Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

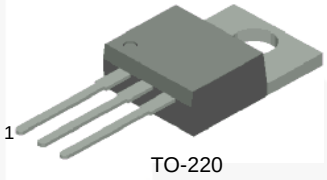
FAIRCHILD SEMICONDUCTOR®

January 2014

KSC5502
NPN Planar Silicon Transistor

Features

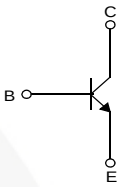
- High-Voltage Power Switch Mode Application
- Small Variance in Storage Time
- Wide Safe Operating Area
- Suitable for Electronic Ballast Application



TO-220

1.Base 2.Collector 3.Emitter

Equivalent Circuit



Ordering Information

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

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
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)(1)	4	A
I_B	Base Current (DC)	1	A
I_{BP}	Base Current (Pulse)(1)	2	A
T_J	Junction Temperature	150	°C
T_{STG}	Storage Junction Temperature Range	-65 to +150	°C
EAS	Avalanche Energy (T_J = 25°C)	2.5	mJ

Notes:

1. Pulse test: pulse width = 5 ms, duty cycle ≤ 10%

Thermal Characteristics

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Max.	Unit
P_C	Collector Dissipation (T_C = 25°C)	50	W
$R_{\theta JC}$(2)	Thermal Resistance, Junction to Case	2.5	°C/W
$R_{\theta JA}$(3)	Thermal Resistance, Junction to Ambient	85	°C/W

Notes:

2. $R_{\theta JC}$ test fixture under infinite cooling condition.

3. $R_{\theta JA}$ test board and fixture under natural convection, JESD51-10 recommended thermal test board.

Electrical Characteristics(4)

Values are at T_C = 25°C unless otherwise noted.

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
BV_{CBO}	Collector-Base Breakdown Voltage	I_C = 1 mA, I_E = 0		1200	1350		V
BV_{CEO}	Collector-Emitter Breakdown Voltage	I_C = 5 mA, I_B = 0		600	750		V
BV_{EBO}	Emitter-Base Breakdown Voltage	I_E = 500 µA, I_C=0		12.0	13.2		V
I_{CES}	Collector Cut-Off Current	V_{CES} = 1200 V, V_{BE} = 0	T_C = 25°C			100	µA
			T_C = 125°C			500	
I_{CEO}	Collector Cut-Off Current	V_{CE} = 600 V, I_B = 0	T_C = 25°C			100	µA
			T_C = 125°C			500	
I_{EBO}	Emitter Cut-Off Current	V_{EB} = 12 V, I_C = 0	T_C = 25°C			10	µA
h_{FE}	DC Current Gain	V_{CE} = 1 V, I_C = 0.2 A	T_C = 25°C	15	28	40	
			T_C = 125°C	8	27		
		V_{CE} = 1 V, I_C = 1 A	T_C = 25°C	4.0	8.7		
			T_C = 125°C	3.0	6.6		
		V_{CE} = 2.5 V, I_C = 0.5 A	T_C = 25°C	12	20	30	
			T_C = 125°C	6	16		
V_{CE}(sat)	Collector-Emitter Saturation Voltage	I_C = 0.2 A, I_B = 0.02 A	T_C = 25°C		0.09	0.80	V
			T_C = 125°C		0.13	1.10	
		I_C = 0.4 A, I_B = 0.08 A	T_C = 25°C		0.08	0.60	
			T_C = 125°C		0.12	1.00	
		I_C = 1 A, I_B = 0.2 A	T_C = 25°C		0.19	1.50	
			T_C = 125°C		0.35	3.00	
V_{BE}(sat)	Base-Emitter Saturation Voltage	I_C = 0.4 A, I_B = 0.08 A	T_C = 25°C		0.77	1.00	V
			T_C = 125°C		0.65	0.90	
		I_C = 1 A, I_B = 0.2 A	T_C = 25°C		0.83	1.20	
			T_C = 125°C		0.70	1.00	
C_{ib}	Input Capacitance	V_{EB} = 8 V, I_C = 0, f = 1 MHz			410	500	pF
C_{ob}	Output Capacitance	V_{CB} = 10 V, I_E = 0, f = 1 MHz			20	100	pF

Note:

4. Pulse test : pulse width = 5 ms, duty cycle ≤ 10%

Electrical Characteristics (Continued)

Values are at T_C = 25°C unless otherwise noted.

