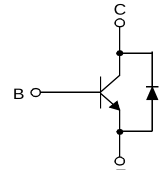
FAIRCHILD
SEMICONDUCTOR®

KSC5502D/KSC5502DT

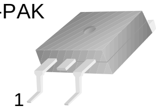
High Voltage Power Switch Switching Application

- Wide Safe Operating Area
- Built-in Free-Wheeling Diode
- Suitable for Electronic Ballast Application
- Small Variance in Storage Time
- Two Package Choices : D-PAK or TO-220

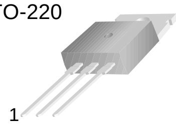
Equivalent Circuit



D-PAK



TO-220



1.Base 2.Collector 3.Emitter

NPN Triple Diffused Planar Silicon Transistor

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	1200	V
V_{CEO}	Collector-Emitter Voltage	600	V
V_{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}	*Base Current (Pulse)	2	A
P_C	Collector Dissipation (T_C=25°C)	50	W
T_J	Junction Temperature	150	°C
T_{STG}	Storage Temperature	- 65 ~ 150	°C
EAS	Avalanche Energy(T_j=25°C)	2.5	mJ

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

Thermal Characteristics T_C=25°C unless otherwise noted

Symbol	Characteristics		Rating	Unit
$R_{\theta jc}$	Thermal Resistance	Junction to Case	2.5	°C/W
$R_{\theta ja}$		Junction to Ambient	62.5	
T_L	Maximun Lead Temperature for Soldering Purpose : 1/8” from Case for 5 seconds		270	°C

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	13.7		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	18		
		V_{CE}=1V, I_C=1A	T_C=25°C	4	6.4		
			T_C=125°C	3	4.7		
		V_{CE}=2.5V, I_C=0.5A	T_C=25°C	12	20	30	
			T_C=125°C	6	12		
V_{CE}(sat)	Collector-Emitter Saturation Voltage	I_C=0.2A, I_B=0.02A	T_C=25°C		0.31	0.8	V
			T_C=125°C		0.54	1.1	V
		I_C=0.4A, I_B=0.08A	T_C=25°C		0.15	0.6	V
			T_C=125°C		0.23	1.0	V
		I_C=1A, I_B=0.2A	T_C=25°C		0.40	1.5	V
			T_C=125°C		1.3	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		0.60	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			385	500	pF
C_{ob}	Output Capacitance	V_{CB}=10V, I_E=0, f=1MHz			60	100	pF
f_T	Current Gain Bandwidth Product	I_C=0.5A,V_{CE}=10V			11		MHz
V_F	Diode Forward Voltage	I_F=0.2A	T_C=25°C		0.75	1.2	V
			T_C=125°C		0.59		V
		I_F=0.4A	T_C=25°C		0.80	1.3	V
			T_C=125°C		0.64		V
		I_F=1A	T_C=25°C		0.9	1.5	V

Electrical Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Condition		Min	Typ.	Max.	Units
t_{fr}	Diode Froward Recvery Time (di/dt=10A/µs)	I_F=0.2A			650		ns
		I_F=0.4A			740		ns
		I_F=1A			785		ns
V_{CE}(DSAT)	Dynamic Saturation Voltage	I_C=0.4A, I_{B1}=80mA V_{CC}=300V	@ 1µs		7.2		V
			@ 3µs		1.8		V
		I_C=1A, I_{B1}=200mA V_{CC}=300V	@ 1µs		18		V
			@ 3µs		6		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		175	350	ns
			T_C=125°C		185		ns
t_{OFF}	Turn Off Time		T_C=25°C		2.1	3.0	µs
			T_C=125°C		2.6		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		240	450	ns
			T_C=125°C		310		ns
t_{OFF}	Turn Off Time		T_C=25°C		3.7	5.0	µs
			T_C=125°C		4.5		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=200H	T_C=25°C		1.2	2.0	µs
			T_C=125°C		1.5		µs
t_F	Fall Time		T_C=25°C		90	200	ns
			T_C=125°C		65		ns
t_C	Cross-over Time		T_C=25°C		185	350	ns
			T_C=125°C		145		ns
t_{STG}	Storage Time	I_C=0.8A, I_{B1}=160mA I_{B2}=160mA, V_{CC}=300V L_C=200H	T_C=25°C		3.3	4.5	µs
			T_C=125°C		3.75		µs
t_F	Fall Time		T_C=25°C		90	250	ns
			T_C=125°C		160		ns
t_C	Cross-over Time		T_C=25°C		300	600	ns
			T_C=125°C		570		ns

