chanhvinh.com

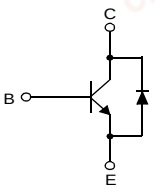
FAIRCHILD SEMICONDUCTOR®

KSC5502D/KSC5502DT

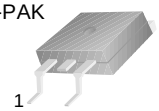
High Voltage Power Switch Switching Application

- 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

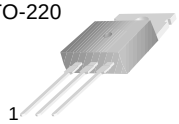
Equivalent Circuit



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

©2001 Fairchild Semiconductor Corporation

chanhvinh.com

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

©2001 Fairchild Semiconductor Corporation

chanhvinh.com

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 I_F=0.4A I_F=1A			650 740 785		ns ns 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

©2001 Fairchild Semiconductor Corporation

chanhvinh.com

Typical Characteristics

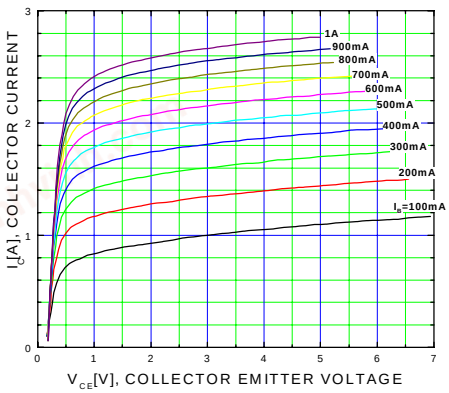


Figure 1. Static Characteristic

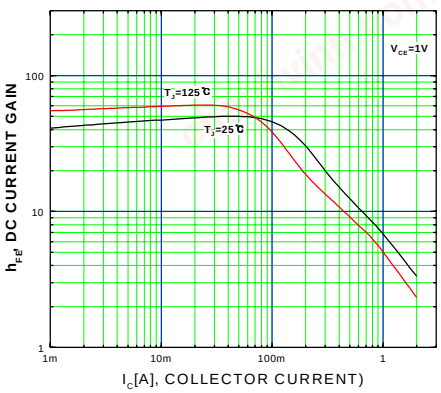


Figure 2. DC current Gain

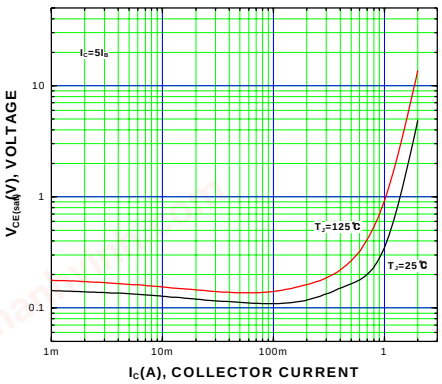


Figure 3. Collector-Emitter Saturation Voltage

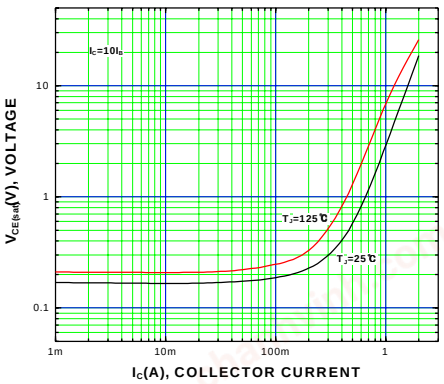


Figure 4. Collector-Emitter Saturation Voltage

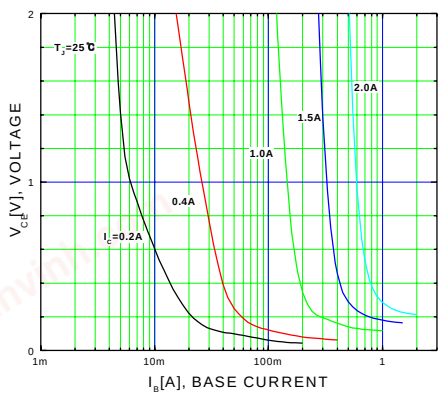


Figure 5. Typical Collector Saturation Voltage

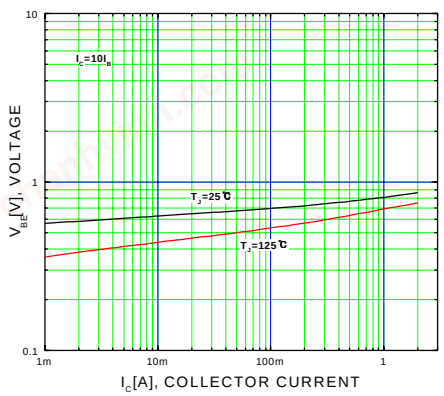


Figure 6. Base-Emitter Saturation Voltage

©2001 Fairchild Semiconductor Corporation

chanhvinh.com

Typical Characteristics (Continued)

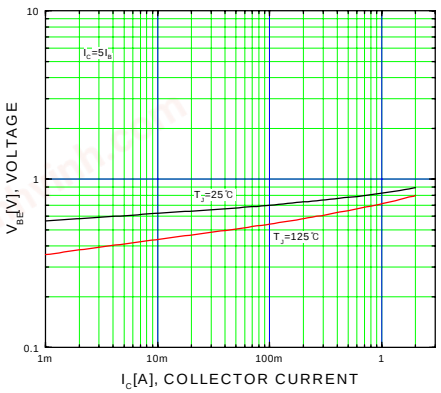


Figure 7. Base-Emitter Saturation Voltage

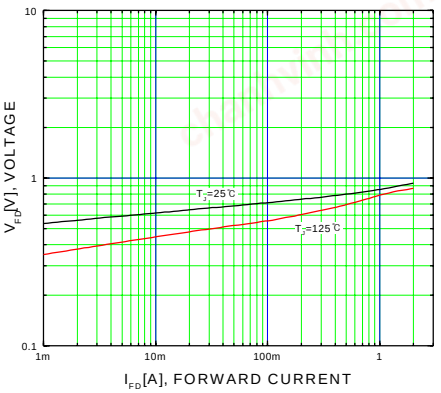


Figure 8. Diode Forward Voltage

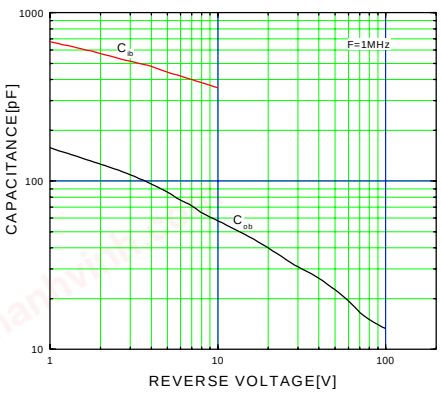


Figure 9. Collector Output Capacitance

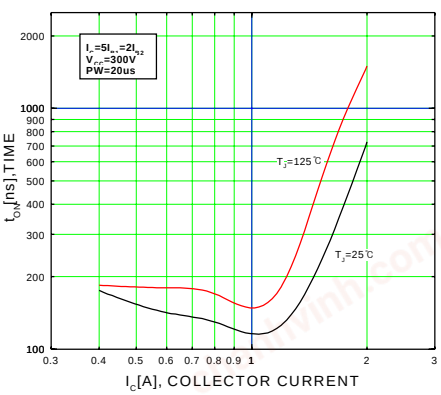


Figure 10. Resistive Switching Time, t_{on}

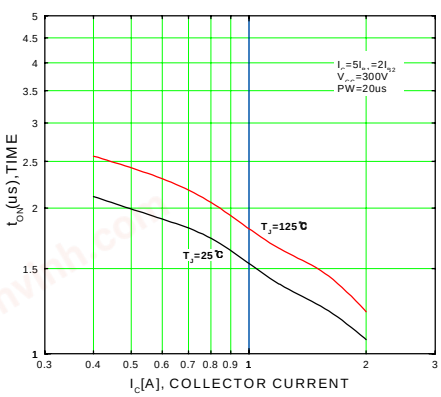


Figure 11. Resistive Switching Time, t_{off}

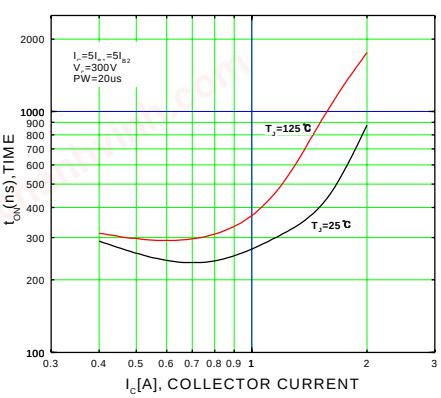


Figure 12. Resistive Switching Time, t_{on}

©2001 Fairchild Semiconductor Corporation

chanhvinh.com

Typical Characteristics (Continued)

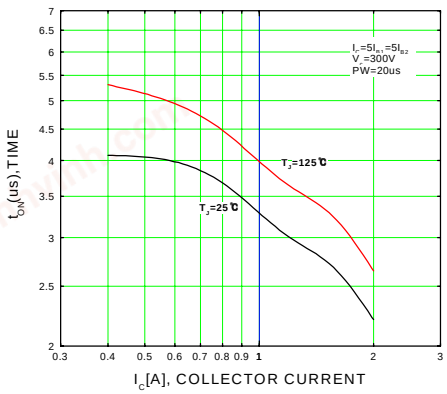


Figure 13. Resistive Switching Time, t_{off}

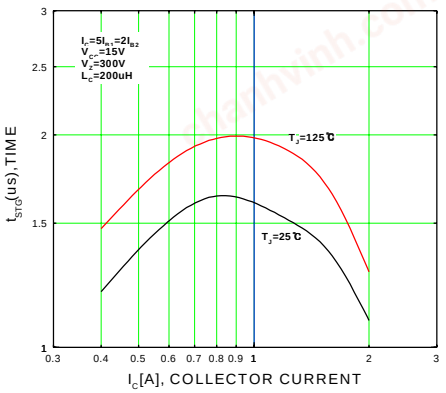


Figure 14. Inductive Switching Time, t_{STG}

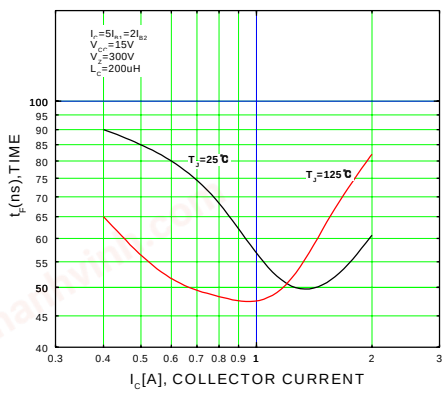


Figure 15. Inductive Switching Time, t_F

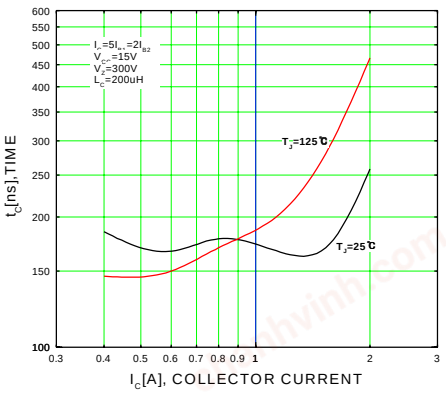


Figure 16. Inductive Switching Time, t_c

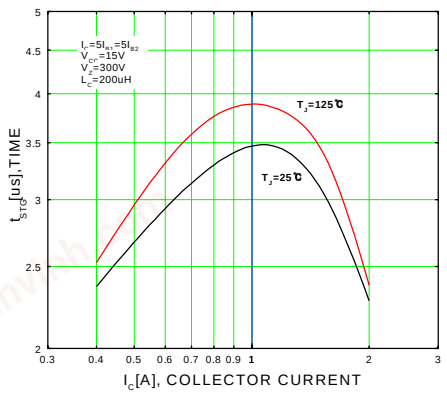


Figure 17. Inductive Switching Time, t_{STG}

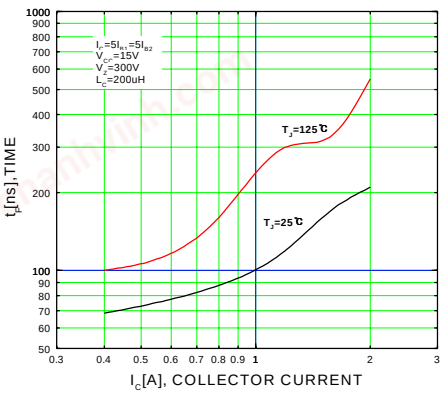


Figure 18. Inductive Switching Time, t_F

©2001 Fairchild Semiconductor Corporation

chanhvinh.com

Typical Characteristics (Continued)

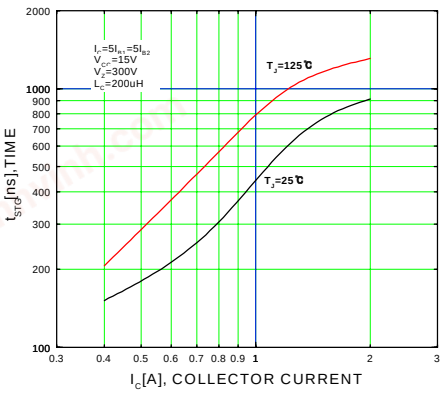


Figure 19. Inductive Switching Time, t_c

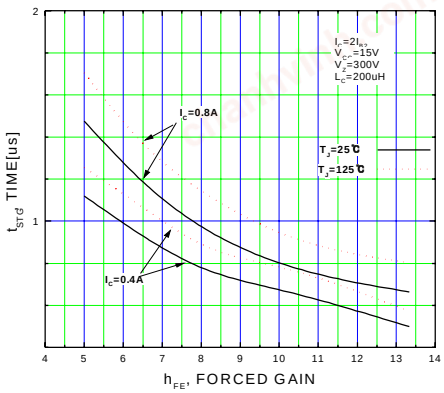


Figure 20. Inductive Switching Time, t_{STG}

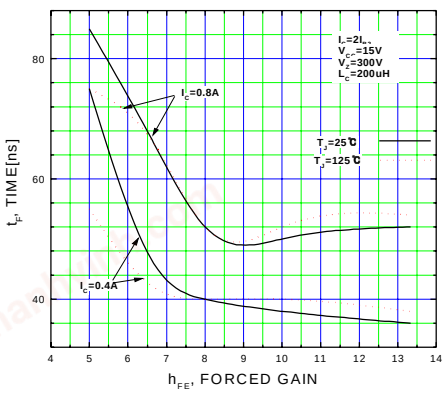


Figure 21. Inductive Switching Time, t_F

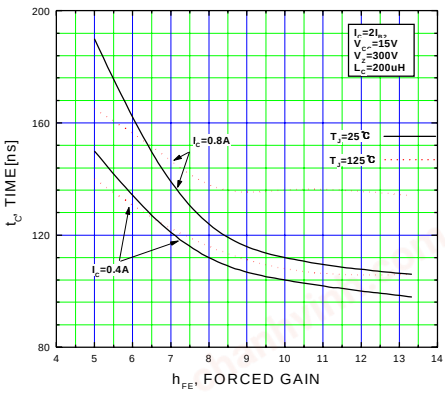


Figure 22. Inductive Switching Time, t_c

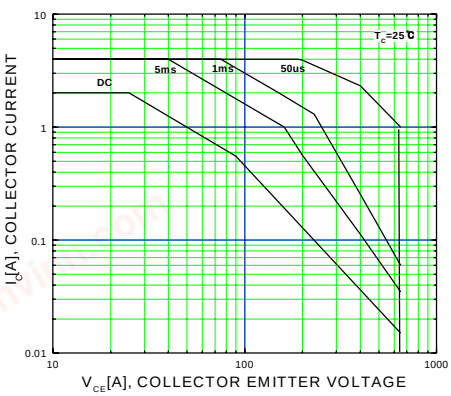


Figure 23. Forward Bias Safe Operating Area

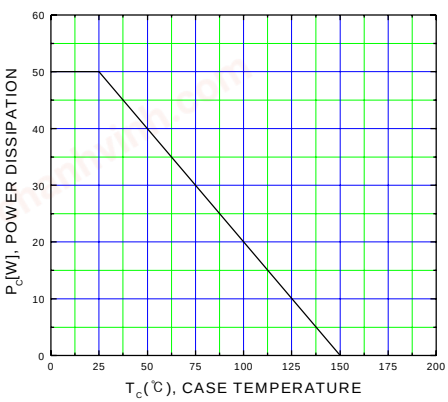


Figure 24. Power Derating

©2001 Fairchild Semiconductor Corporation

chanhvinh.com

Typical Characteristics (Continued)

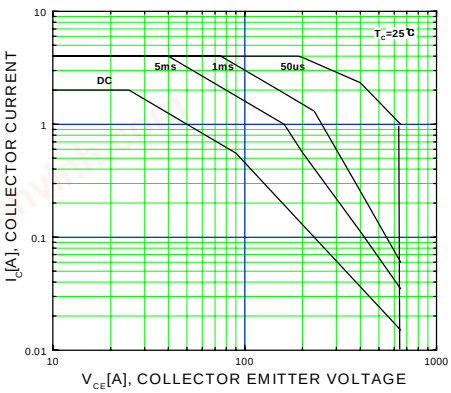


Figure 25. Forward Bias Safe Operating Area

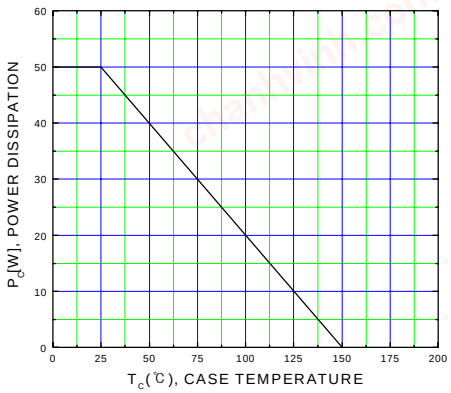


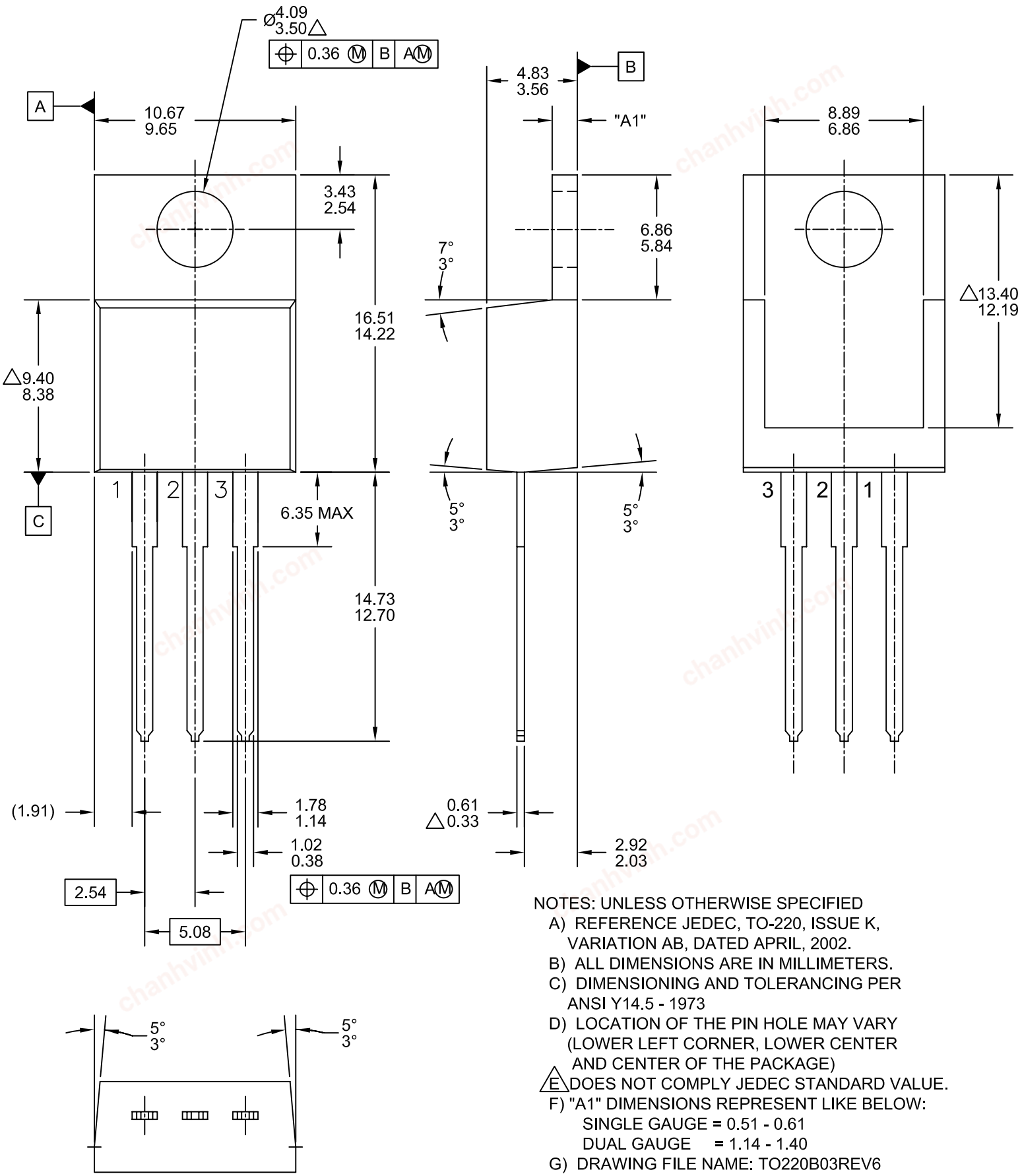
Figure 26. Power Derating

©2001 Fairchild Semiconductor Corporation

chanhvinh.com

TO-220

Dimensions are in mm



NOTES: UNLESS OTHERWISE SPECIFIED

A) REFERENCE JEDEC, TO-220, ISSUE K, VARIATION AB, DATED APRIL, 2002.

B) ALL DIMENSIONS ARE IN MILLIMETERS.

C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1973

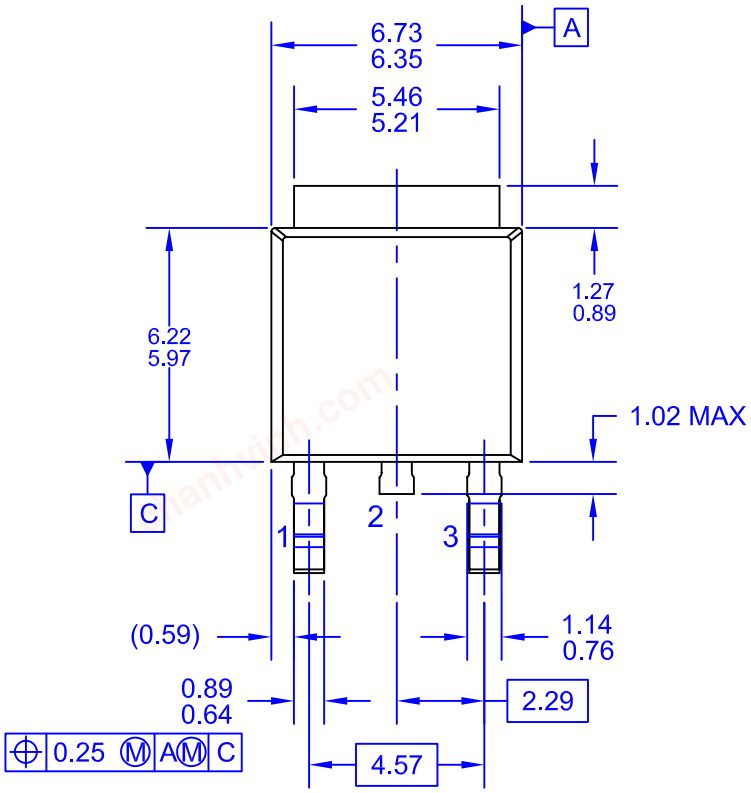
D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)

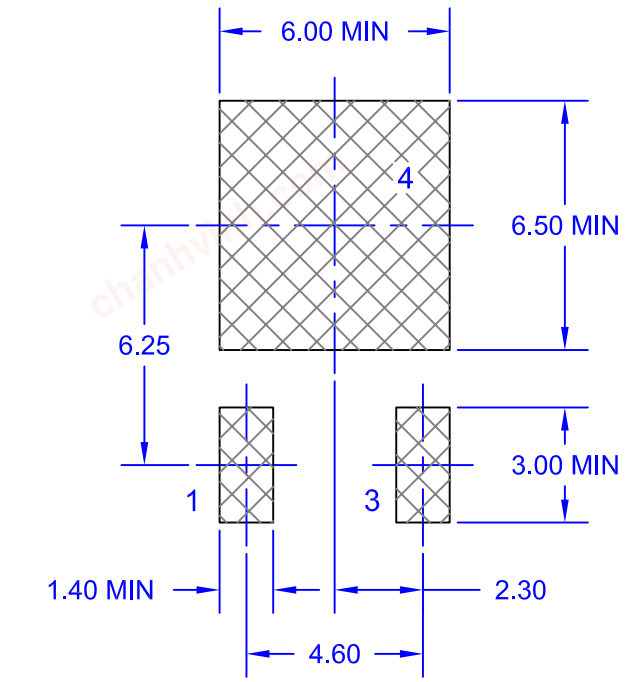
△E DOES NOT COMPLY JEDEC STANDARD VALUE.

F) "A1" DIMENSIONS REPRESENT LIKE BELOW:
SINGLE GAUGE = 0.51 - 0.61
DUAL GAUGE = 1.14 - 1.40

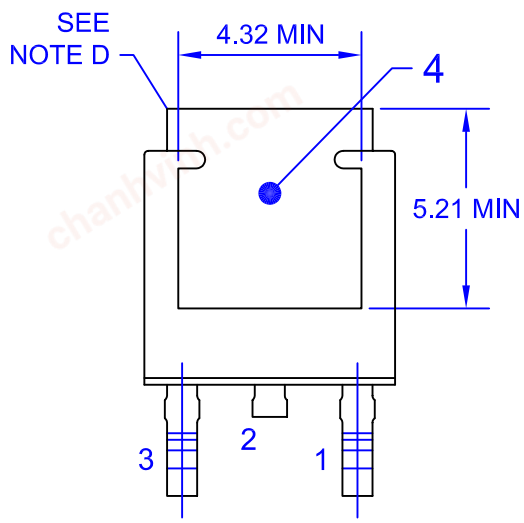
G) DRAWING FILE NAME: TO220B03REV6

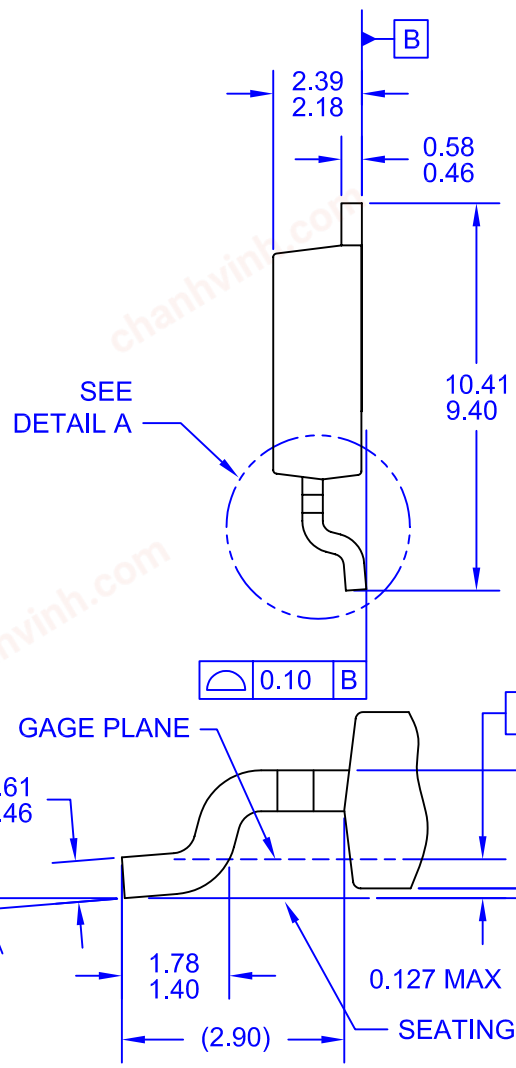
chanhvinh.com





LAND PATTERN RECOMMENDATION





NOTES: UNLESS OTHERWISE SPECIFIED

A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
D) HEAT SINK TOP EDGE COULD BE IN CHAMFERED CORNERS OR EDGE PROTRUSION.
E) PRESENCE OF TRIMMED CENTER LEAD IS OPTIONAL.
F) DIMENSIONS ARE EXCLUSSIVE OF BURSS, MOLD FLASH AND TIE BAR EXTRUSIONS.
G) LAND PATTERN RECOMENDATION IS BASED ON IPC7351A STD TO220P1003X238-3N.
H) DRAWING NUMBER AND REVISION: MKT-TO252A03REV8

chanhvinh.com

FAIRCHILD SEMICONDUCTOR®

TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

2Cool™
AccuPower™
AX-CAP®*
BitSiC™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
ESBC™
F®
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FETBench™
FPS™
F-PFS™
FRFET®
Global Power Resource SM
GreenBridge™
Green FPS™
Green FPS™ e-Series™
G*max*™
GTO™
IntelliMAX™
ISOPLANAR™
Making Small Speakers Sound Louder and Better™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
mWSaver™
OptoHiT™
OPTOLOGIC®
OPTOPLANAR®
PowerTrench®
PowerXS™
Programmable Active Droop™
QFET®
QS™
Quiet Series™
RapidConfigure™
™
Saving our world, 1mW/W/kW at a time™
SignalWise™
SmartMax™
SMART START™
Solutions for Your Success™
SPM®
STEALTH™
SuperFET®
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SupreMOS®
SyncFET™
Sync-Lock™
SYSTEM GENERAL®*
TinyBoost™
TinyBuck™
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
TranSiC™
TriFault Detect™
TRUECURRENT®*
µSerDes™
SerDes™
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
VoltagePlus™
XS™

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

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. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

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, and (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 a significant injury of the user.
2. A critical component in 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.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I64

© Fairchild Semiconductor Corporation