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

Typical Performance Characteristics

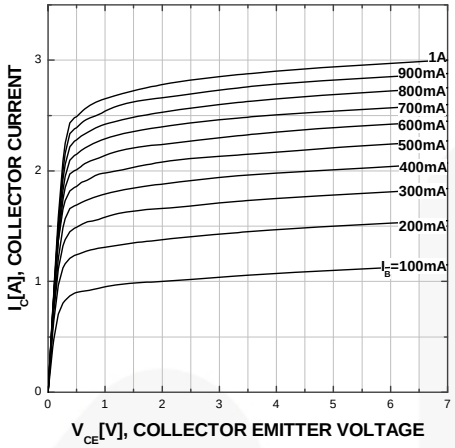


Figure 1. Static Characteristic

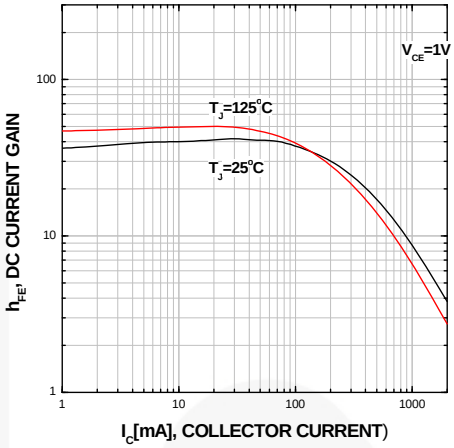


Figure 2. DC current Gain

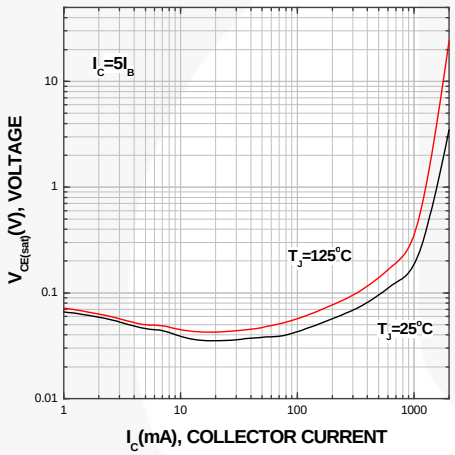


Figure 3. Collector-Emitter Saturation Voltage

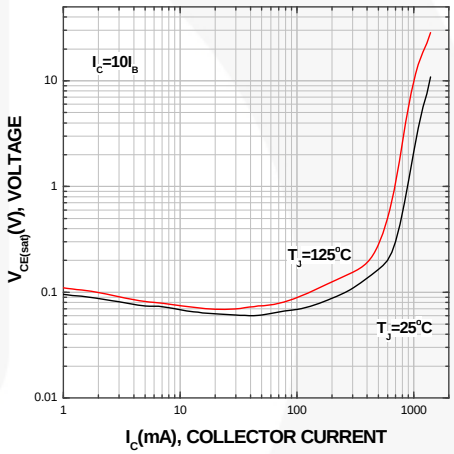


Figure 4. Collector-Emitter Saturation Voltage

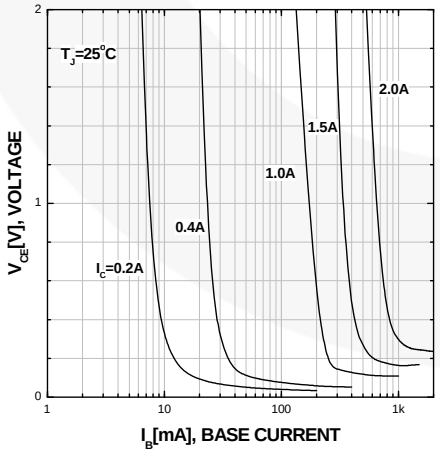


Figure 5. Typical Collector Saturation Voltage

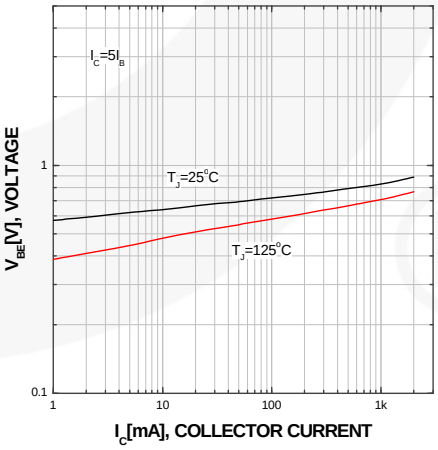


Figure 6. Base-Emitter Saturation Voltage

Typical Performance Characteristics (Continued)

