



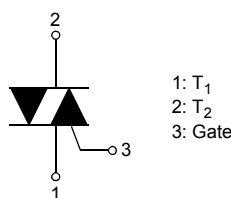
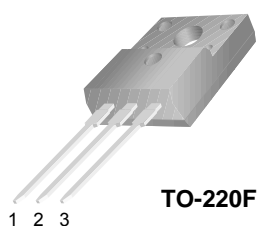
# THE DATASHEET OF FKPF12N80



# FKPF12N80

## 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



## Bi-Directional Triode Thyristor Planar Silicon

### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
$V_{\text{DRM}}$	Repetitive Peak Off-State Voltage (Note 1)	800	V

Symbol	Parameter	Conditions	Rating	Units	
$I_{\text{T(RMS)}}$	RMS On-State Current	Commercial frequency, sine full wave 360° conduction, $T_C=82^\circ\text{C}$	12	A	
$I_{\text{TSM}}$	Surge On-State Current	Sinewave 1 full cycle, peak value, non-repetitive	50Hz	120	A
			60Hz	132	A
$I^2t$	$I^2t$ for Fusing	Value corresponding to 1 cycle of halfwave, surge on-state current, $t_p=10\text{ms}$	72	$\text{A}^2\text{s}$	
$di/dt$	Critical Rate of Rise of On-State Current	$I_G = 2x I_{\text{GT}}$ , $t_r \leq 100\text{ns}$	50	$\text{A}/\mu\text{s}$	
$P_{\text{GM}}$	Peak Gate Power Dissipation		5	W	
$P_{\text{G(AV)}}$	Average Gate Power Dissipation		0.5	W	
$V_{\text{GM}}$	Peak Gate Voltage		10	V	
$I_{\text{GM}}$	Peak Gate Current		2	A	
$T_{\text{J}}$	Junction Temperature		- 40 ~ 125	$^\circ\text{C}$	
$T_{\text{STG}}$	Storage Temperature		- 40 ~ 125	$^\circ\text{C}$	
$V_{\text{iso}}$	Isolation Voltage	$T_a=25^\circ\text{C}$ , AC 1 minute, T <sub>1</sub> T <sub>2</sub> G terminal to case	1500	V	

## Thermal Characteristic

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$R_{\text{th(J-C)}}$	Thermal Resistance	Junction to case (Note 4)	-	-	3.0	$^\circ\text{C}/\text{W}$

### Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

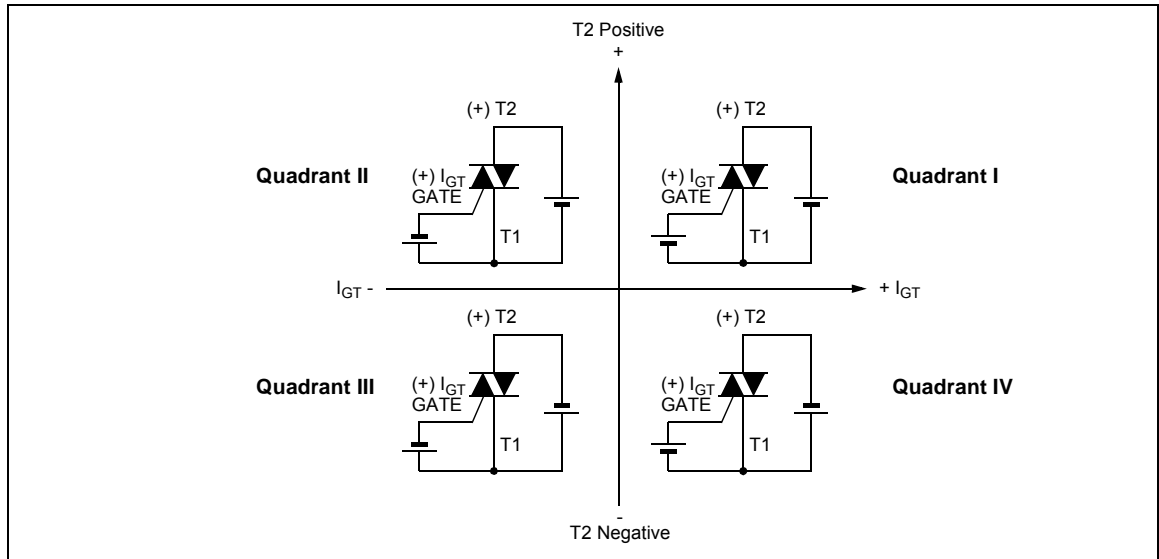
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units	
$I_{\text{DRM}}$	Repetitive Peak Off-State Current	$V_{\text{DRM}}$ applied	-	-	20	$\mu\text{A}$	
$V_{\text{TM}}$	On-State Voltage	$T_C=25^\circ\text{C}$ , $I_{\text{TM}}=17\text{A}$ Instantaneous measurement	-	-	1.5	V	
$V_{\text{GT}}$	Gate Trigger Voltage (Note 2)	$V_{\text{D}}=12\text{V}$ , $R_{\text{L}}=20\Omega$	T2(+), Gate (+)	-	-	1.5	V
			T2(+), Gate (-)	-	-	1.5	V
			T2(-), Gate (-)	-	-	1.5	V
$I_{\text{GT}}$	Gate Trigger Current (Note 2)	$V_{\text{D}}=12\text{V}$ , $R_{\text{L}}=20\Omega$	T2(+), Gate (+)	-	-	30	mA
			T2(+), Gate (-)	-	-	30	mA
			T2(-), Gate (-)	-	-	30	mA
$V_{\text{GD}}$	Gate Non-Trigger Voltage	$T_J=125^\circ\text{C}$ , $V_{\text{D}}=1/2V_{\text{DRM}}$	0.2	-	-	V	
$I_{\text{H}}$	Holding Current	$V_{\text{D}}=12\text{V}$ , $I_{\text{TM}}=1\text{A}$	-	-	50	mA	
$I_{\text{L}}$	Latching Current	$V_{\text{D}}=12\text{V}$ , $I_{\text{G}}=1.2I_{\text{GT}}$	I, III	-	-	50	mA
			II	-	-	70	mA
dv/dt	Critical Rate of Rise of Off-State Voltage	$V_{\text{DRM}} = \text{Rated}$ , $T_J = 125^\circ\text{C}$ , Exponential Rise	-	300	-	V/ $\mu\text{s}$	
$(dv/dt)_\text{C}$	Critical-Rate of Rise of Off-State Commutating Voltage (Note 3)		10	-	-	V/ $\mu\text{s}$	

**Notes:**

- Gate Open
- Measurement using the gate trigger characteristics measurement circuit
- The critical-rate of rise of the off-state commutating voltage is shown in the table below
- The contact thermal resistance  $R_{\text{TH}(C-F)}$  in case of greasing is  $0.5^\circ\text{C/W}$

$V_{\text{DRM}}$ (V)	Test Condition	Commutating voltage and current waveforms (inductive load)
FKPF12N80	<ol style="list-style-type: none"> <li>Junction Temperature <math>T_J=125^\circ\text{C}</math></li> <li>Rate of decay of on-state commutating current <math>(di/dt)_\text{C} = -6.5\text{A/ms}</math></li> <li>Peak off-state voltage <math>V_{\text{D}} = 400\text{V}</math></li> </ol>	