Typical Characteristics

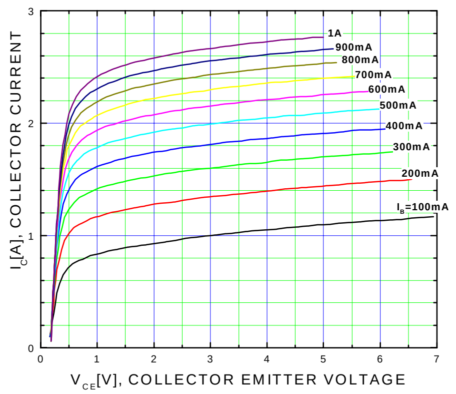


Figure 1. Static Characteristic

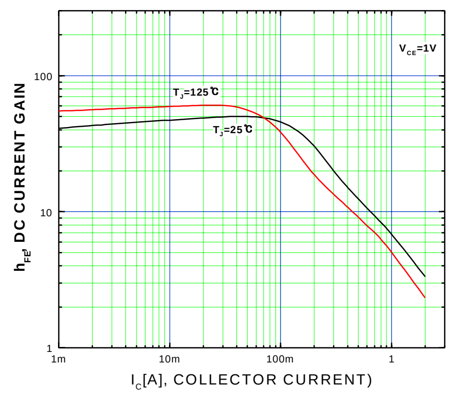


Figure 2. DC current Gain

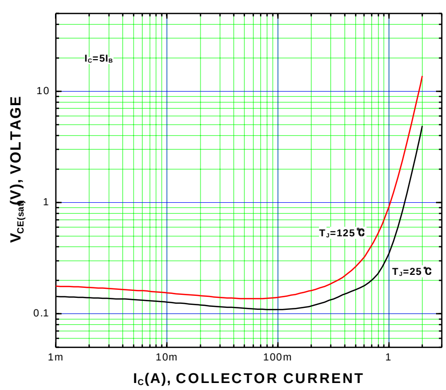


Figure 3. Collector-Emitter Saturation Voltage

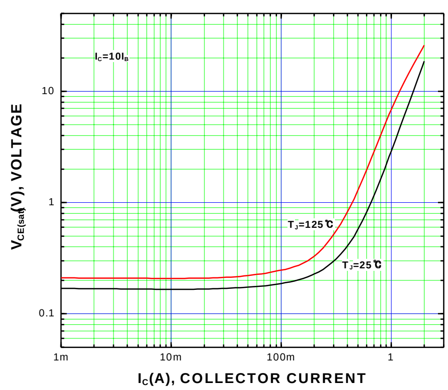


Figure 4. Collector-Emitter Saturation Voltage

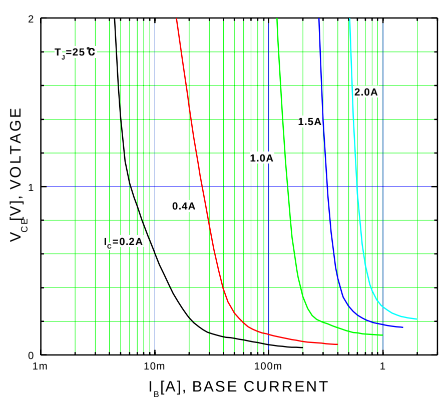


Figure 5. Typical Collector Saturation Voltage

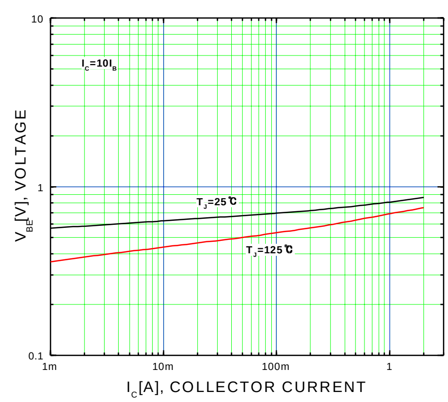


Figure 6. Base-Emitter Saturation Voltage

Typical Characteristics (Continued)

