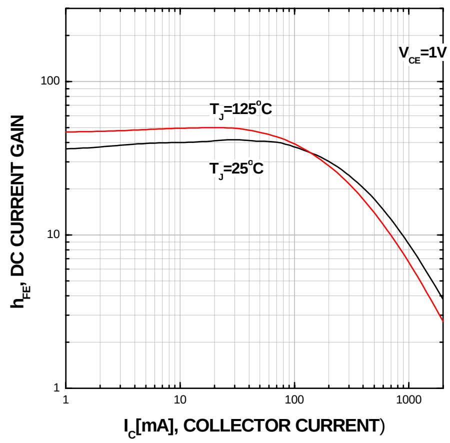


Figure 2. DC current Gain

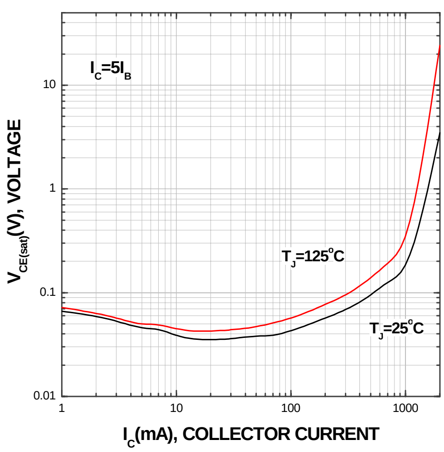


Figure 3. Collector-Emitter Saturation Voltage

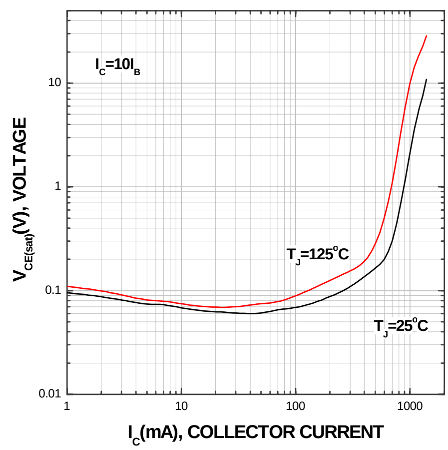


Figure 4. Collector-Emitter Saturation Voltage

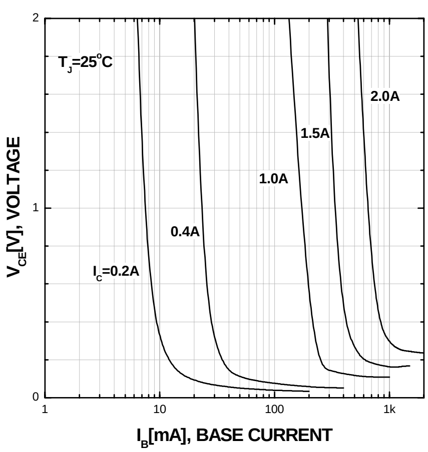


Figure 5. Typical Collector Saturation Voltage

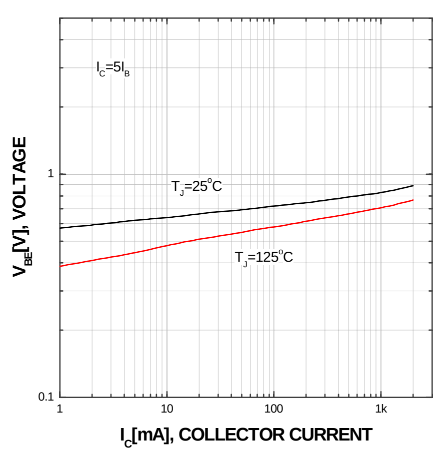


Figure 6. Base-Emitter Saturation Voltage

Typical Characteristics (Continued)