### Quadrant Definitions for a Triac



# Typical Curves

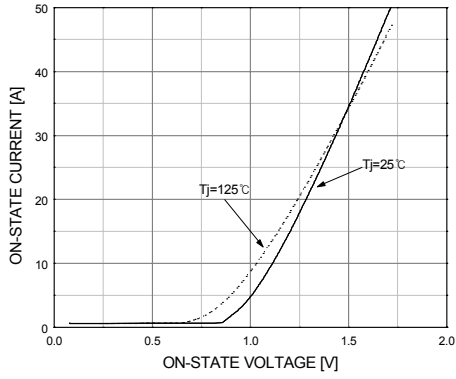


Figure 1. Maximum On-state Characteristics

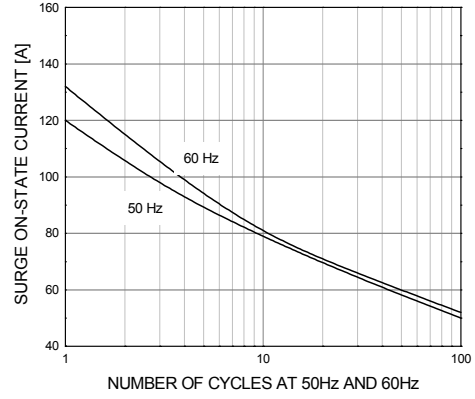


Figure 2. Rated Surge On-state Current

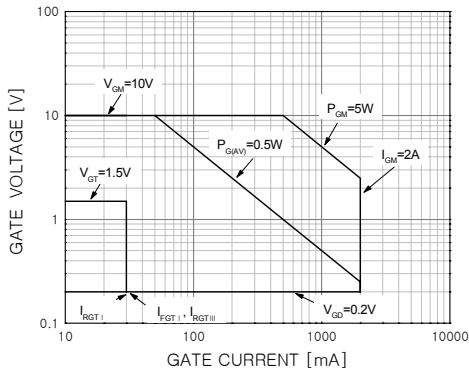


Figure 3. Gate Characteristics

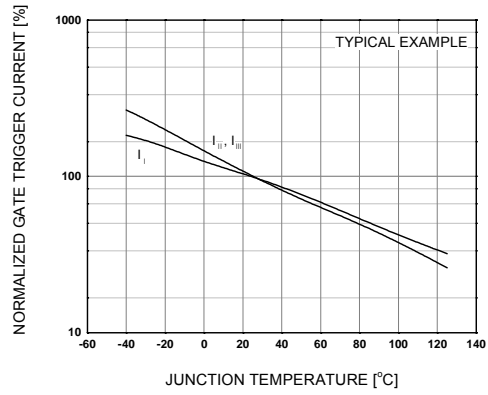


Figure 4. Gate Trigger Current vs Tj

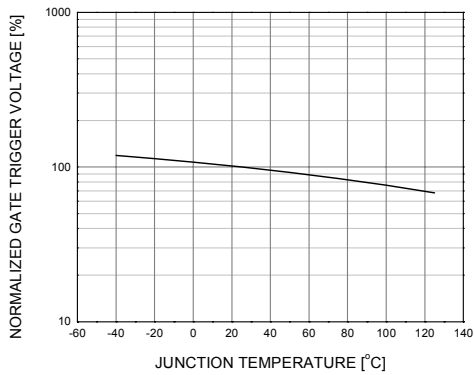


Figure 5. Gate Trigger Voltage vs Tj

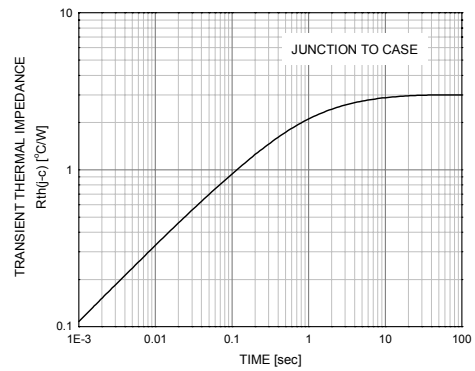
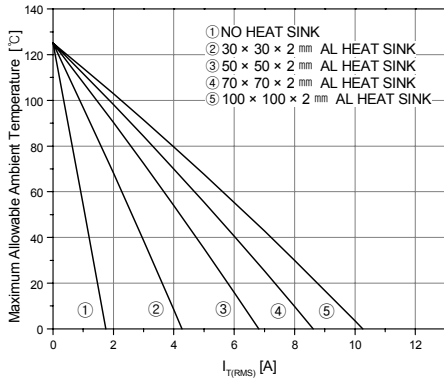
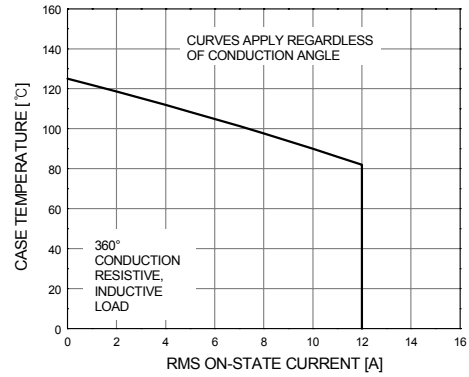


