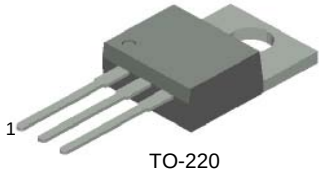
FAIRCHILD SEMICONDUCTOR®

April 2008

KSC5502
NPN Planar Silicon Transistor

High Voltage Power Switch Mode Application

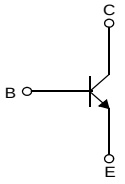
- Small Variance in Storage Time
- Wide Safe Operating Area
- Suitable for Electronic Ballast Application



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

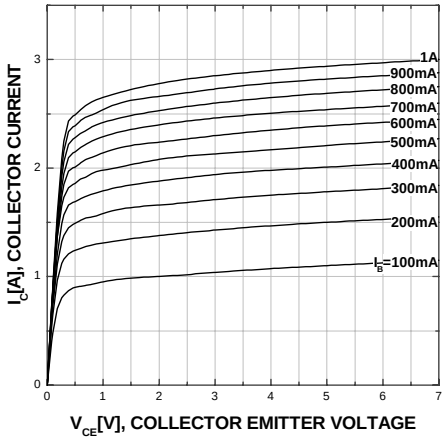


Figure 1. Static Characteristic

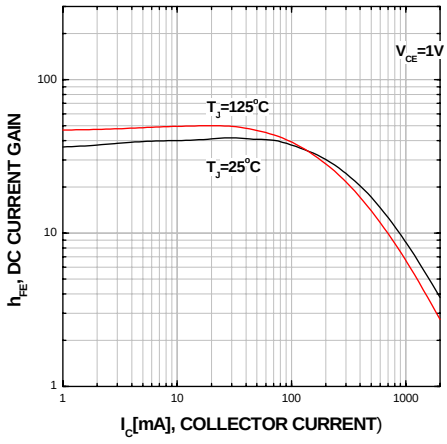


Figure 2. DC current Gain

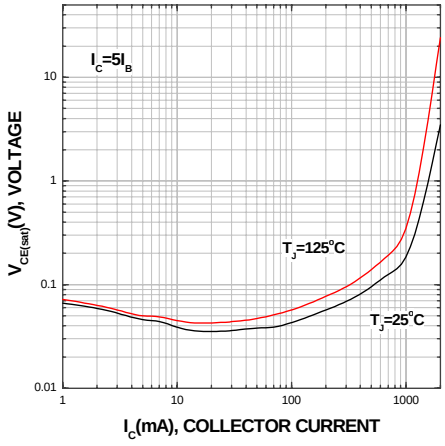


Figure 3. Collector-Emitter Saturation Voltage

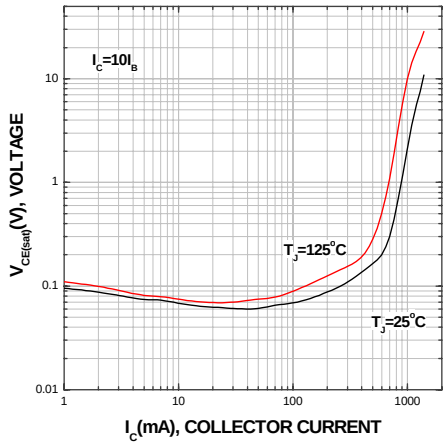


Figure 4. Collector-Emitter Saturation Voltage

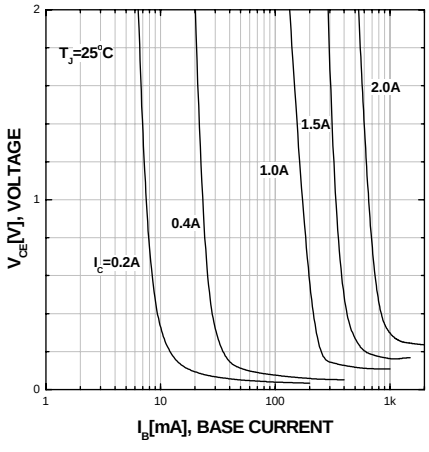


Figure 5. Typical Collector Saturation Voltage

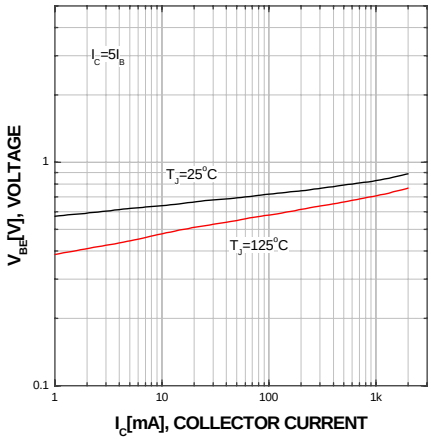


Figure 6. Base-Emitter Saturation Voltage

Typical Characteristics (Continued)