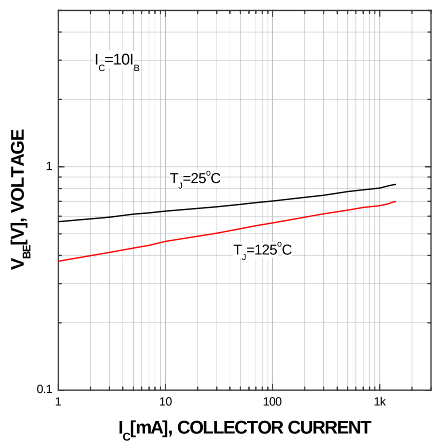


Figure 7. Base-Emitter Saturation Voltage

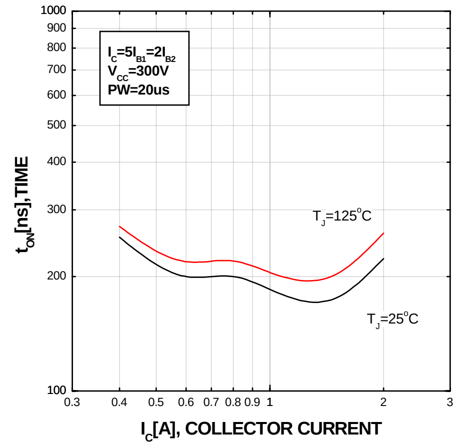


Figure 8. Resistive Switching Time, t_{on}

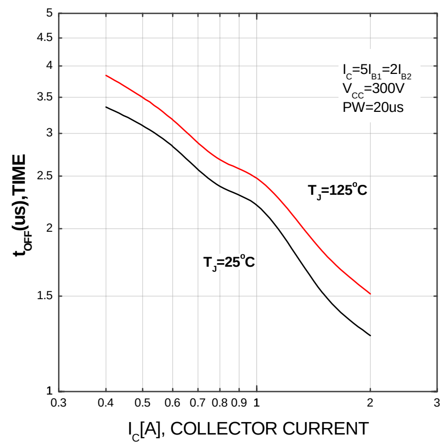


Figure 9. Resistive Switching Time, t_{off}

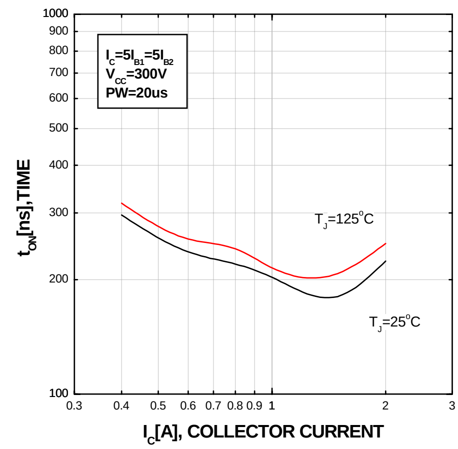


Figure 10. Resistive Switching Time, t_{on}

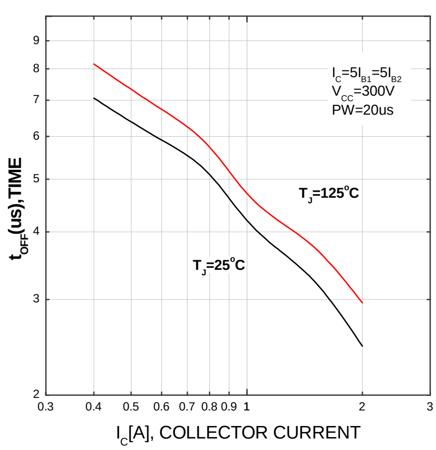


Figure 11. Resistive Switching Time, t_{off}

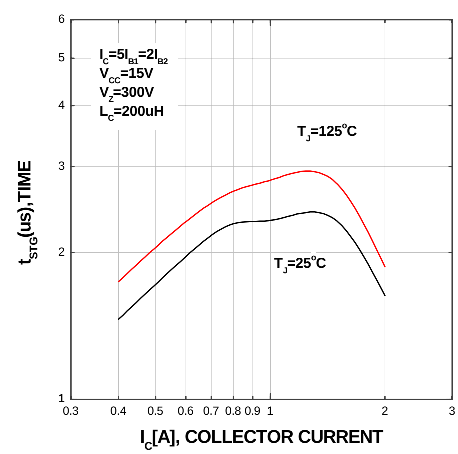


Figure 12. Inductive Switching Time, t_{STG}

Typical Characteristics (Continued)