Figure 6. Transient Thermal Impedance

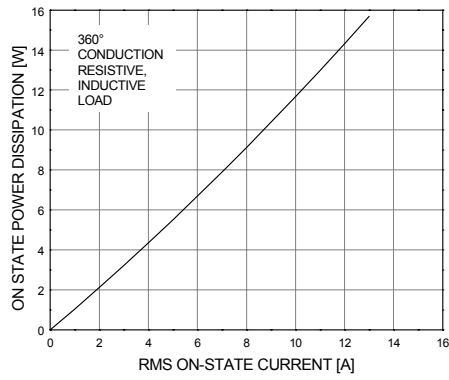
## Typical Curves (Continues)



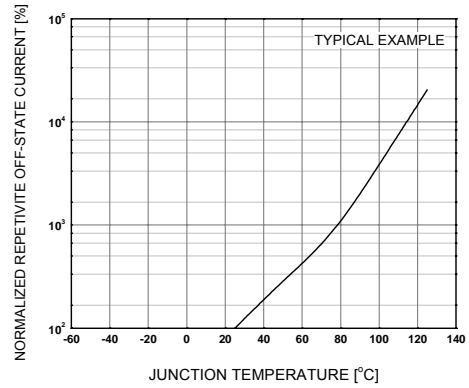
**Figure 7. Allowable Ambient Temperature vs Rms On-state Current**



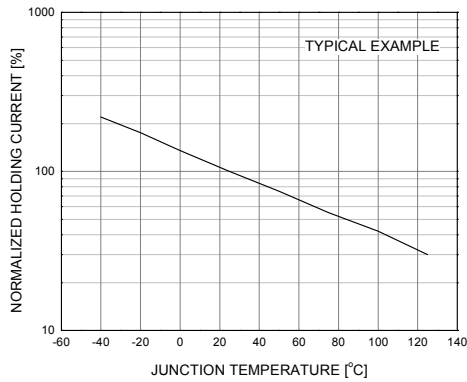
**Figure 8. Allowable Case Temperature vs Rms On-state Current**



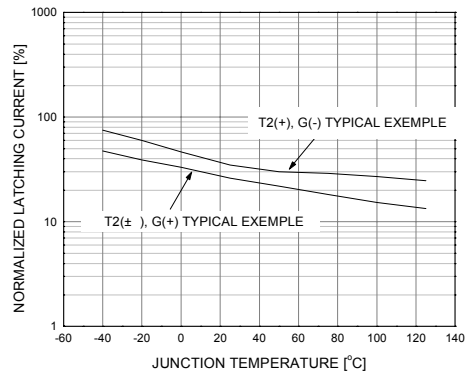
**Figure 9. Maximum On-state Power Dissipation**



**Figure 10. Repetitive Peak Off-state Current vs Junction Temperature**



**Figure 11. Holding Current vs Junction Temperature**



**Figure 12. Latching Current vs Junction Temperature**

Typical Curves (Continues)