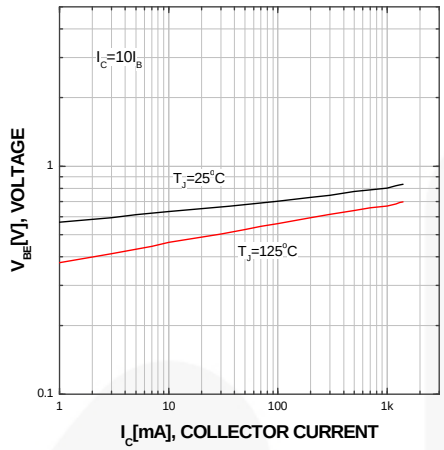


Figure 7. Base-Emitter Saturation Voltage

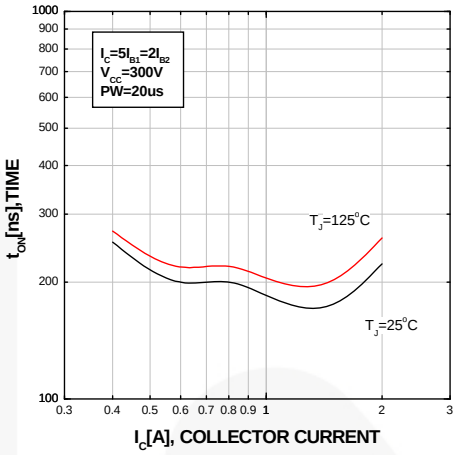


Figure 8. Resistive Switching Time, t_{on}

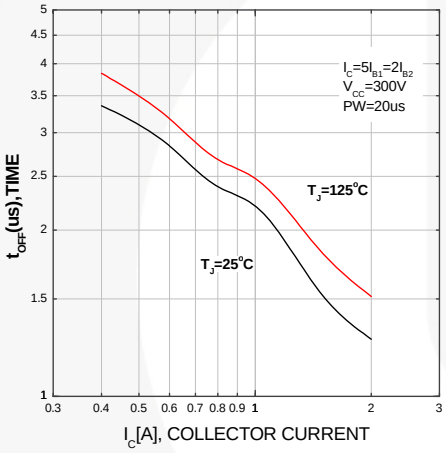


Figure 9. Resistive Switching Time, t_{off}

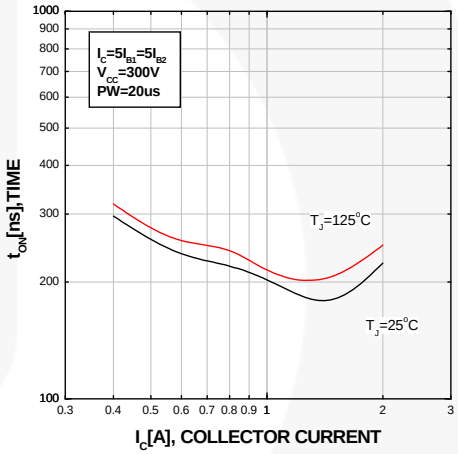


Figure 10. Resistive Switching Time, t_{on}

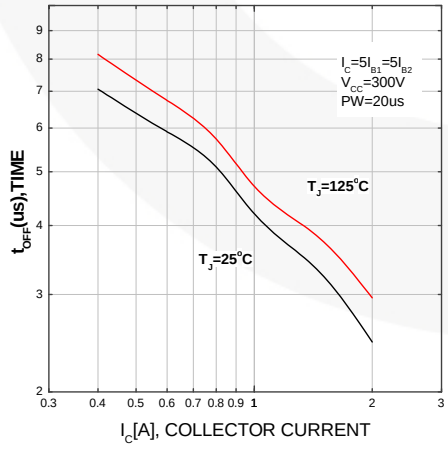


Figure 11. Resistive Switching Time, t_{off}

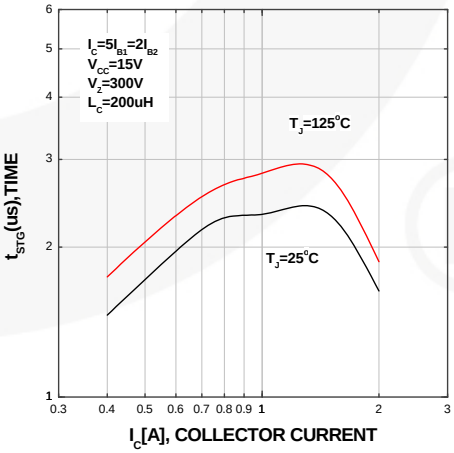


Figure 12. Inductive Switching Time, t_{STG}

Typical Performance Characteristics (Continued)