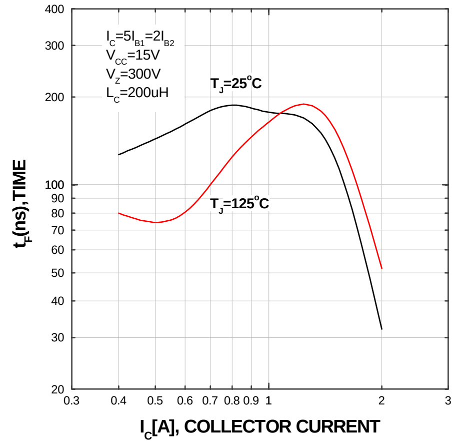


Figure 13. Inductive Switching Time, t_F

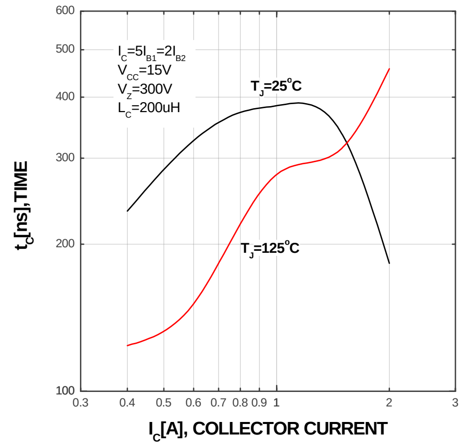


Figure 14. Inductive Switching Time, t_C

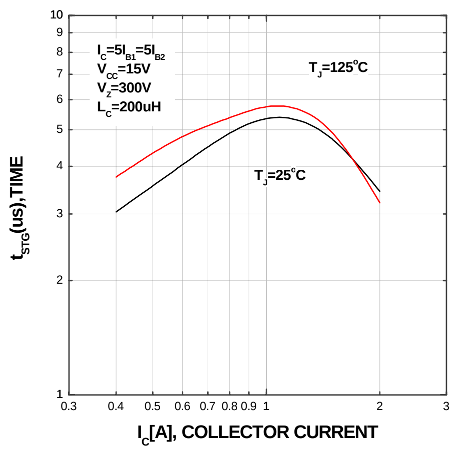


Figure 15. Inductive Switching Time, t_{STG}

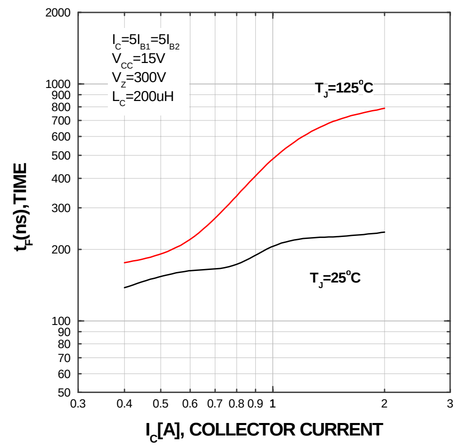


Figure 16. Inductive Switching Time, t_F

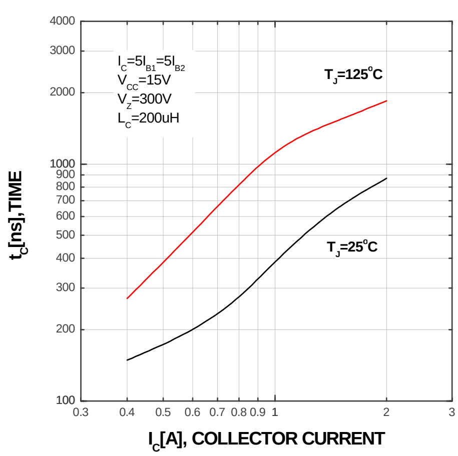


Figure 17. Inductive Switching Time, t_C

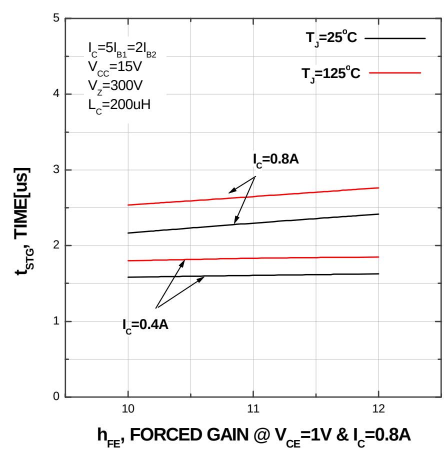


Figure 18. Inductive Switching Time, t_{STG}

Typical Characteristics (Continued)

