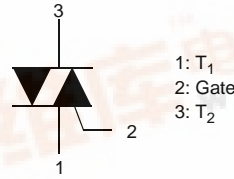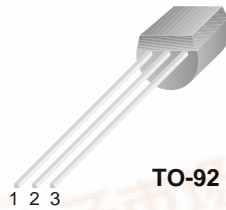**FAIRCHILD**
SEMICONDUCTOR®

February 2008

FKN08PN60S
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 2 3

3

1: T_1
2: Gate
3: T_2

2

1

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		600	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 half cycle, peak value, non-repetitive	60Hz	8	A
I^2t	I^2t for Fusing	Value corresponding to halfwave, surge on-state current, tp=8.33ms		0.26	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]	45	°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 (Note 2)	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 (Note 2)	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/uS)				3.0	-	-	V/μs

Commutation dv/dt test

V_{DRM} (V)	Test Condition	Commutating voltage and current waveforms (inductive load)
FKN08PN60S	1. Junction Temperature $T_J=125°C$ 2. Rate of decay of on-state commutating current $(di/dt)_C$ 3. Peak off-state voltage $V_D = 300V$	

Quadrant Definitions for a Triac
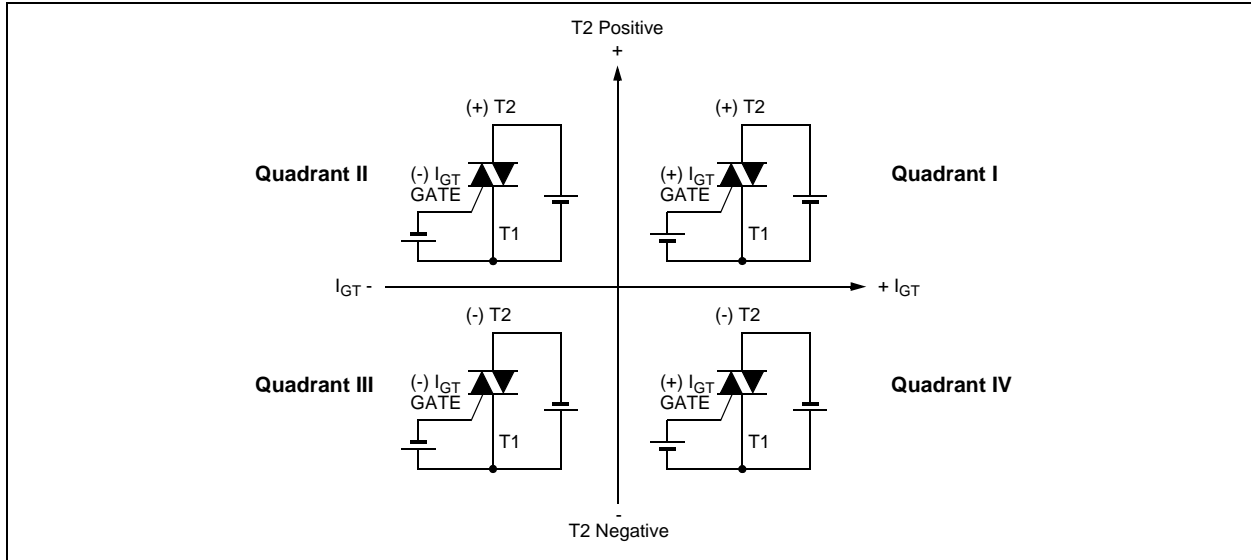
Package Marking and Ordering Information

Device Marking	Device	Package	Packing	Tape Width	Quantity
K08PN60S	FKN08PN60S	TO-92	BULK	--	--

Typical Performance Characteristics

Figure 1. On-State Characteristics

$T_J = 125\,^{\circ}C$ $T_J = 25\,^{\circ}C$

I_{TM}[A], On-State Current

V_{TM}[V], On-State Voltage
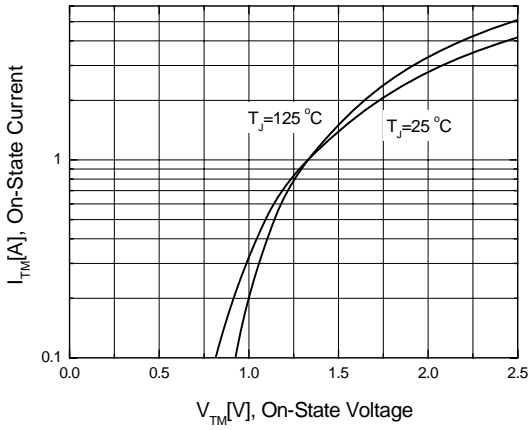
Figure 2. Power Dissipation