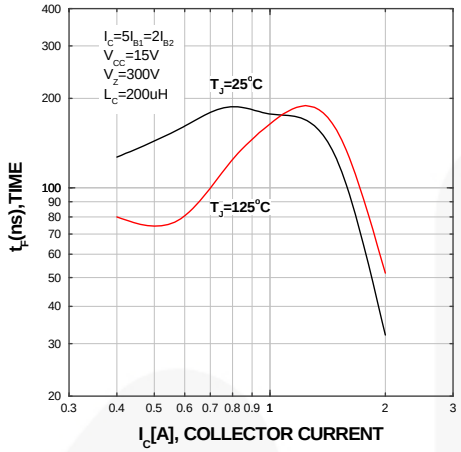


Figure 13. Inductive Switching Time, t_F

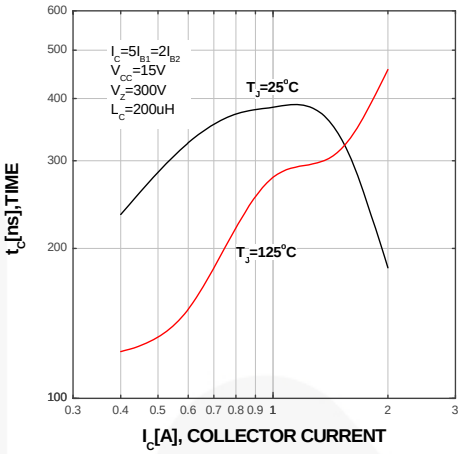


Figure 14. Inductive Switching Time, t_C

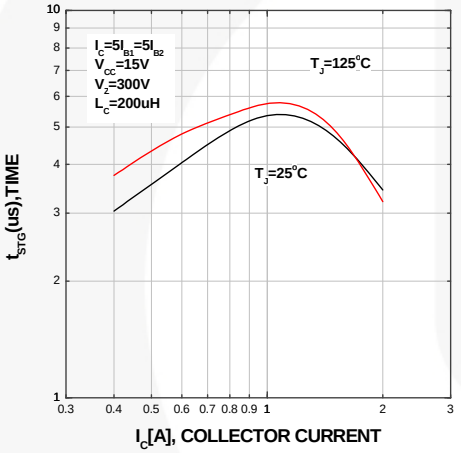


Figure 15. Inductive Switching Time, t_{STG}

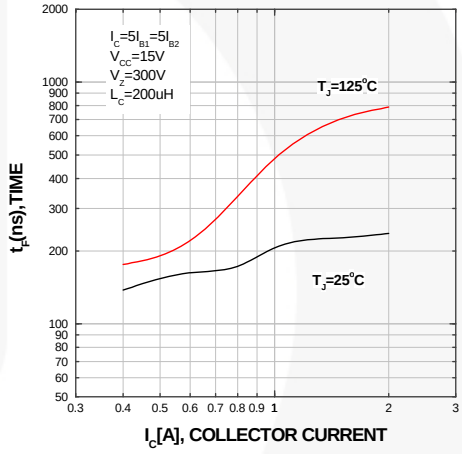


Figure 16. Inductive Switching Time, t_F

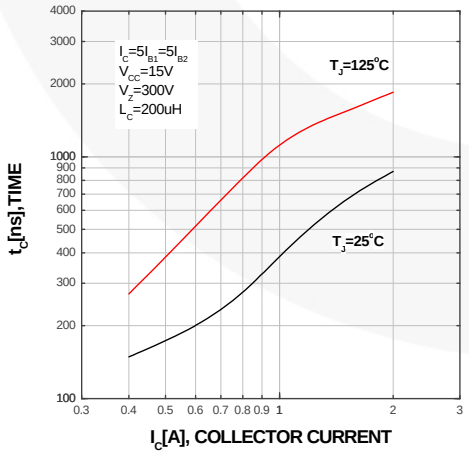


Figure 17. Inductive Switching Time, t_c

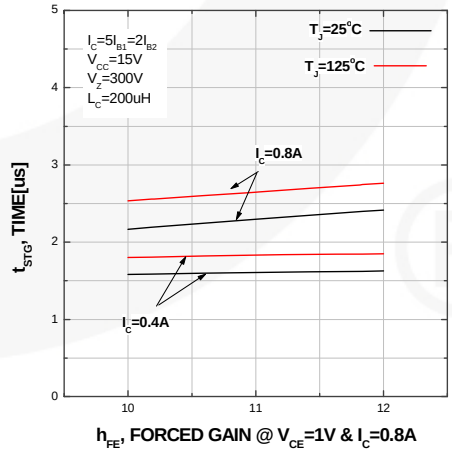


Figure 18. Inductive Switching Time, t_{STG}

Typical Performance Characteristics (Continued)