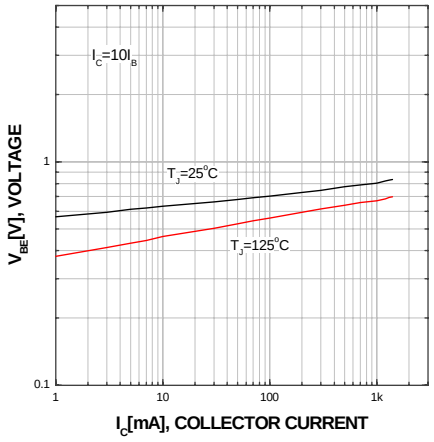


Figure 7. Base-Emitter Saturation Voltage

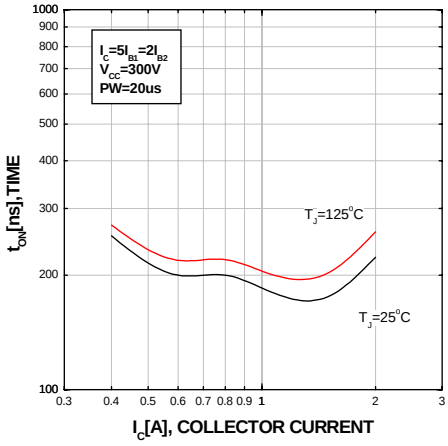


Figure 8. Resistive Switching Time, t_{on}

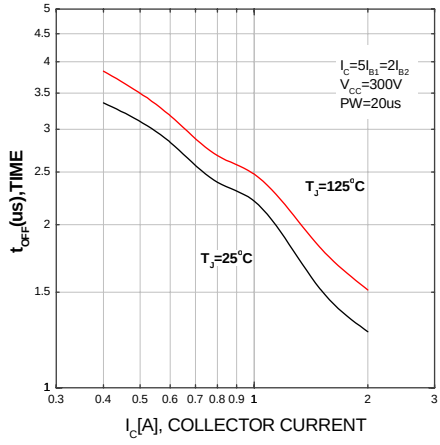


Figure 9. Resistive Switching Time, t_{off}

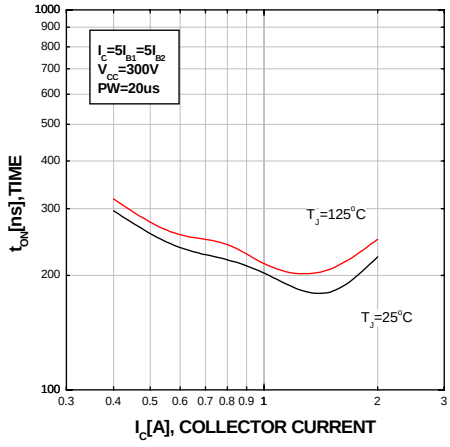


Figure 10. Resistive Switching Time, t_{on}

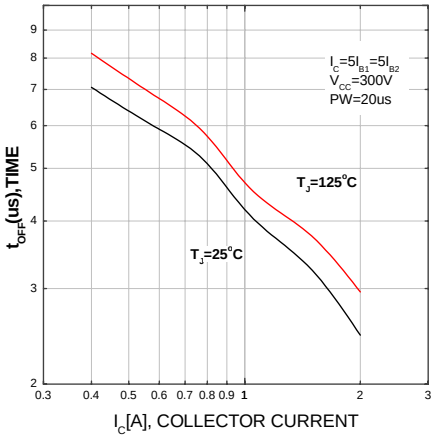


Figure 11. Resistive Switching Time, t_{off}

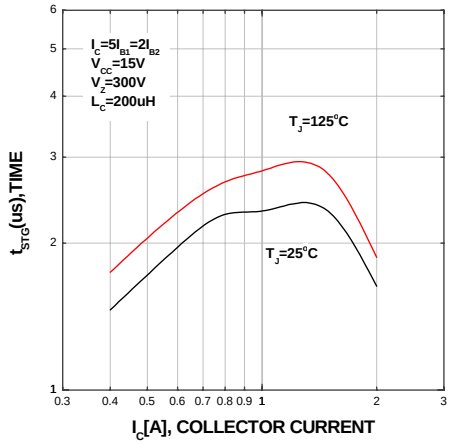


Figure 12. Inductive Switching Time, t_{STG}

Typical Characteristics (Continued)

