

Feathers:

- Advanced trench process technology
- Special designed for Convertors and power controls
- High density cell design for ultra low Rdson
- Fully characterized Avalanche voltage and current
- Avalanche Energy 100% test

Description:

The FTK7510 is a new generation of middle voltage and high current N-Channel enhancement mode trench power MOSFET. This new technology increases the cell density and reduces the on-resistance; its typical Rdson can reduce to 6.8mohm.

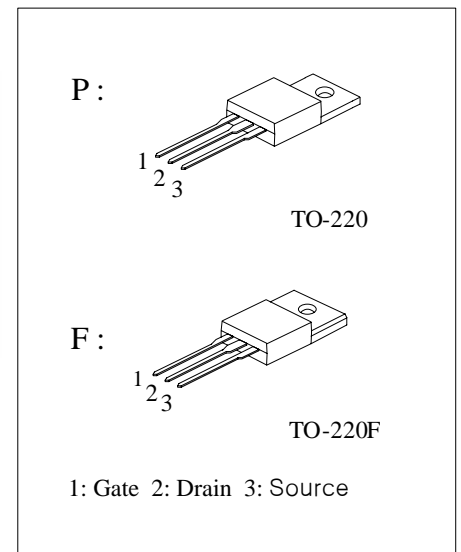
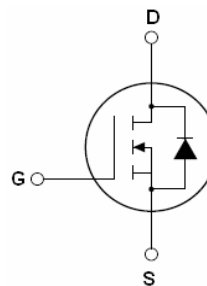
Application:

- Power switching application

ID=75A

BV=75V

Rdson=10mohm



Absolute Maximum Ratings

| | Parameter | Max. | Units |
|-----------------------------|--|-------------|-------|
| $I_D@T_c=25^\circ\text{C}$ | Continuous drain current, VGS@10V | 75 | A |
| $I_D@T_c=100^\circ\text{C}$ | Continuous drain current, VGS@10V | 70 | |
| I_{DM} | Pulsed drain current ① | 300 | |
| $P_D@T_c=25^\circ\text{C}$ | Power dissipation | 150 | W |
| | Linear derating factor | 2.0 | W/°C |
| V_{GS} | Gate-to-Source voltage | ±20 | V |
| dv/dt | Peak diode recovery voltage | 31 | v/ns |
| E_{AS} | Single pulse avalanche energy ② | 480 | mJ |
| E_{AR} | Repetitive avalanche energy | TBD | |
| T_J T_{STG} | Operating Junction and Storage Temperature Range | -55 to +150 | °C |

Thermal Resistance

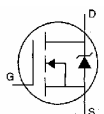
| | Parameter | Min. | Typ. | Max. | Units |
|-----------------|---------------------|------|------|------|-------|
| $R_{\theta JC}$ | Junction-to-case | — | 0.83 | — | °C/W |
| $R_{\theta JA}$ | Junction-to-ambient | — | — | 62 | |

Electrical Characteristics @TJ=25°C(unless otherwise specified)

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------------|--------------------------------------|------|-------|------|-------|--|
| BV_{DSS} | Drain-to-Source breakdown voltage | 75 | — | — | V | $V_{GS}=0V, I_D=250\mu A$ |
| $R_{DS(on)}$ | Static Drain-to-Source on-resistance | — | 0.007 | 0.01 | Ω | $V_{GS}=10V, I_D=40A$ |
| $V_{GS(th)}$ | Gate threshold voltage | 2.0 | 2.7 | 4.0 | V | $V_{DS}=V_{GS}, I_D=250\mu A$ |
| g_{fs} | Forward transconductance | - | 58 | — | S | $V_{DS}=5V, I_D=30A$ |
| I_{DSS} | Drain-to-Source leakage current | — | — | 1 | μA | $V_{DS}=75V, V_{GS}=0V$ |
| | | — | — | 10 | | $V_{DS}=75V, V_{GS}=0V, T_J=150^\circ\text{C}$ |
| I_{GSS} | Gate-to-Source forward leakage | — | — | 100 | nA | $V_{GS}=20V$ |