DC
180°
120°
90°
60°
30°

P_{AV}[W], Maximum Average Power Dissipation

IT_{RMS}[A], On-State Current
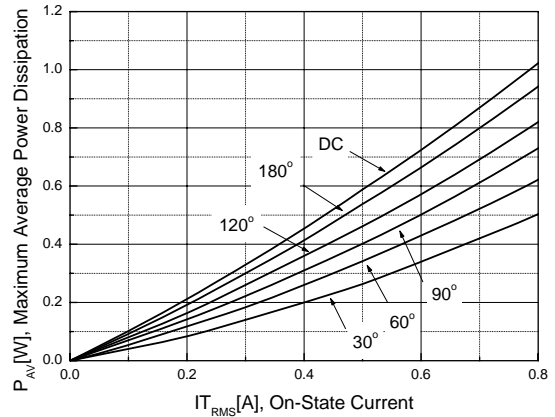
Figure 3. RMS Current Rating

30°   60°   90°   120°   180°   DC

Maximum Allowable Case Temperature, T_C[$^{\circ}$C]

IT_{RMS}[A], On-State Current
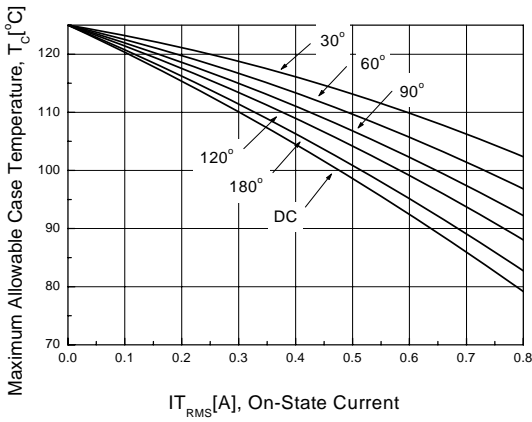
Figure 4. Typical Gate Trigger Current vs Junction Temperature

Q3   Q2   Q1

I_{GT}[mA], Gate Trigger Current

T_J[$^{\circ}$C], Junction Temperature
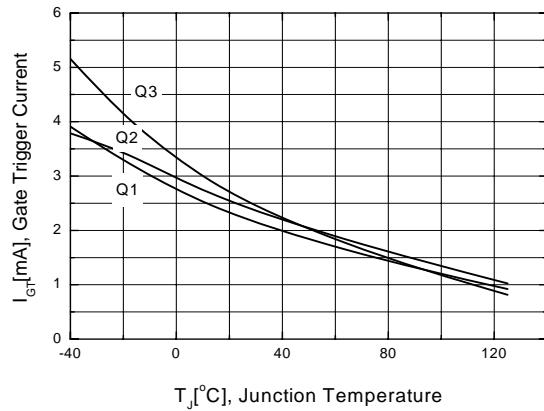
Figure5. Typical Gate Voltage vs Junction Temperarure

Q3   Q1   Q2

V_{GT}[mA], Gate Trigger Voltage

T_J[$^{\circ}$C], Junction Temperature
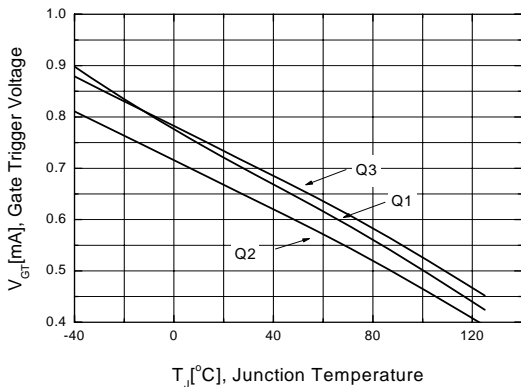
Figure6. Typical Latching Currrent vs Junction Temperature

Q3   Q1

I_L[mA], Latching Current

T_J[$^{\circ}$C], Junction Temperature
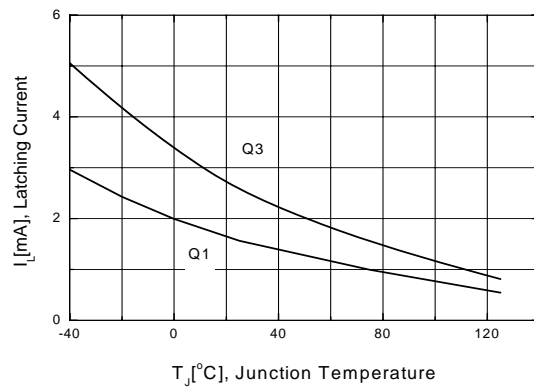
Typical Performance Characteristics (Continued)