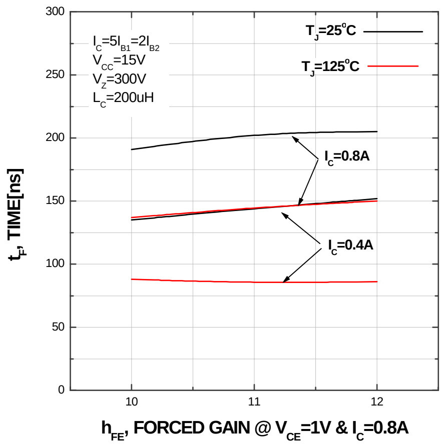


Figure 19. Inductive Switching Time, t_F

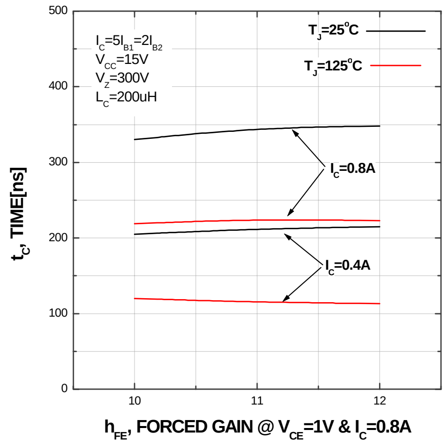


Figure 20. Inductive Switching Time, t_C

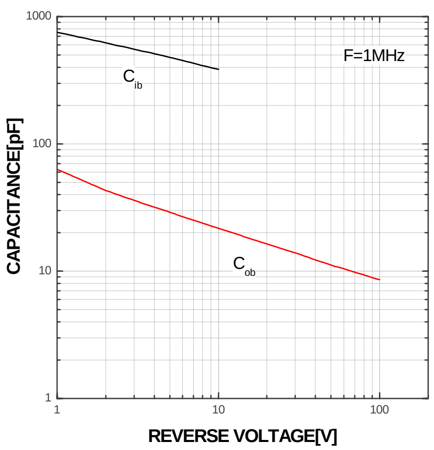


Figure 21. Capacitance

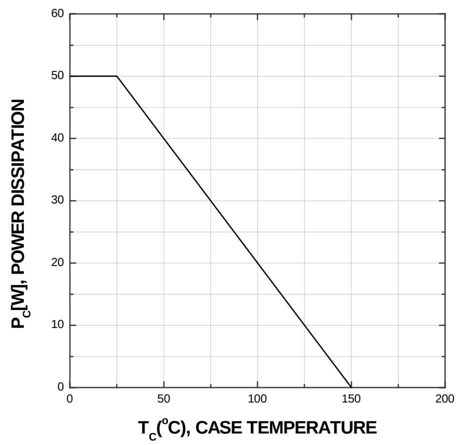


Figure 22. Power Derating

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QS™
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Datasheet Identification	Product Status	Definition
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