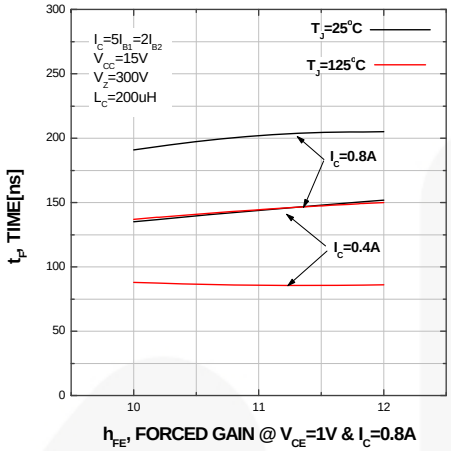


Figure 19. Inductive Switching Time, t_F

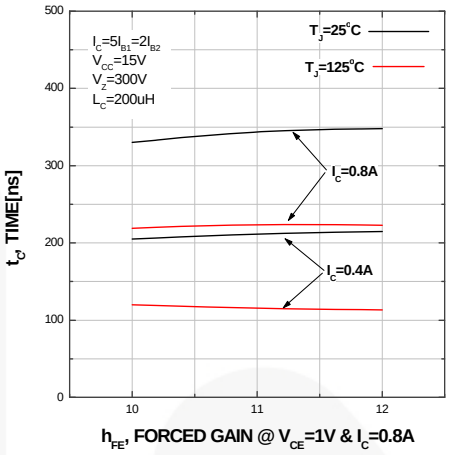


Figure 20. Inductive Switching Time, t_C

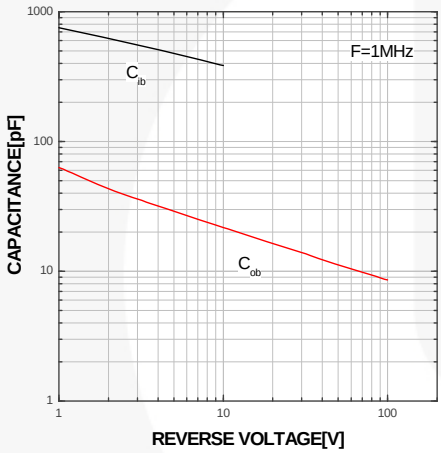


Figure 21. Capacitance

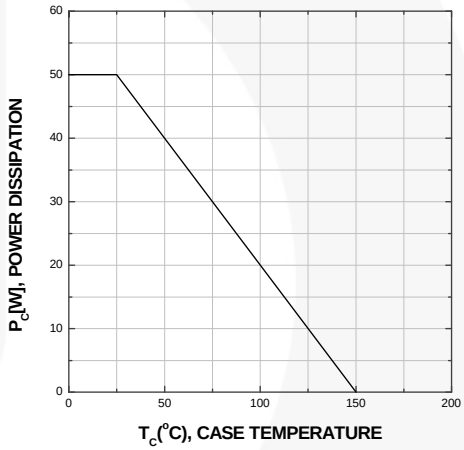


Figure 22. Power Derating

Physical Dimensions

TO-220

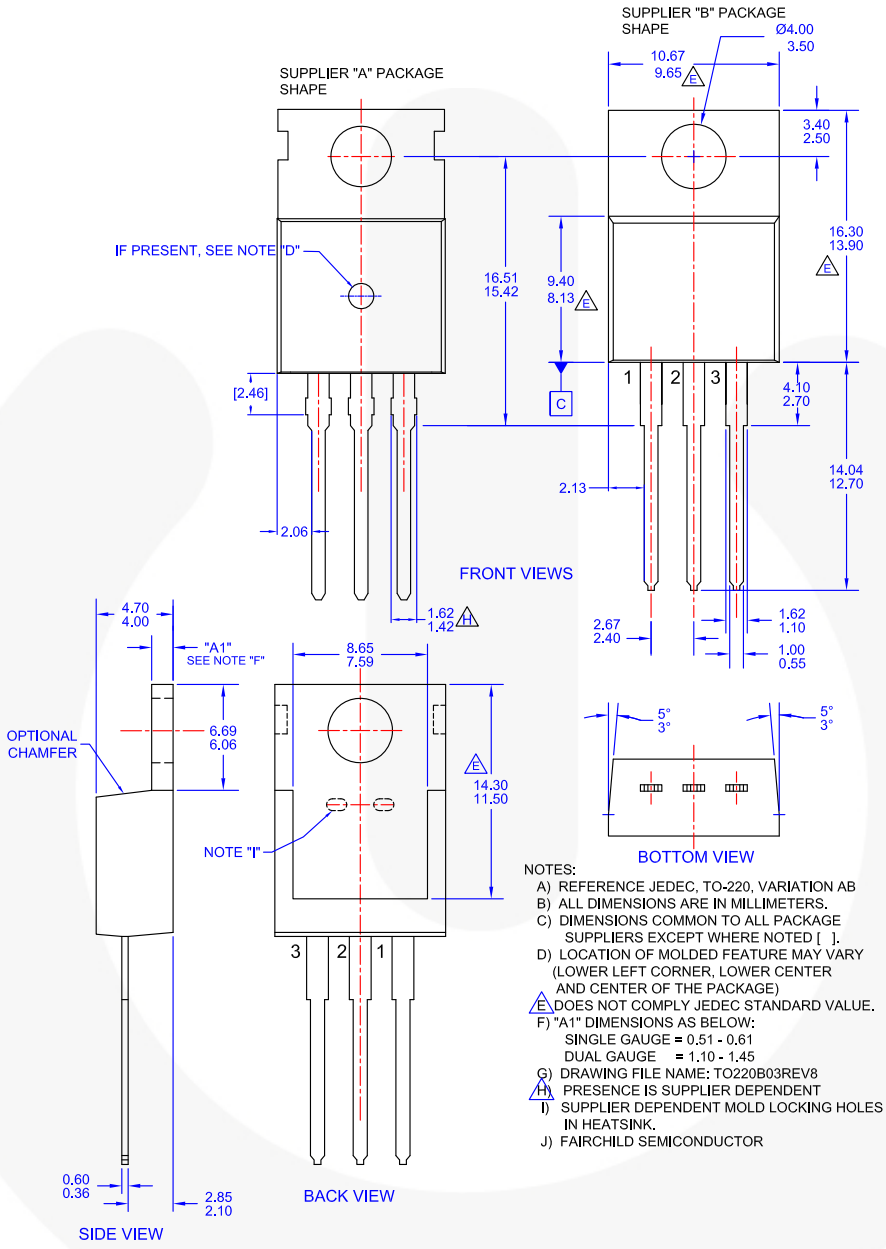


Figure 23. TO-220, MOLDED, 3-LEAD, JEDEC VARIATION AB (ACTIVE)

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:
http://www.fairchildsemi.com/dwg/TO/TO220B03.pdf.

For current tape and reel specifications, visit Fairchild Semiconductor's online packaging area:
http://www.fairchildsemi.com/packing_dwg/PKG-TO220B03.pdf.

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.

AccuPower™
AX-CAP®*
BitSiC™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
ESBC™
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FETBench™
FPS™
F-PFS™
FRFET®
Global Power Resource℠
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™
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. I66

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative