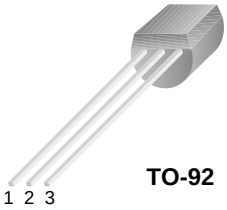
FAIRCHILD SEMICONDUCTOR®

August 2006

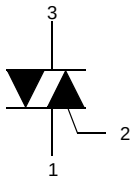
FKN08PN40
TRIAC (Silicon Bidirectional Thyristor)

Application Explanation

- Switching mode power supply, light dimmer, electric flasher unit, hair drier
- TV sets, stereo, refrigerator, washing machine
- Electric blanket, solenoid driver, small motor control
- Photo copier, electric tool



TO-92



1: T_1
2: Gate
3: T_2

Absolute Maximum Ratings

T_a = 25°C unless otherwise noted

Symbol	Parameter	Value		Rating	Units
V_{DRM} V_{RRM}	Peak Repetitive Off-State Voltage	Sine Wave 50 to 60Hz, Gate Open		400	V
$I_{T\ (RMS)}$	RMS On-State Current	Commercial frequency, sine full wave 360° conduction, Tc= 70 ℃		0.8	A
I_{TSM}	Surge On-State Current	Sinewave 1 full cycle, peak value, non-repetitive	50Hz	8	A
			60Hz	9	A
I^2t	I^2t for Fusing	Value corresponding to 1 cycle of halfwave, surge on-state current, tp=8.4ms		0.33	A^2s
P_{GM}	Peak Gate Power Dissipation			5	W
$P_{G\ (AV)}$	Average Gate Power Dissipation			0.1	W
V_{GM}	Peak Gate Voltage			5	V
I_{GM}	Peak Gate Current			1	A
T_J	Junction Temperature			- 40 ~ 125	°C
T_{STG}	Storage Temperature			- 40 ~ 125	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case (note1)	40	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (note2)	160	°C/W

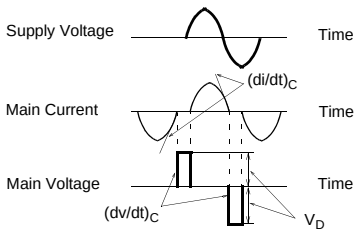
Note1: Infinite cooling condition.

Note2: JESD51-10 (Test Borad: FR4 3.0"*4.5"*0.062", Minimum land pad)

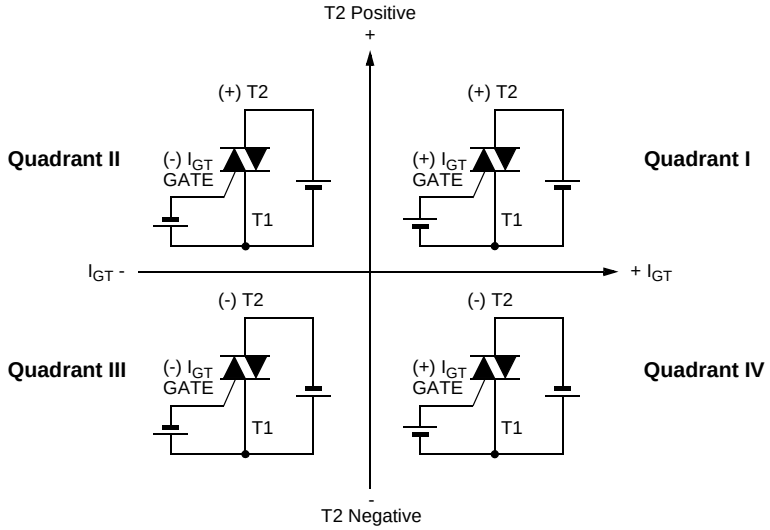
Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter		Test Condition		Min.	Typ.	Max.	Units
I_{DRM} I_{RRM}	Repetieive Peak Off-State Current		V_{DRM}/V_{RRM} applied		-	-	100	μA
V_{TM}	On-State Voltage		T_C=25°C, I_{TM}=1.12A Instantaneous measurement		-	-	1.8	V
V_{GT}	Gate Trigger Voltage	I	V_D=12V, R_L=100Ω	T2(+), Gate (+)	-	-	2.0	V
		II		T2(+), Gate (-)	-	-	2.0	V
		III		T2(-), Gate (-)	-	-	2.0	V
I_{GT}	Gate Trigger Current	I	V_D=12V, R_L=100Ω	T2(+), Gate (+)	-	-	5	mA
		II		T2(+), Gate (-)	-	-	5	mA
		III		T2(-), Gate (-)	-	-	5	mA
V_{GD}	Gate Non-Trigger Voltage		T_J=125°C, V_D=1/2V_{DRM}		0.2	-	-	V
I_H	Holding Current (I, II,III)		V_D = 12V, I_{TM} = 200mA		-	-	15	mA
I_L	Latching Current	I, III	V_D = 12V, I_G = 10mA		-	-	15	mA
		II			-	-	20	mA
dv/dt(s)	Critical Rate of Rise of Off-State Voltag		V_{DRM} = 63% Rated, T_j = 125°C, Exponential Rise		20	-	-	V/μs
dv/dt(c)	Critical-Rate of Rise of Off-State Commutating Voltage (di/dt=-0.7A/mS)				3.0	-	-	V/μs

