


FS50SMJ-2

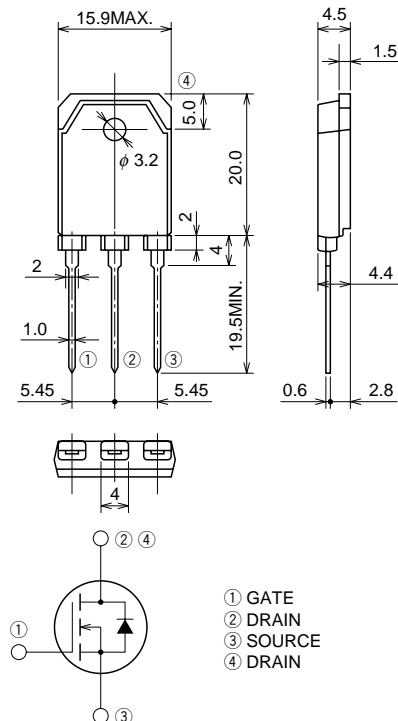
HIGH-SPEED SWITCHING USE

FS50SMJ-2



- 4V DRIVE
- V_{DSS} 100V
- $r_{DS(ON)}$ (MAX) 48m Ω
- I_D 50A
- Integrated Fast Recovery Diode (TYP.) 90ns

OUTLINE DRAWING Dimensions in mm



TO-3P

APPLICATION

Motor control, Lamp control, Solenoid control
DC-DC converter, etc.

MAXIMUM RATINGS (Tc = 25°C)

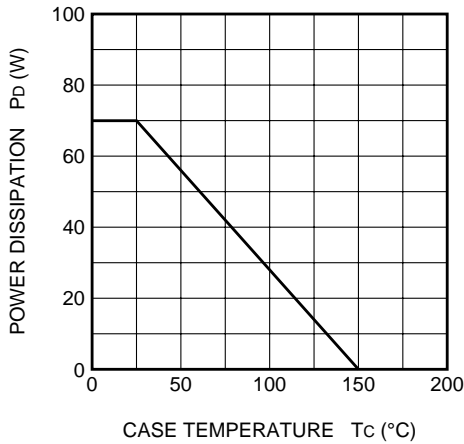
| Symbol | Parameter | Conditions | Ratings | Unit |
|-----------|----------------------------------|---------------|------------|------|
| V_{DSS} | Drain-source voltage | $V_{GS} = 0V$ | 100 | V |
| V_{GSS} | Gate-source voltage | $V_{DS} = 0V$ | ± 20 | V |
| I_D | Drain current | | 50 | A |
| I_{DM} | Drain current (Pulsed) | | 200 | A |
| I_{DA} | Avalanche drain current (Pulsed) | $L = 50\mu H$ | 50 | A |
| I_S | Source current | | 50 | A |
| I_{SM} | Source current (Pulsed) | | 200 | A |
| P_D | Maximum power dissipation | | 70 | W |
| T_{ch} | Channel temperature | | -55 ~ +150 | °C |
| T_{stg} | Storage temperature | | -55 ~ +150 | °C |
| — | Weight | Typical value | 4.8 | g |

ELECTRICAL CHARACTERISTICS (Tch = 25°C)

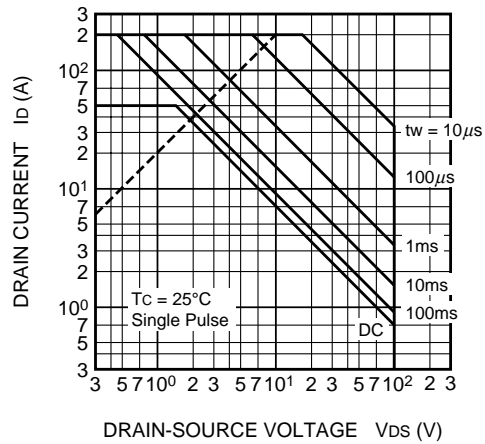
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|-----------|----------------------------------|--|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| V(BR)DSS | Drain-source breakdown voltage | ID = 1mA, VGS = 0V | 100 | — | — | V |
| IGSS | Gate-source leakage current | VGS = ±20V, VDS = 0V | — | — | ±0.1 | μA |
| IDSS | Drain-source leakage current | VDS = 100V, VGS = 0V | — | — | 0.1 | mA |
| VGS(th) | Gate-source threshold voltage | ID = 1mA, VDS = 10V | 1.0 | 1.5 | 2.0 | V |
| rDS(ON) | Drain-source on-state resistance | ID = 25A, VGS = 10V | — | 37 | 48 | mΩ |
| rDS(ON) | Drain-source on-state resistance | ID = 25A, VGS = 4V | — | 40 | 52 | mΩ |
| VDS(ON) | Drain-source on-state voltage | ID = 25A, VGS = 10V | — | 0.93 | 1.20 | V |
| yfs | Forward transfer admittance | ID = 25A, VDS = 10V | — | 40 | — | S |
| Ciss | Input capacitance | VDS = 10V, VGS = 0V, f = 1MHz | — | 3000 | — | pF |
| Coss | Output capacitance | | — | 410 | — | pF |
| Crss | Reverse transfer capacitance | | — | 210 | — | pF |
| td(on) | Turn-on delay time | VDD = 50V, ID = 25A, VGS = 10V, RGEN = RGS = 50Ω | — | 22 | — | ns |
| tr | Rise time | | — | 65 | — | ns |
| td(off) | Turn-off delay time | | — | 270 | — | ns |
| tf | Fall time | | — | 160 | — | ns |
| VSD | Source-drain voltage | IS = 25A, VGS = 0V | — | 1.0 | 1.5 | V |
| Rth(ch-c) | Thermal resistance | Channel to case | — | — | 1.78 | °C/W |
| trr | Reverse recovery time | IS = 50A, dis/dt = -100A/μs | — | 90 | — | ns |

PERFORMANCE CURVES

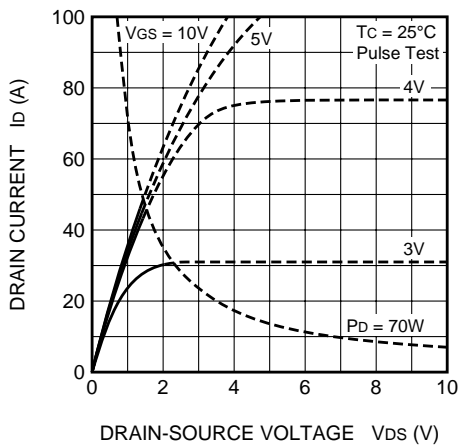
POWER DISSIPATION DERATING CURVE



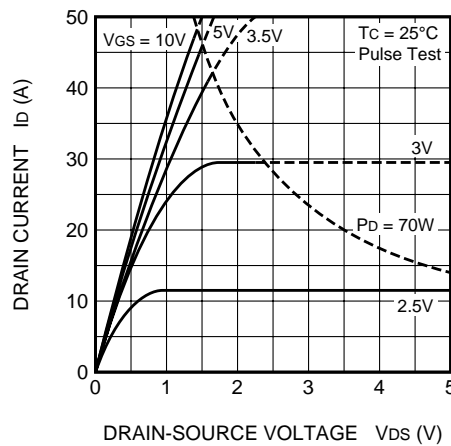
MAXIMUM SAFE OPERATING AREA

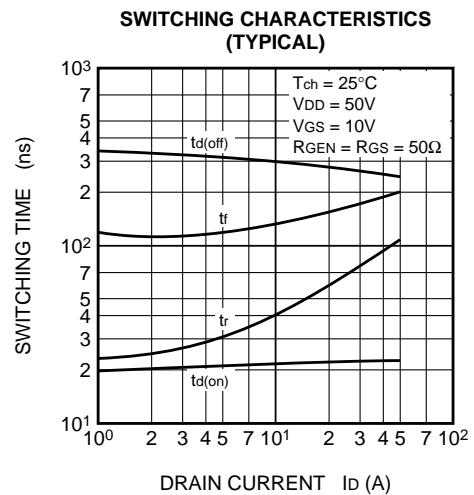
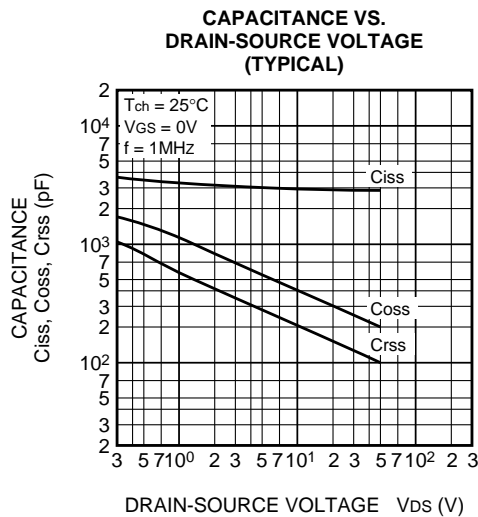
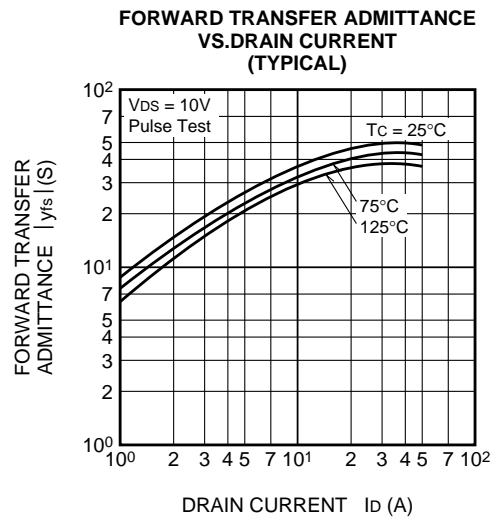
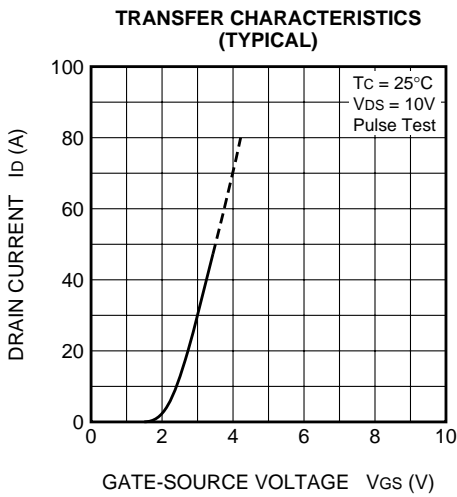
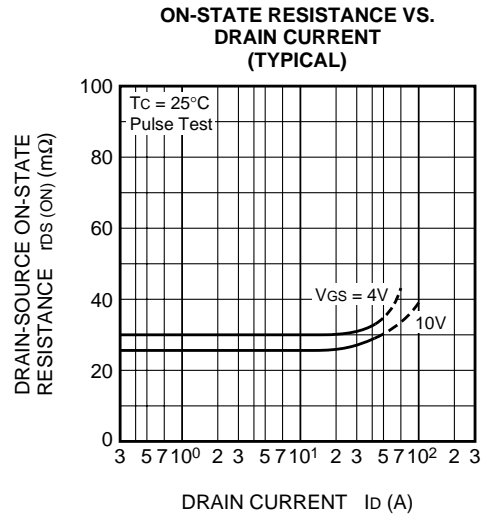
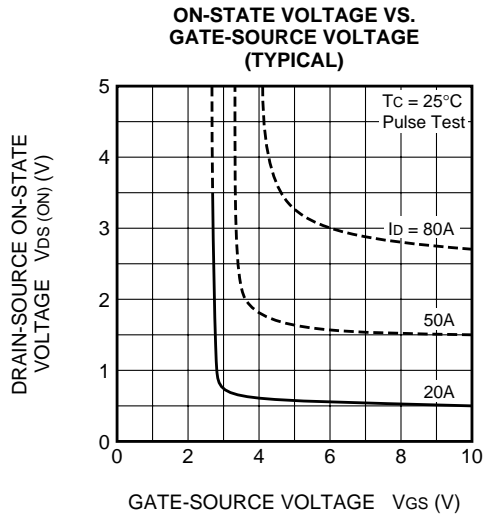


OUTPUT CHARACTERISTICS (TYPICAL)

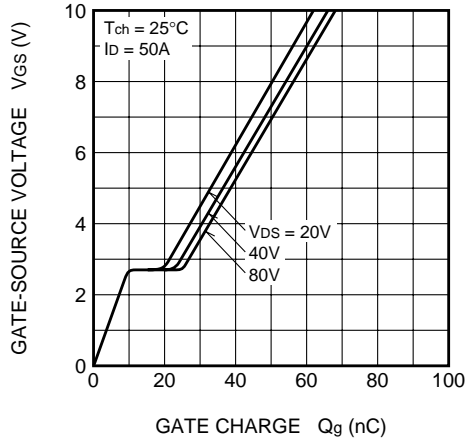


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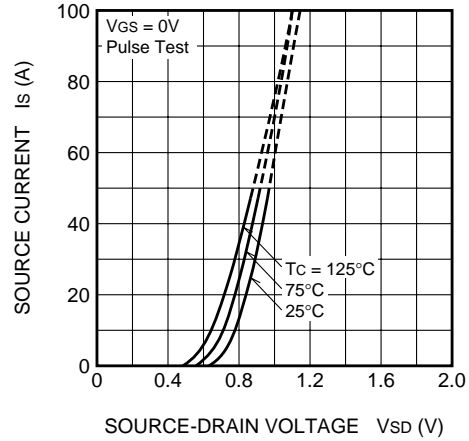




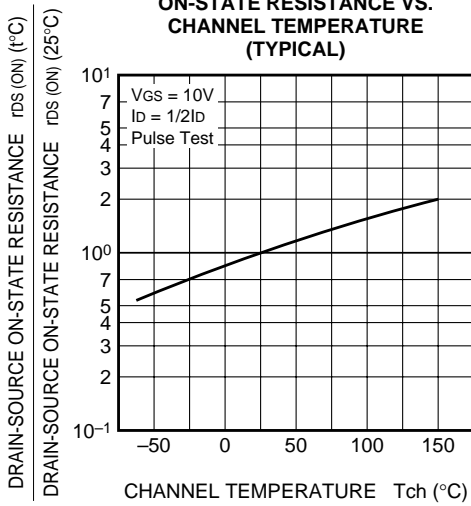
GATE-SOURCE VOLTAGE VS. GATE CHARGE (TYPICAL)



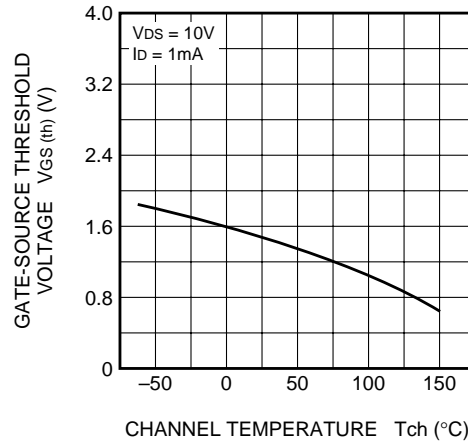
SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)



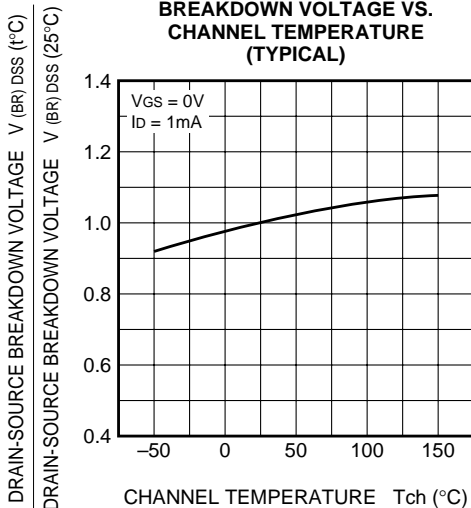
ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)



THRESHOLD VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)



BREAKDOWN VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS