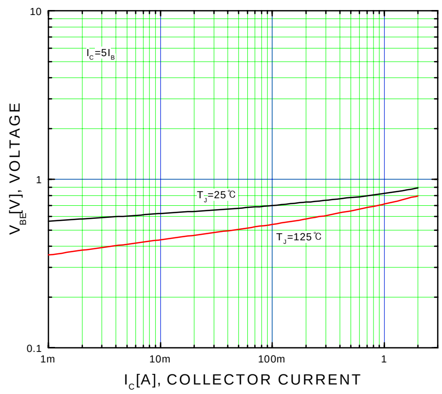


Figure 7. Base-Emitter Saturation Voltage

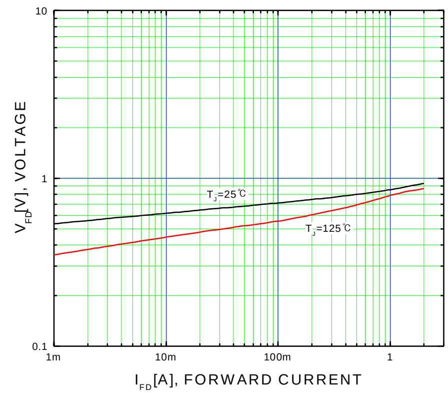


Figure 8. Diode Forward Voltage

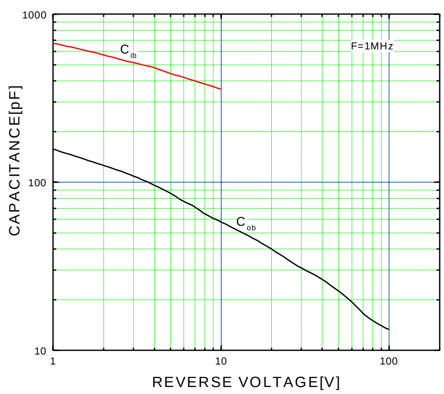


Figure 9. Collector Output Capacitance

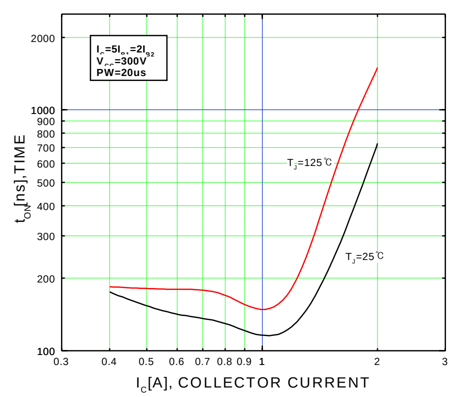


Figure 10. Resistive Switching Time, t_{on}

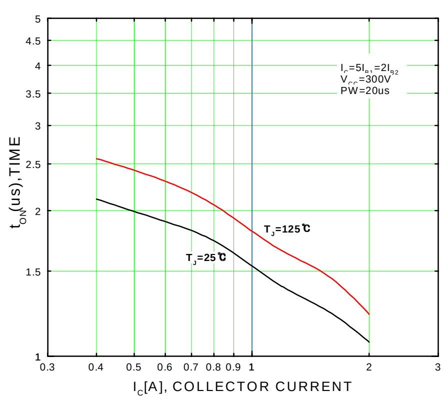


Figure 11. Resistive Switching Time, t_{off}

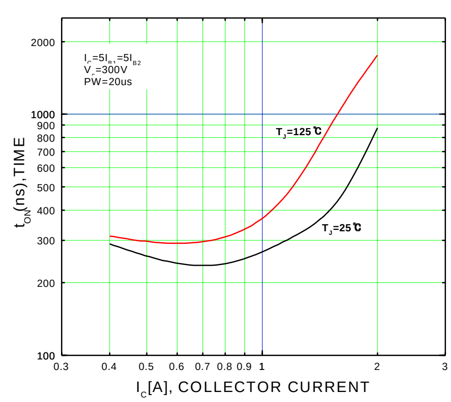


Figure 12. Resistive Switching Time, t_{on}

Typical Characteristics (Continued)