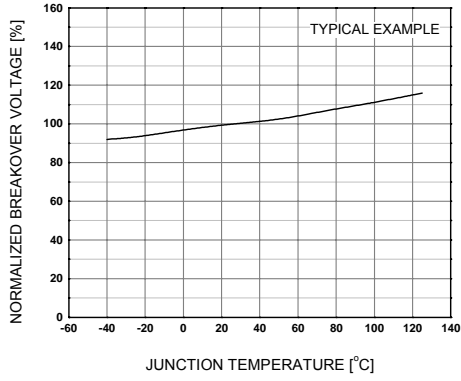


Figure 13. Breakover Voltage vs. Junction Temperature

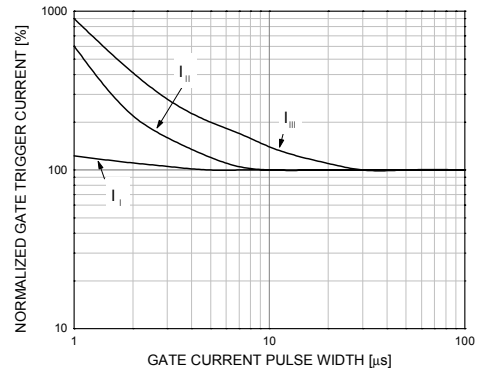


Figure 14. Gate Trigger Current vs. Gate Current Pulse Width

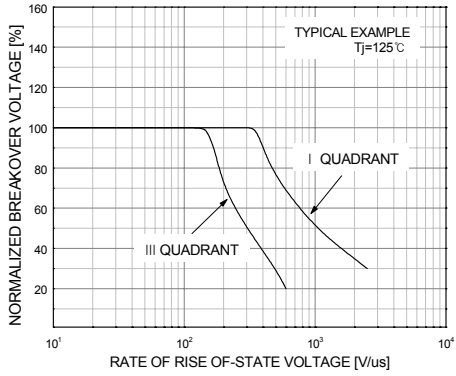


Figure 15. Breakover Voltage vs. Rate of Rise of Off-State Voltage

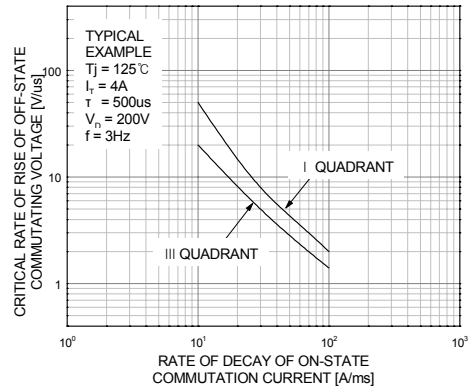
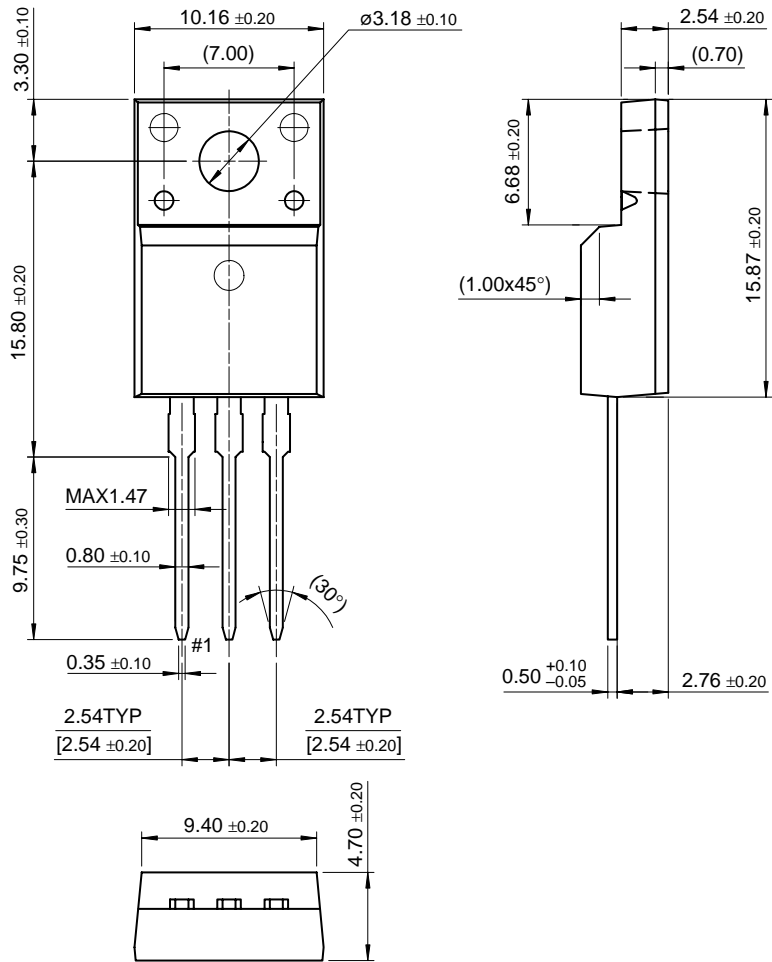


Figure 16. Commutation Characteristics

# Package Dimension

## TO-220F

FKPF12N80



Dimensions in Millimeters

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