Commutation dv/dt Test

V_{DRM} (V)	Test Condition	Commutating voltage and current waveforms (inductive load)
FKN08PN40	1. Junction Temperature T_J=125°C 2. Rate of decay of on-state commutating current $(di/dt)_C$ 3. Peak off-state voltage V_D = 200V	

Quadrant Definitions for a Triac



Package Marking and Ordering Information

Device Marking	Device	Package	Packing	Tape Width	Quantity
K08PN40	FKN08PN40	TO-92	Bulk	--	--

Typical Performance Characteristics

Figure 1. On-State Characteristics

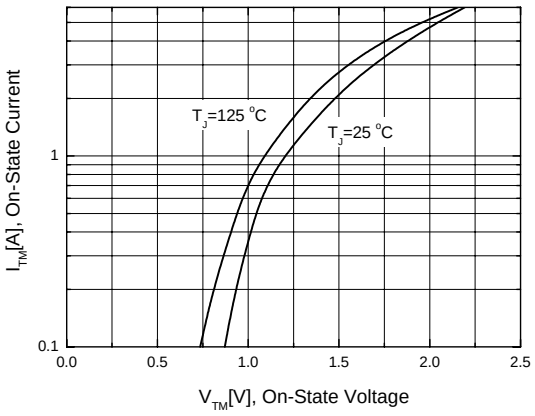


Figure 2. Power Dissipation

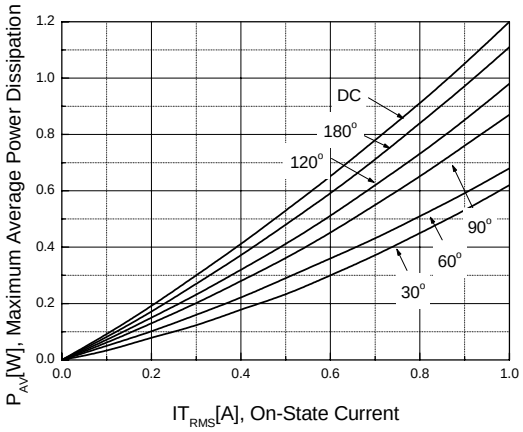


Figure 3. RMS Current Rating

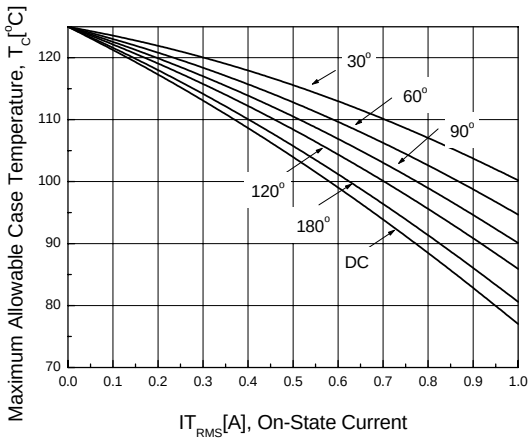


Figure 4. Typical Gate Trigger Current vs Junction Temperature

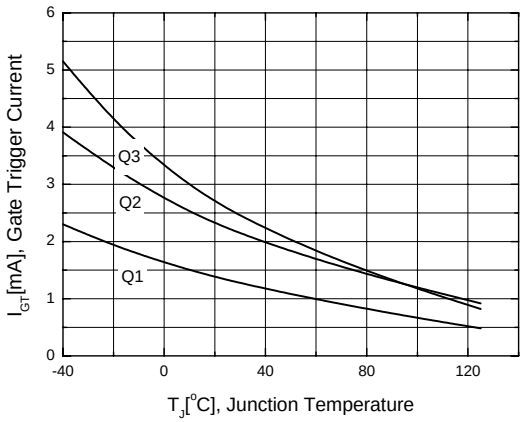


Figure5. Typical Gate Voltage vs Junction Temperarure

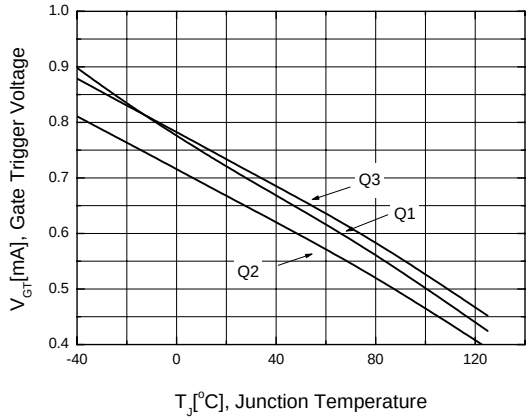
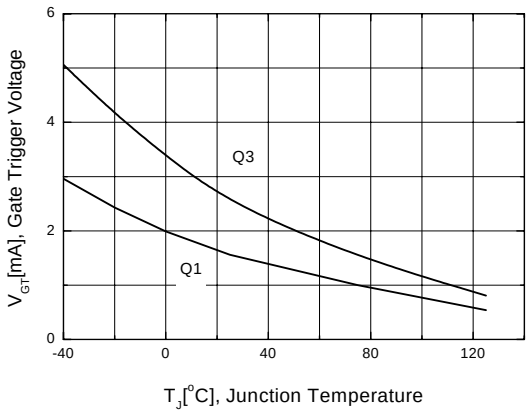


Figure6. Typical Latching Currrent vs Junction Temperature



Typical Performance Characteristics (Continued)

Figure7. Typical Holding Current vs Junction Temperature

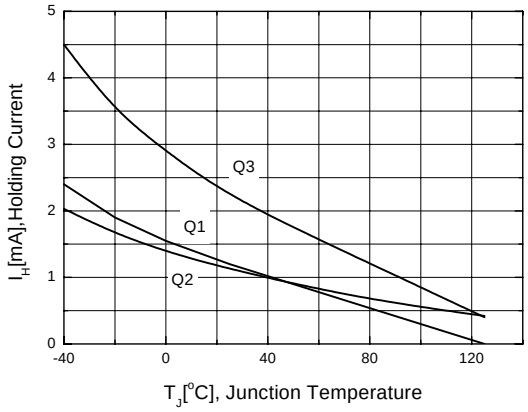
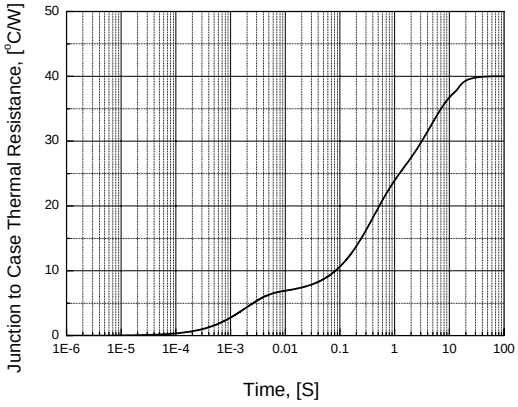
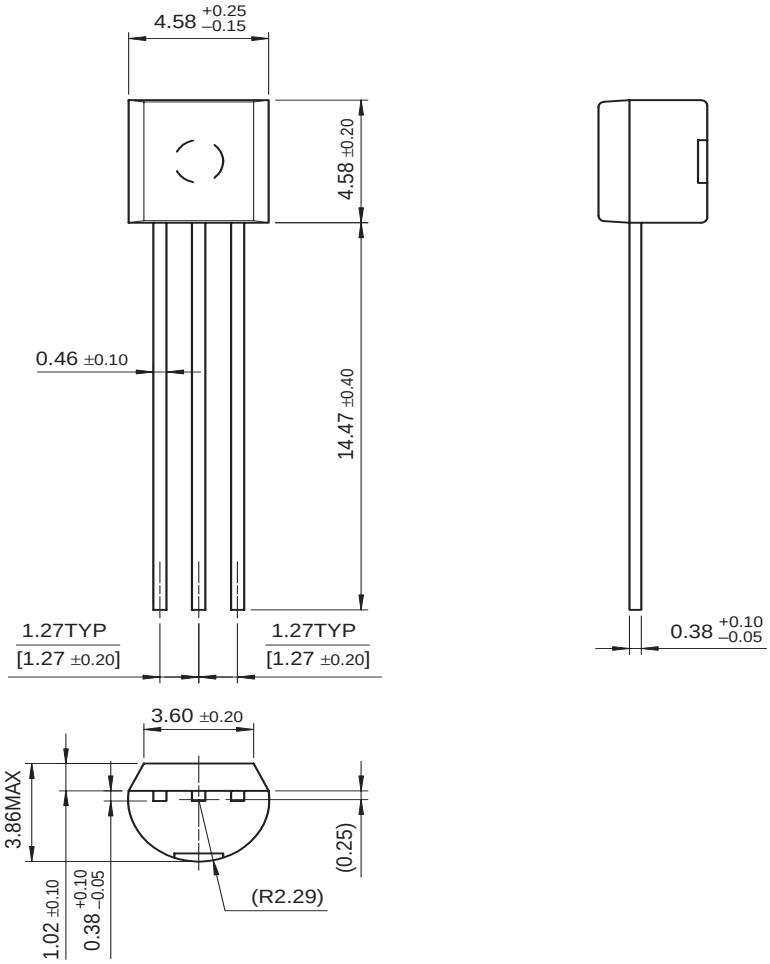


Figure8. Junction to Case Thermal Resistance



Package Dimension

TO-92



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™
ActiveArray™
Bottomless™
Build it Now™
CoolFET™
CROSSVOLT™
DOME™
EcoSPARK™
E^2CMOS™
EnSigna™
FACT™
FAST®
FASTr™
FPS™
FRFET™
FACT Quiet Series™
GlobalOptoisolator™
GTO™
HiSeC™
I^2C™
i-Lo™
ImpliedDisconnect™
IntelliMAX™
ISOPLANAR™
LittleFET™
MICROCOUPLER™
MicroFET™
MicroPak™
MICROWIRE™
MSX™
MSXPro™
OCX™
OCXPro™
OPTOLOGIC®
OPTOPLANAR™
PACMAN™
POP™
Power247™
PowerEdge™
PowerSaver™
PowerTrench®
QFET®
QS™
QT Optoelectronics™
Quiet Series™
RapidConfigure™
RapidConnect™
μSerDes™
ScalarPump™
SILENT SWITCHER®
SMART START™
SPM™
Stealth™
SuperFET™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SyncFET™
TCM™
TinyBoost™
TinyBuck™
TinyPWM™
TinyPower™
TinyLogic®
TINYOPTO™
TruTranslation™
UHC™
UltraFET®
UniFET™
VCX™
Wire™

Across the board. Around the world.™
The Power Franchise®
Programmable Active Droop™

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, 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.

Rev. I20