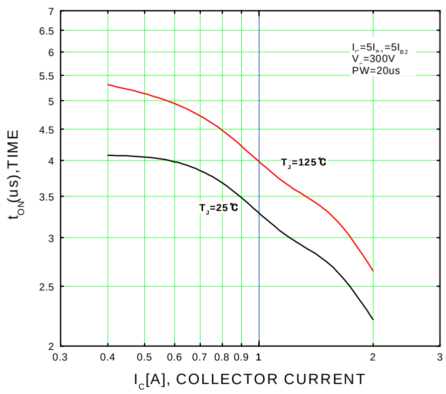


Figure 13. Resistive Switching Time, t_{off}

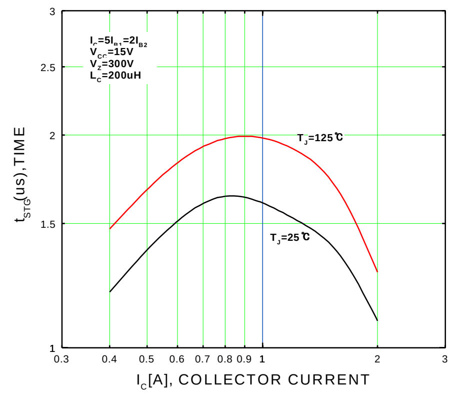


Figure 14. Inductive Switching Time, t_{STG}

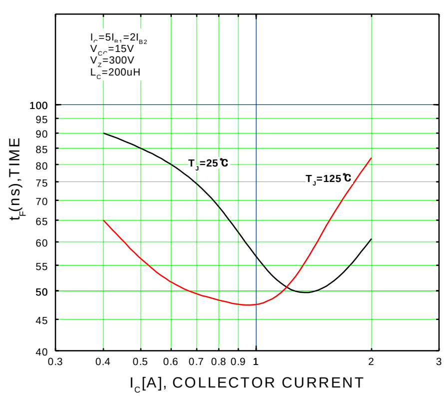


Figure 15. Inductive Switching Time, t_F

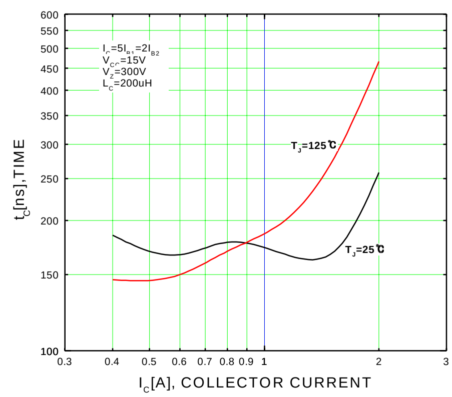


Figure 16. Inductive Switching Time, t_c

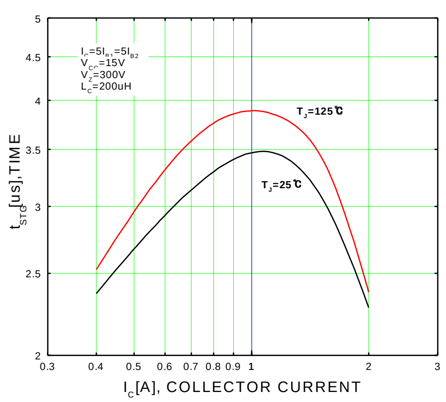


Figure 17. Inductive Switching Time, t_{STG}

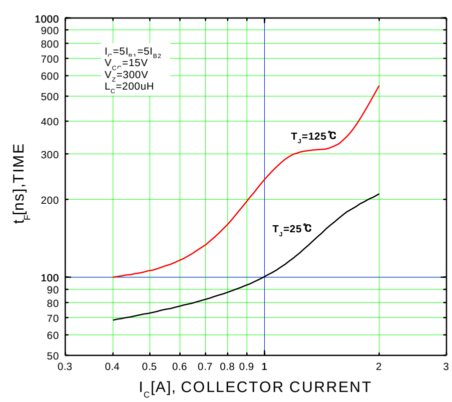


Figure 18. Inductive Switching Time, t_F

Typical Characteristics (Continued)