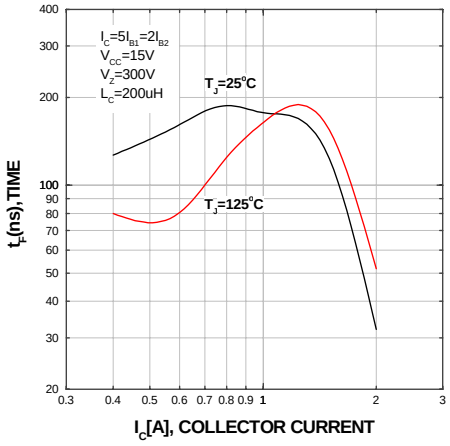


Figure 13. Inductive Switching Time, t_F

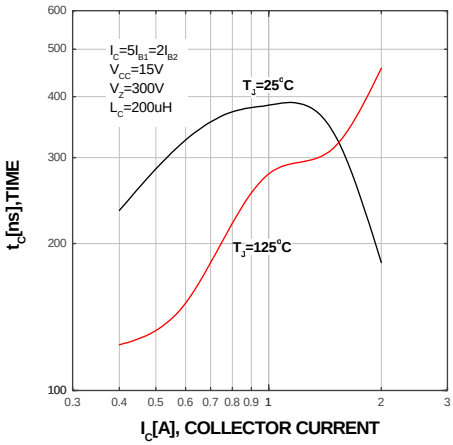


Figure 14. Inductive Switching Time, t_C

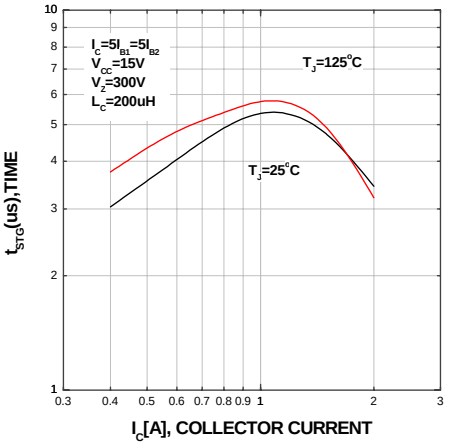


Figure 15. Inductive Switching Time, t_{STG}

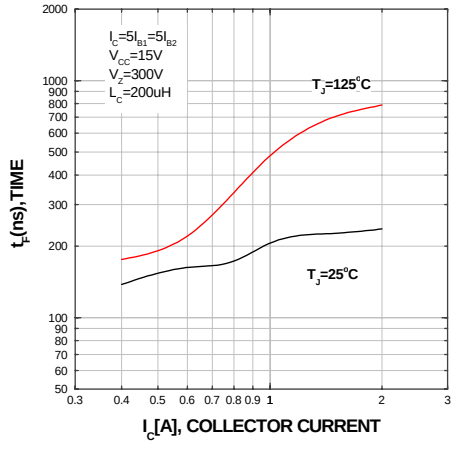


Figure 16. Inductive Switching Time, t_F

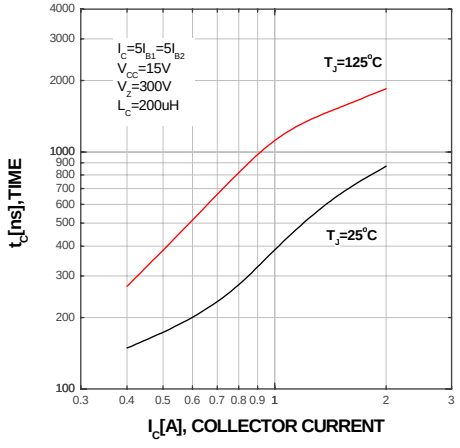


Figure 17. Inductive Switching Time, t_C

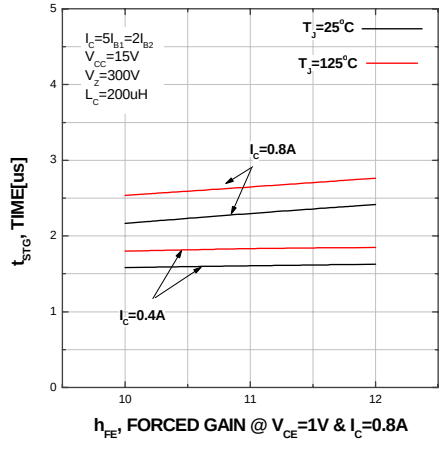


Figure 18. Inductive Switching Time, t_{STG}

Typical Characteristics (Continued)

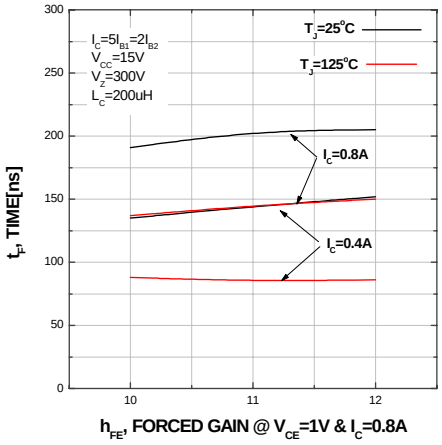


Figure 19. Inductive Switching Time, t_F

