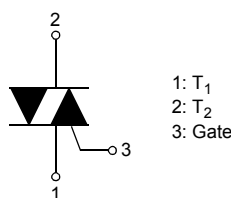
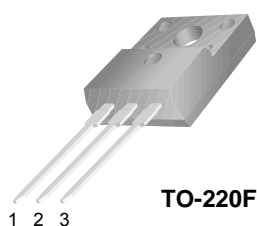


FKPF12N80

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_{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_{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 | A^2s | |
| 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_{GM} | Peak Gate Power Dissipation | | 5 | W | |
| $P_{\text{G(AV)}}$ | Average Gate Power Dissipation | | 0.5 | W | |
| V_{GM} | Peak Gate Voltage | | 10 | V | |
| I_{GM} | Peak Gate Current | | 2 | A | |
| T_{J} | Junction Temperature | | - 40 ~ 125 | $^\circ\text{C}$ | |
| T_{STG} | Storage Temperature | | - 40 ~ 125 | $^\circ\text{C}$ | |
| V_{iso} | Isolation Voltage | $T_a=25^\circ\text{C}$, AC 1 minute, T_1 T_2 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

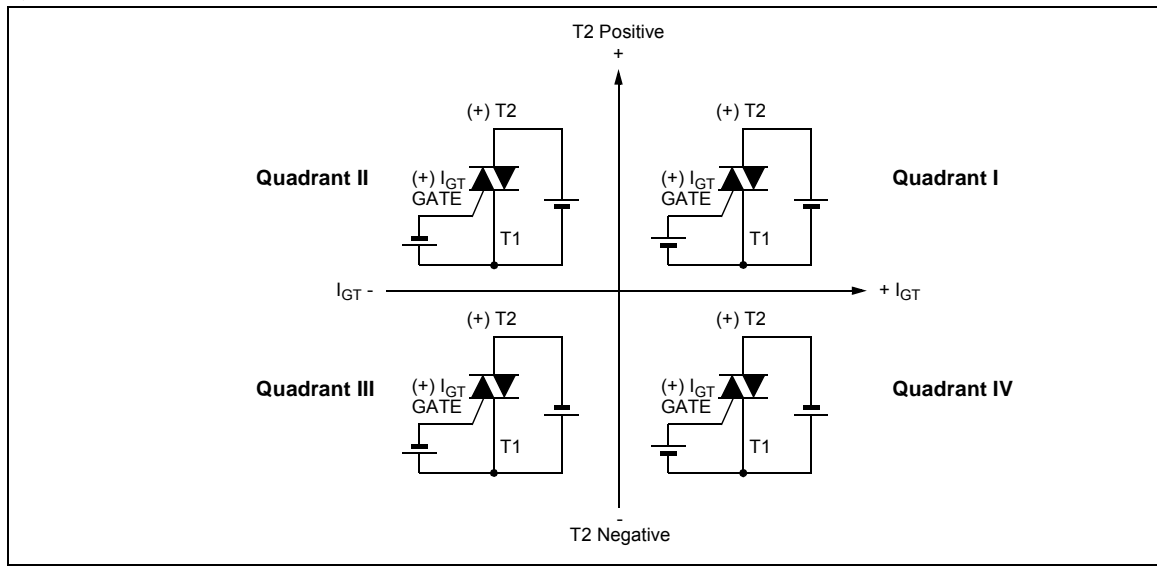
| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units | |
|----------------------|---|--|-----------------|------|------|------------------|----|
| I_{DRM} | Repetitive Peak Off-State Current | V_{DRM} applied | - | - | 20 | μA | |
| V_{TM} | On-State Voltage | $T_C=25^\circ\text{C}$, $I_{\text{TM}}=17\text{A}$ Instantaneous measurement | - | - | 1.5 | V | |
| V_{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_{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_{GD} | Gate Non-Trigger Voltage | $T_{\text{J}}=125^\circ\text{C}$, $V_{\text{D}}=1/2V_{\text{DRM}}$ | 0.2 | - | - | V | |
| I_{H} | Holding Current | $V_{\text{D}}=12\text{V}$, $I_{\text{TM}}=1\text{A}$ | - | - | 50 | mA | |
| I_{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 | $V_{\text{DRM}} = \text{Rated}$, $T_{\text{J}} = 125^\circ\text{C}$, Exponential Rise | - | 300 | - | V/ μs | |
| $(dv/dt)_{\text{C}}$ | Critical-Rate of Rise of Off-State Commutating Voltage (Note 3) | | 10 | - | - | V/ μs | |

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°C/W

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

Quadrant Definitions for a Triac



Typical Curves

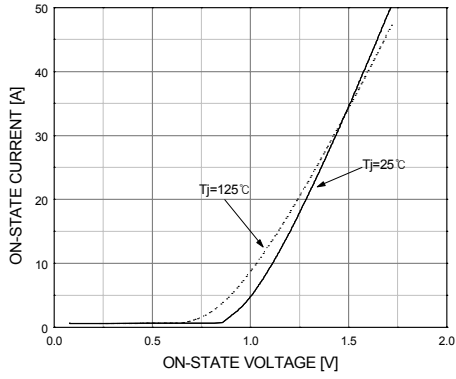


Figure 1. Maximum On-state Characteristics

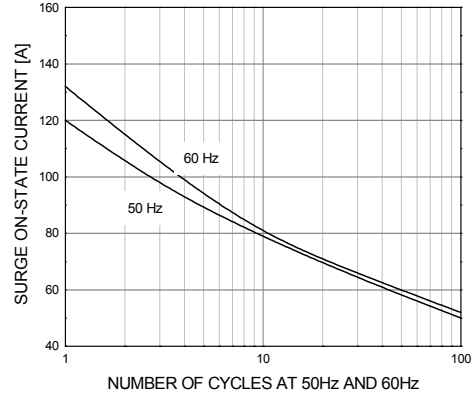


Figure 2. Rated Surge On-state Current

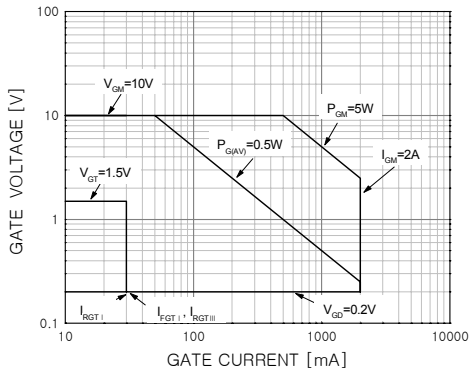


Figure 3. Gate Characteristics

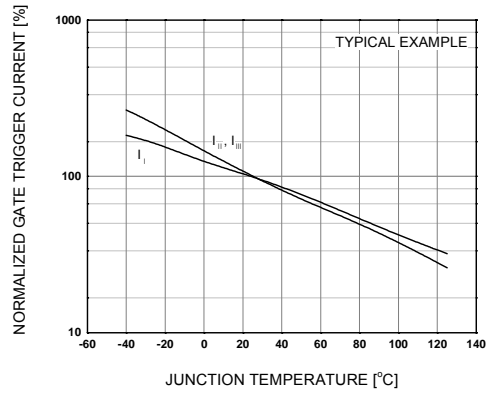


Figure 4. Gate Trigger Current vs T_j

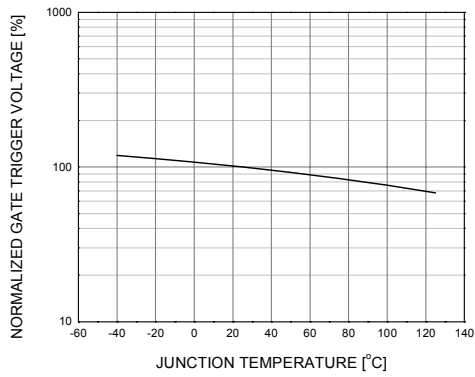


Figure 5. Gate Trigger Voltage vs T_j

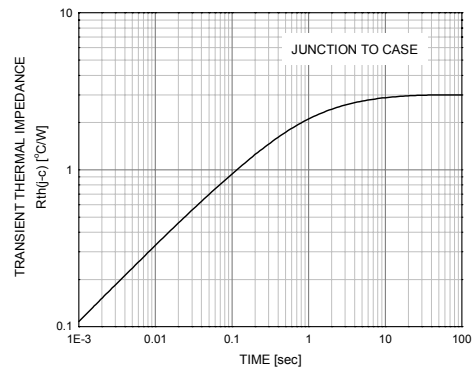


Figure 6. Transient Thermal Impedance

Typical Curves (Continues)

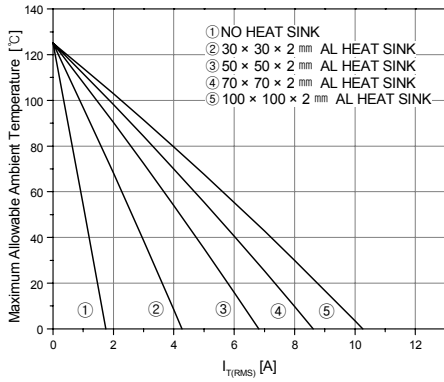


Figure 7. Allowable Ambient Temperature vs Rms On-state Current

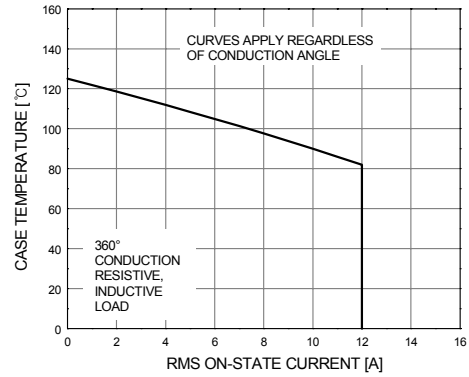


Figure 8. Allowable Case Temperature vs Rms On-state Current

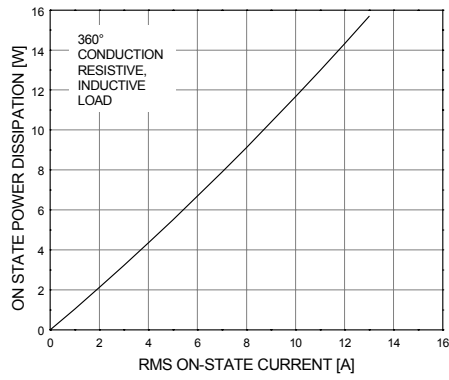


Figure 9. Maximum On-state Power Dissipation

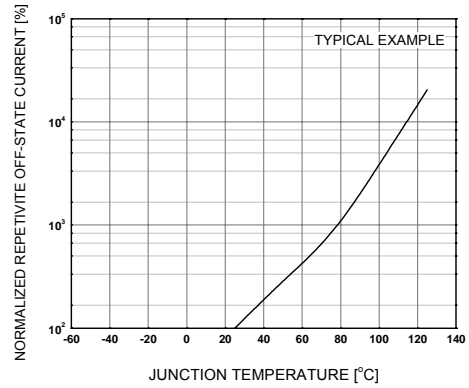


Figure 10. Repetitive Peak Off-state Current vs Junction Temperature

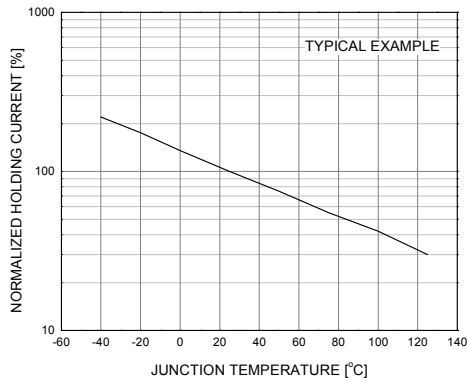


Figure 11. Holding Current vs Junction Temperature

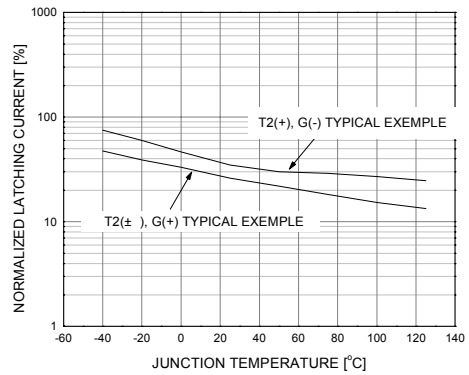


Figure 12. Latching Current vs Junction Temperature

Typical Curves (Continues)

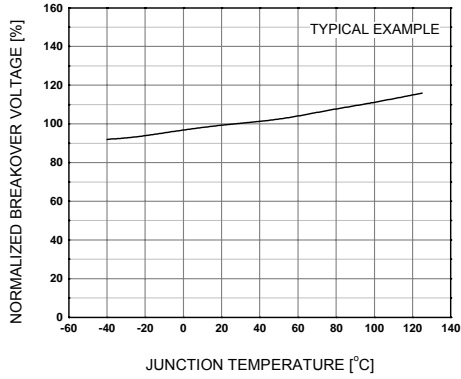


Figure 13. Breakover Voltage vs. Junction Temperature

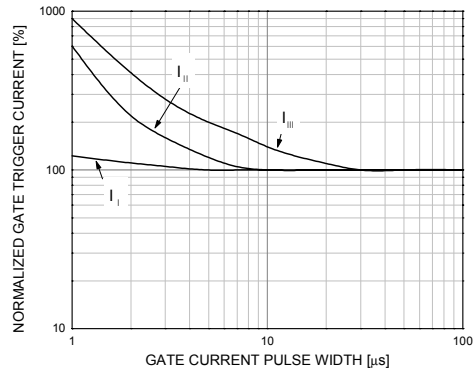


Figure 14. Gate Trigger Current vs. Gate Current Pulse Width

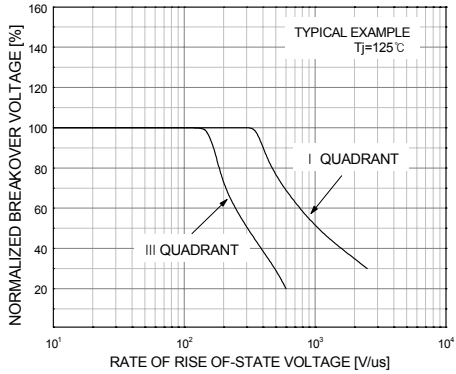


Figure 15. Breakover Voltage vs. Rate of Rise of Off-State Voltage

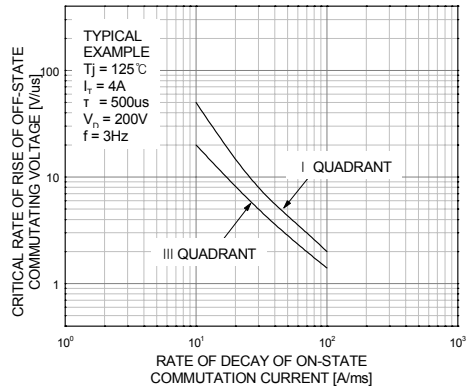
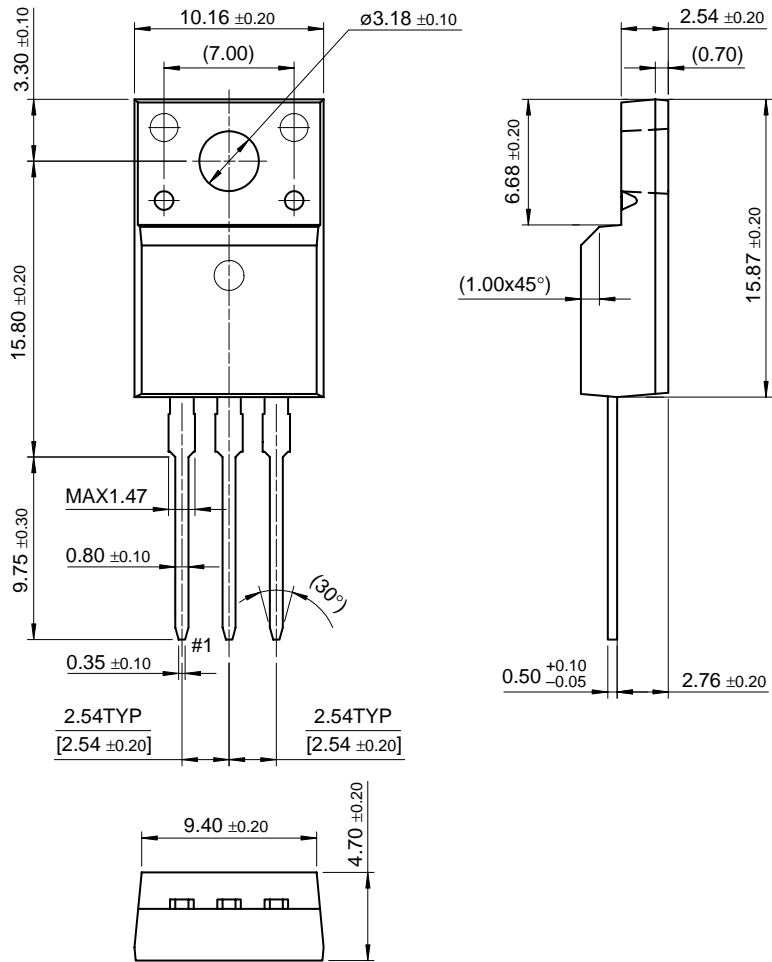


Figure 16. Commutation Characteristics

Package Dimension

TO-220F

FKPF12N80



Dimensions in Millimeters

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