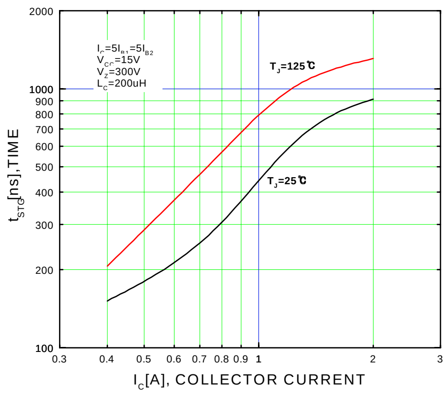


Figure 19. Inductive Switching Time, t_c

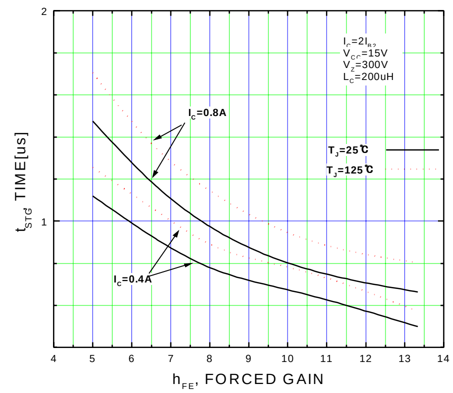


Figure 20. Inductive Switching Time, t_{STG}

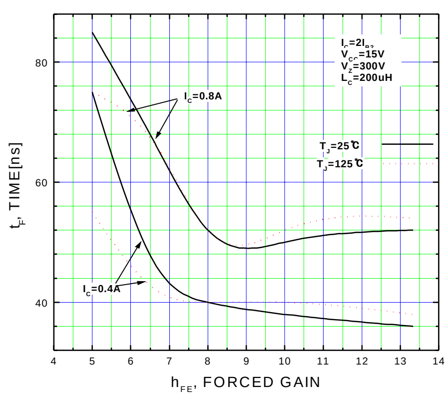


Figure 21. Inductive Switching Time, t_F

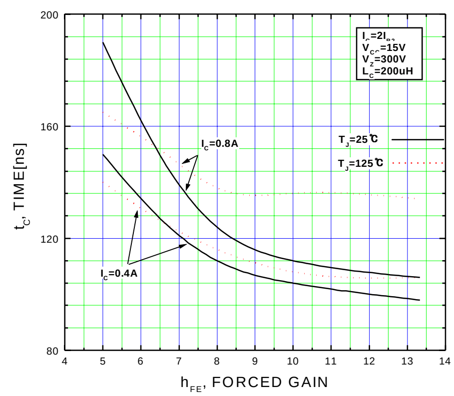


Figure 22. Inductive Switching Time, t_c

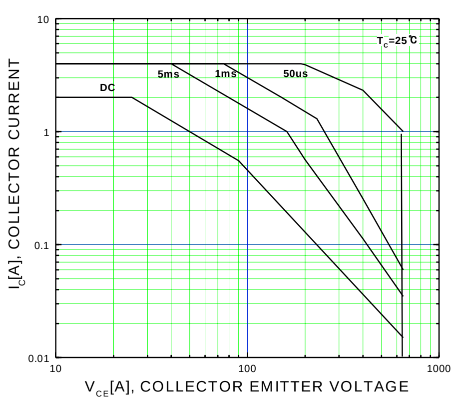


Figure 23. Forward Bias Safe Operating Area

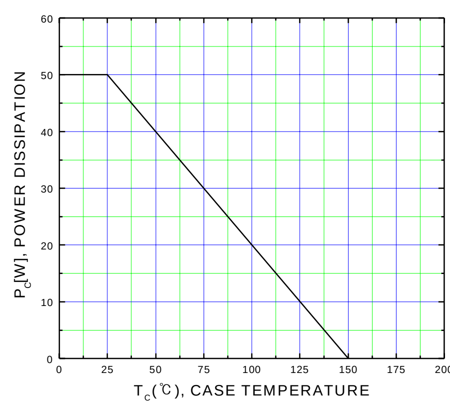


Figure 24. Power Derating

Typical Characteristics (Continued)

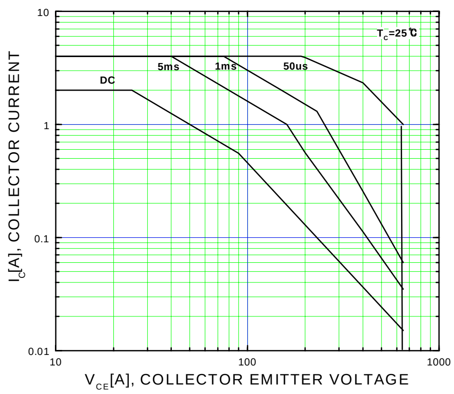


Figure 25. Forward Bias Safe Operating Area

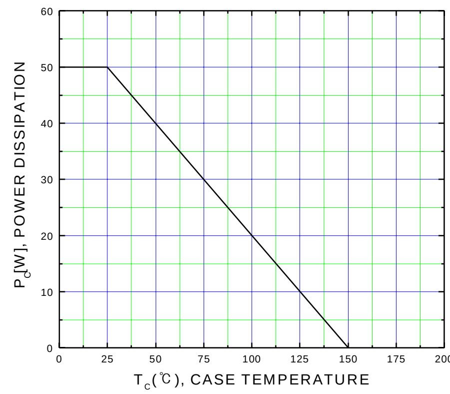
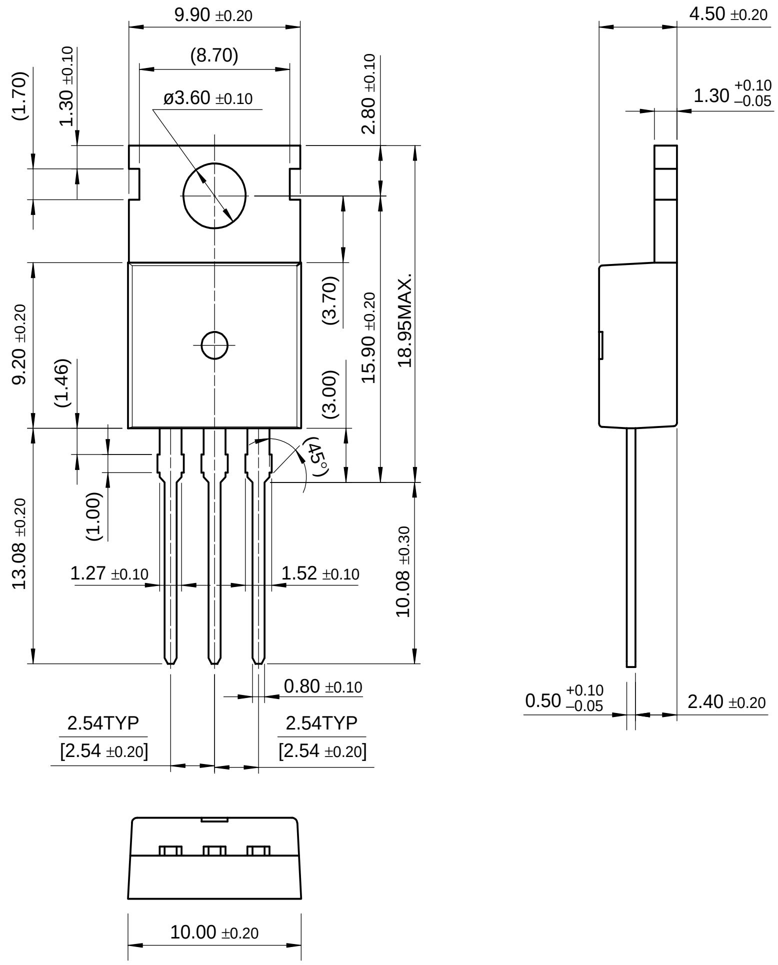


Figure 26. Power Derating

Package Demensions

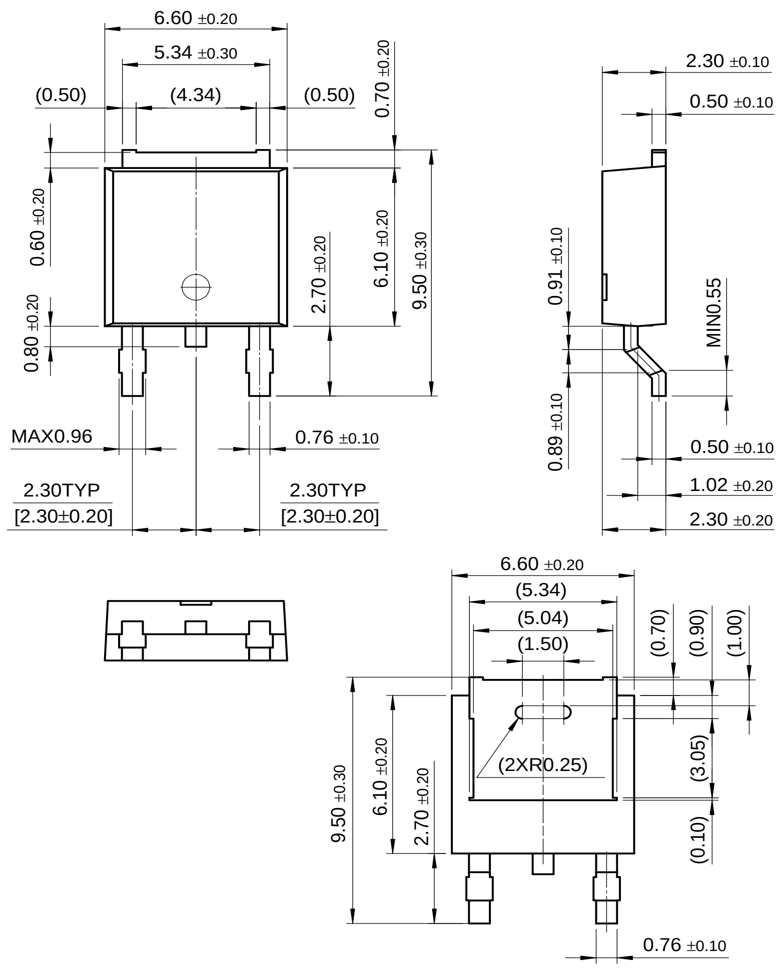
TO-220



Dimensions in Millimeters

Package Demensions (Continued)

D-PAK



Dimensions in Millimeters

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FAST®	OPTOPLANAR™	STAR*POWER™
Bottomless™	FASTr™	PACMAN™	Stealth™
CoolFET™	FRFET™	POP™	SuperSOT™-3
CROSSVOLT™	GlobalOptoisolator™	Power247™	SuperSOT™-6
DenseTrench™	GTO™	PowerTrench®	SuperSOT™-8
DOME™	HiSeC™	QFET™	SyncFET™
EcoSPARK™	ISOPLANAR™	QS™	TruTranslation™
E^2CMOS™	LittleFET™	QT Optoelectronics™	TinyLogic™
EnSigna™	MicroFET™	Quiet Series™	UHC™
FACT™	MICROWIRE™	SLIENT SWITCHER®	UltraFET®
FACT Quiet Series™	OPTOLOGIC™	SMART START™	VCX™

STAR*POWER is used under license

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

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.

PRODUCT STATUS DEFINITIONS

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.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.