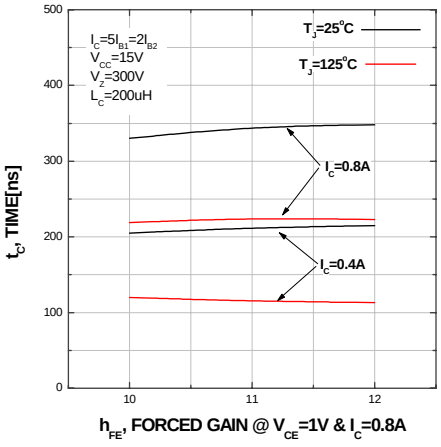


Figure 20. Inductive Switching Time, t_C

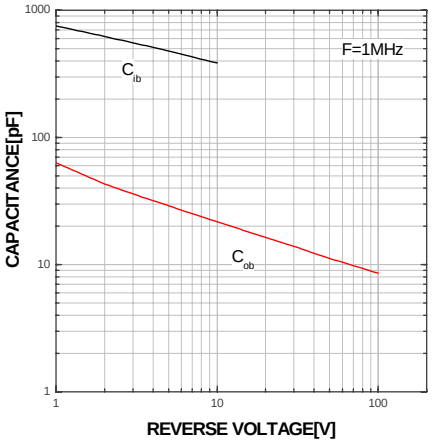


Figure 21. Capacitance

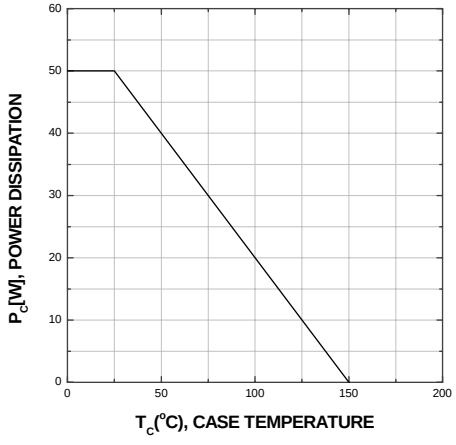


Figure 22. Power Derating

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FACT®	Motion-SPM™	SPM®	TinyWire™
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FastvCore™	OPTOPLANAR®	SuperFET™	UHC®
FPS™		SuperSOT™-3	UniFET™
FRFET®	PDP-SPM™	SuperSOT™-6	VCX™
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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
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