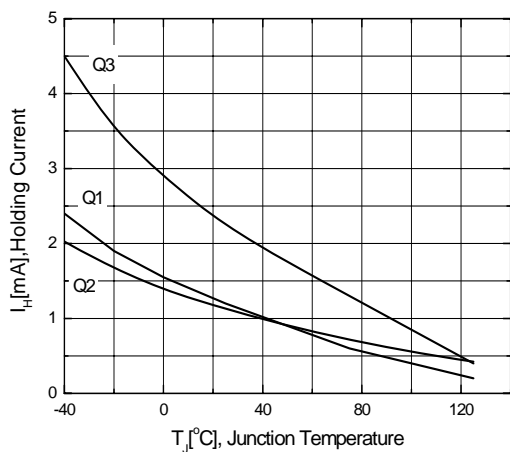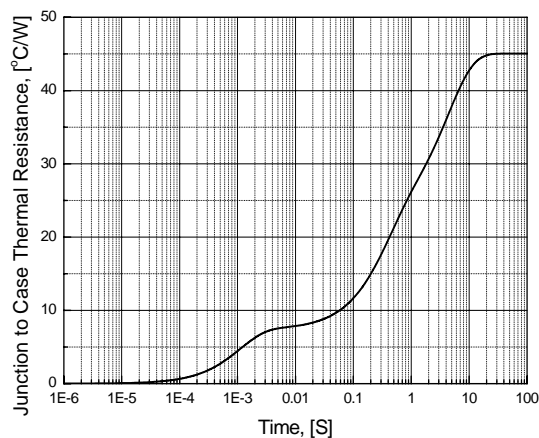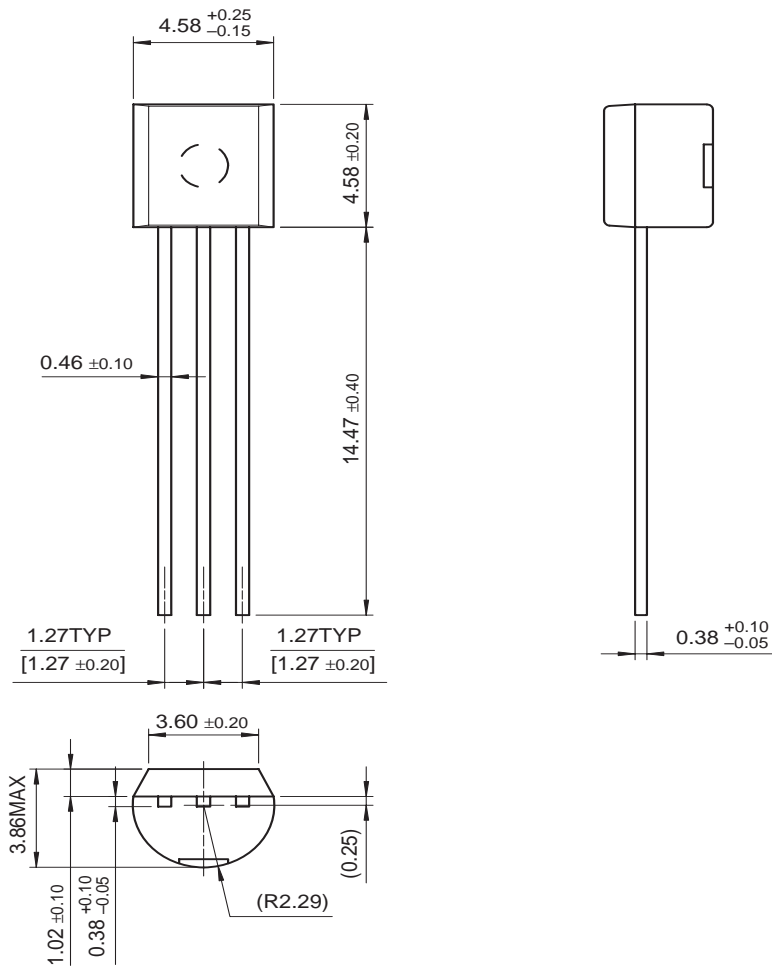**Figure7. Typical Holding Current
vs Junction Temperature**

Figure8. Junction to Case Thermal Resistance

Package Dimension

TO-92

4.58 $^{+0.25}_{-0.15}$

4.58 ±0.20

0.46 ±0.10

14.47 ±0.40

1.27TYP
[1.27 ±0.20]

1.27TYP
[1.27 ±0.20]

0.38 $^{+0.10}_{-0.05}$

3.60 ±0.20

3.86MAX

1.02 ±0.10

0.38 $^{+0.10}_{-0.05}$

(R2.29)

(0.25)

TRADEMARKS

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

ACEx®	Green FPS™	Power247®	SuperSOT™-8
Build it Now™	Green FPS™ e-Series™	POWEREDGE®	SyncFET™
CorePLUS™	GTO™	Power-SPM™	The Power Franchise®
CROSSVOLT™	i-Lo™	PowerTrench®	the power® franchise
CTL™	IntelliMAX™	Programmable Active Droop™	
Current Transfer Logic™	ISOPLANAR™	QFET®	TinyBoost™
EcoSPARK®	MegaBuck™	QS™	TinyBuck™
	MICROCOUPLER™	QT Optoelectronics™	TinyLogic®
Fairchild®	MicroFET™	Quiet Series™	TINYOPTO™
Fairchild Semiconductor®	MicroPak™	RapidConfigure™	TinyPower™
FACT Quiet Series™	MillerDrive™	SMART START™	TinyPWM™
FACT®	Motion-SPM™	SPM®	TinyWire™
FAST®	OPTOLOGIC®	STEALTH™	µSerDes™
FastvCore™	OPTOPLANAR®	SuperFET™	UHC®
FPS™	®	SuperSOT™-3	UniFET™
FRFET®	PDP-SPM™	SuperSOT™-6	VCX™
Global Power Resource℠	Power220®		

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 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; 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	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice 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. I31