| | | | | | | |
|--------------|--------------------------------|---|------|------|----|---|
| | Gate-to-Source reverse leakage | — | — | -100 | | $V_{GS}=-20V$ |
| Q_g | Total gate charge | — | 90 | — | nC | $I_D=30A$ $V_{DD}=30V$ $V_{GS}=10V$ |
| Q_{gs} | Gate-to-Source charge | — | 14 | — | | |
| Q_{gd} | Gate-to-Drain("Miller") charge | — | 24 | — | | |
| $t_{d(on)}$ | Turn-on delay time | — | 18.2 | — | nS | $V_{DD}=30V$ $I_D=2A, R_L=15\Omega$ $R_G=2.5\Omega$ $V_{GS}=10V$ |
| t_r | Rise time | — | 15.6 | — | | |
| $t_{d(off)}$ | Turn-Off delay time | — | 70.5 | — | | |
| t_f | Fall time | — | 13.8 | — | | |
| C_{iss} | Input capacitance | — | 3150 | — | pF | $V_{GS}=0V$ $V_{DS}=25V$ $f=1.0MHZ$ |
| C_{oss} | Output capacitance | — | 300 | — | | |
| C_{rss} | Reverse transfer capacitance | — | 240 | — | | |

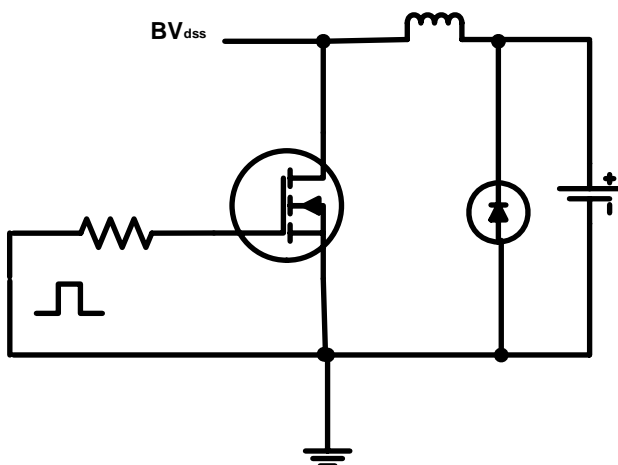
Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|----------|--|---|------|------|-------|---|
| I_S | Continuous Source Current (Body Diode) | — | — | 75 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I_{SM} | Pulsed Source Current (Body Diode) ① | — | — | 300 | | |
| V_{SD} | Diode Forward Voltage | — | — | 1.3 | V | $T_J=25^\circ C, I_S=40A, V_{GS}=0V$ ③ |
| t_{rr} | Reverse Recovery Time | — | 57 | — | nS | $T_J=25^\circ C, I_F=75A$ |
| Q_{rr} | Reverse Recovery Charge | — | 107 | — | nC | $di/dt=100A/\mu s$ ③ |
| t_{on} | Forward Turn-on Time | Intrinsic turn-on time is negligible (turn-on is dominated by $L_s + L_D$) | | | | |

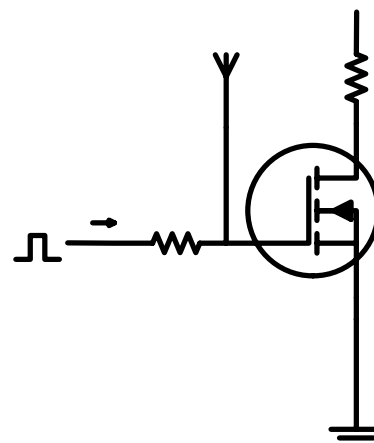
Notes:

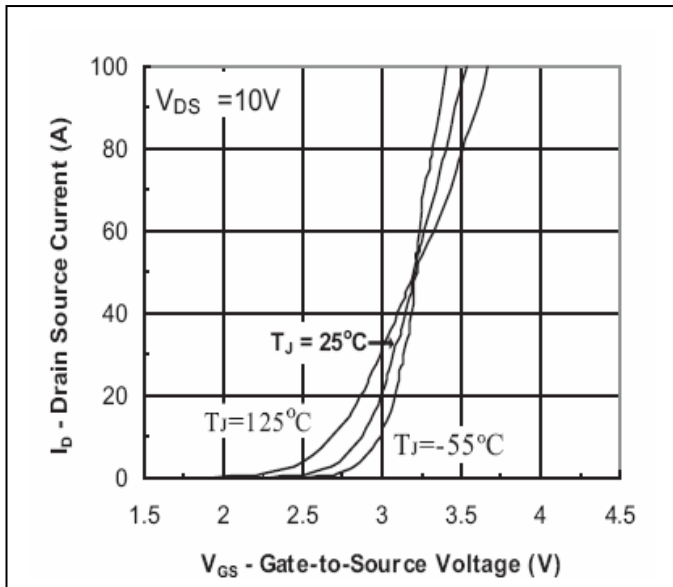
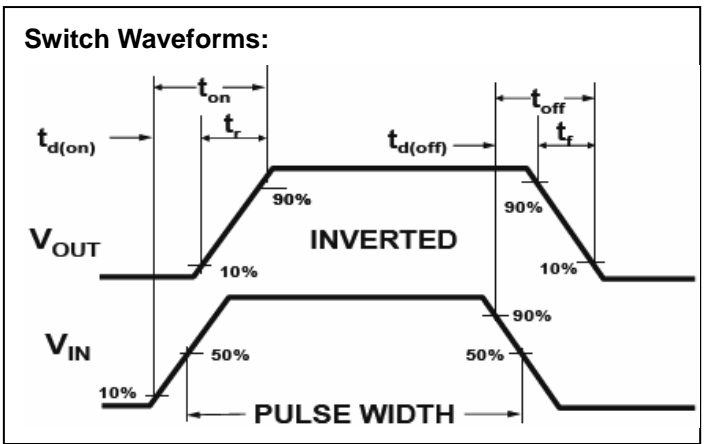
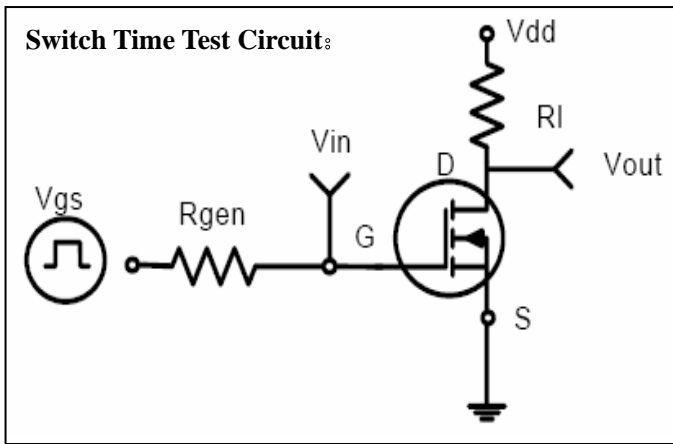
- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: $L = 0.3mH, I_D = 57A, V_{DD} = 47V$
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 1.5\%$ $R_G = 25\Omega$ Starting $T_J = 25^\circ C$

EAS test circuits:

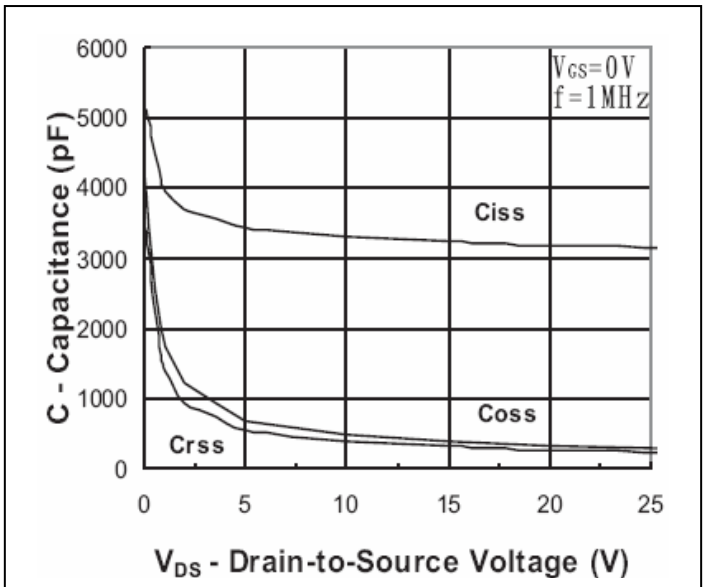


Gate charge test circuit:

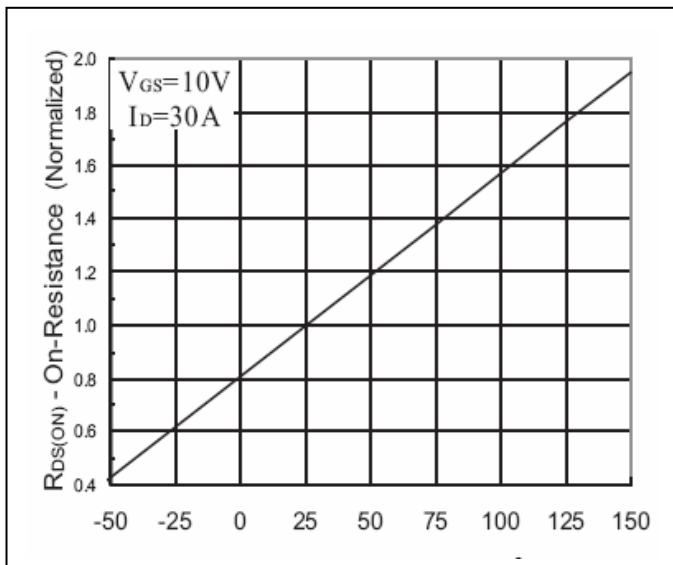




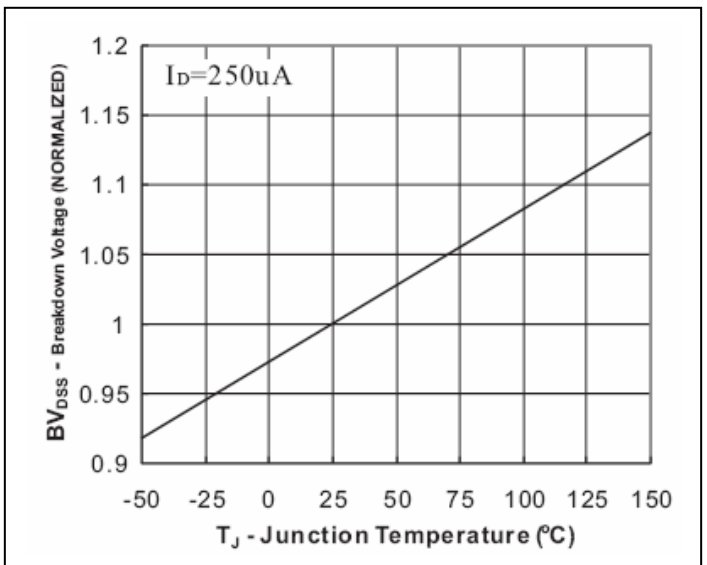
Transfer Characteristic



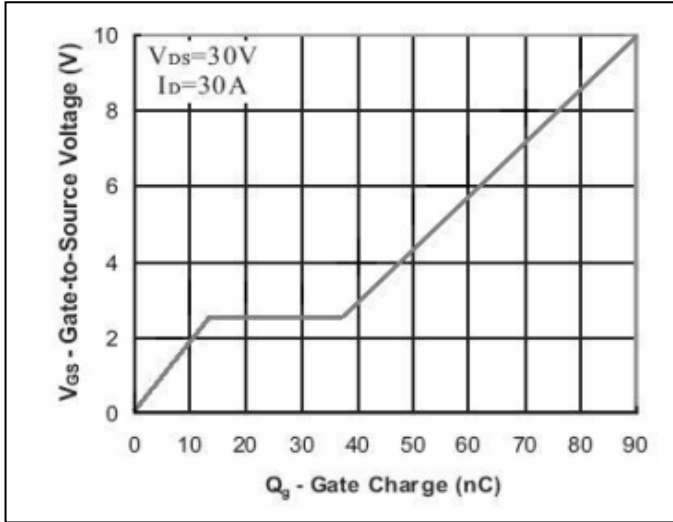
Capacitance



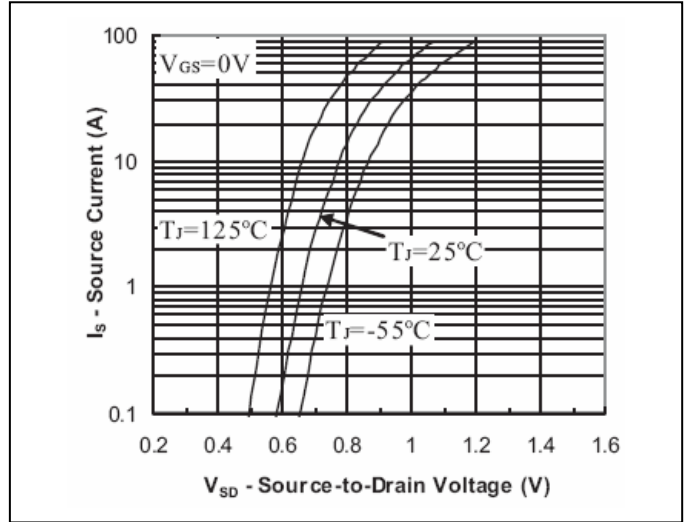
On Resistance vs Junction Temperature



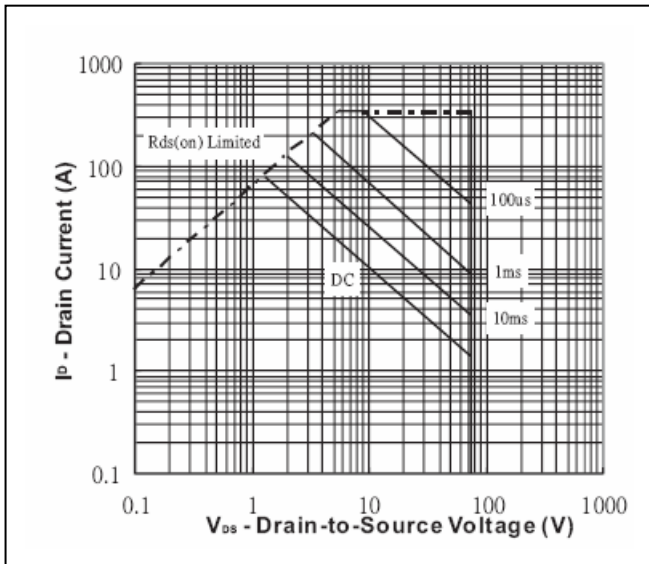
Breakdown Voltage vs Junction Temperature



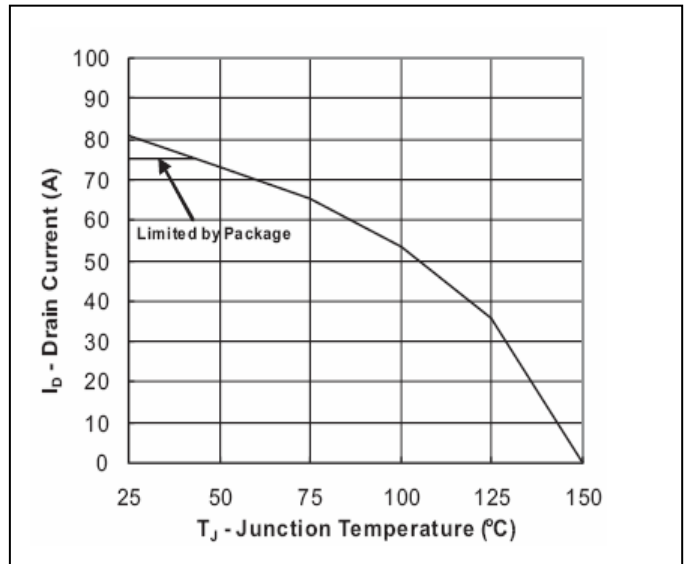
Gate Charge



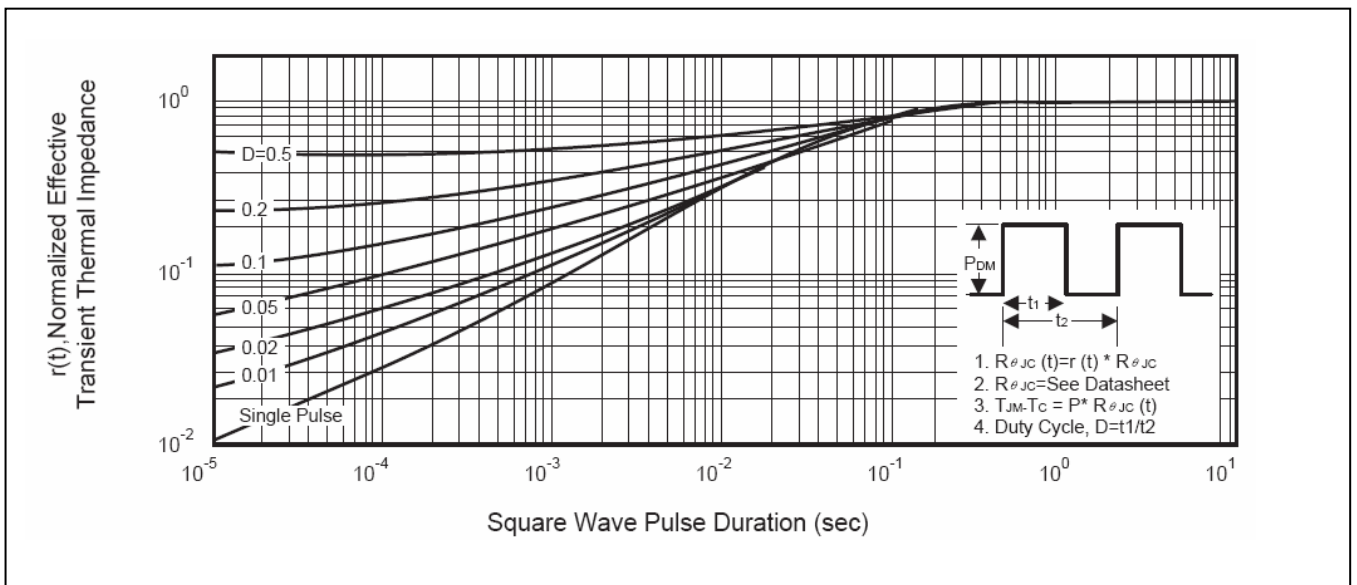
Source-Drain Diode Forward Voltage



Safe Operation Area



Max Drain Current vs Junction Temperature



Transient Thermal Impedance Curve



FTK7510F/P

