

# 2MI50F-050 SIPMOS® FUJI POWER MOS-FET

N-CHANNEL SILICON POWER MOS-FET

## MOS-FET MODULE

### Features

- Low on-resistance
- High current
- Insulated to elements and metal base
- Separated two-elements
- Include fast recovery diode

### Applications

- Inverters
- UPS
- A. C servo motors
- High frequency power supplies

### Max. Ratings and Characteristics

#### Absolute Maximum Ratings(Tc=25°C)

| Items                                   | Symbols       | Ratings    | Units |
|---|---------------|------------|-------|
| Drain-source voltage                    | $V_{DSS}$     | 500        | V     |
| Continuous drain current   Duty=66%     | $I_D$         | 50         | A     |
| Pulsed drain current                    | $I_{D(puls)}$ | 150        | A     |
| Continuous reverse drain current        | $I_{DR}$      | 50         | A     |
| Gate-source peak voltage                | $V_{GSS}$     | $\pm 20$   | V     |
| Max. power dissipation                  | $P_D$         | 400        | W     |
| Operating and storage temperature range | $T_{ch}$      |            | °C    |
|   | $T_{stg}$     | -40 ~ +125 | °C    |
| Isolation test voltage                  | AC Imin       | 2500       | V     |

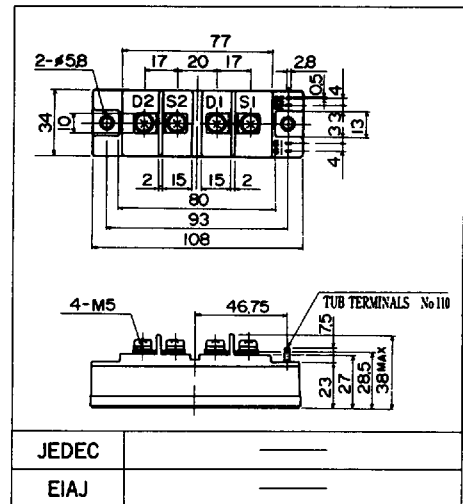
#### Electrical Characteristics(Tc=25°C)

| Items  | Symbols       | Test Conditions                               | Min. | Typ. | Max. | Units    |
|--|---------------|---|------|------|------|----------|
| Drain-source breakdown voltage                 | $V_{(BR)DSS}$ | $V_{GS}=0V$ $I_D=1mA$                         | 500  |      |      | V        |
| Gate threshold voltage                         | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ $I_D=10mA$                    | 2.1  | 3.0  | 4.0  | V        |
| Zero gate voltage drain current                | $I_{DSS}$     | $V_{GS}=0V$ $V_{DS}=500V$ $T_{ch}=25^\circ C$ |      |      | 1.0  | mA       |
| Gate-source leakage current                    | $I_{GSS}$     | $V_{DS}=0V$ $V_{GS}=\pm 20V$                  |      |      | 100  | nA       |
| Drain-source on-state resistance               | $R_{DS(on)}$  | $V_{GS}=15V$ $I_D=25A$                        |      |      | 0.11 | $\Omega$ |
| Forward transconductance                       | $g_{fs}$      | $V_{DS}=25V$ $I_D=25A$                        |      | 45   |      | S        |
| Input capacitance                              | $C_{iss}$     | $V_{GS}=0V$                                   |      | 7.8  | 13   | nF       |
| Output capacitance                             | $C_{oss}$     | $V_{DS}=25V$                                  |      | 0.9  | 1.5  |          |
| Reverse transfer capacitance                   | $C_{rss}$     | $f=1MHz$                                      |      | 0.4  | 0.6  |          |
| Switching time<br>( $t_{off}=t_{d(off)}+t_f$ ) | $t_{on}$      | $V_{CC}=100V$ $R_G=5\Omega$                   |      | 530  | 750  | ns       |
|  | $t_{d(off)}$  | $I_D=25A$ $P_w=20\mu s$                       |      | 700  | 1000 |          |
|  | $t_f$         | $V_{GS}=15V$                                  |      | 80   | 110  |          |
| Diode forward on-voltage                       | $V_{SD}$      | $I_F=50A$ $V_{GS}=0V$                         |      | 1.4  | 1.8  | V        |
| Reverse recovery time                          | $t_{rr}$      | $I_F=50A$ $dI/dt=100A/\mu s$ $V_{GS}=0V$      |      |      | 150  | ns       |

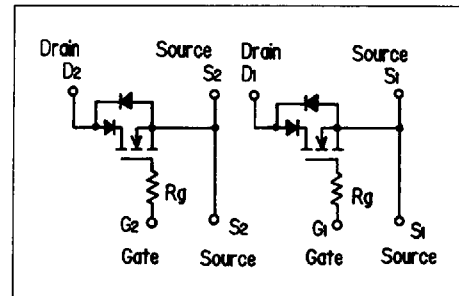
#### Thermal Characteristics

| Items              | Symbols        | Test Conditions | Min. | Typ. | Max.  | Units |
|--------------------|----------------|-----------------|------|------|-------|-------|
| Thermal Resistance | $R_{th(c-f)}$  | case to fim     |      | 0.06 |       | °C/W  |
|                    | $R_{th(ch-c)}$ | channel to case |      |      | 0.312 | °C/W  |

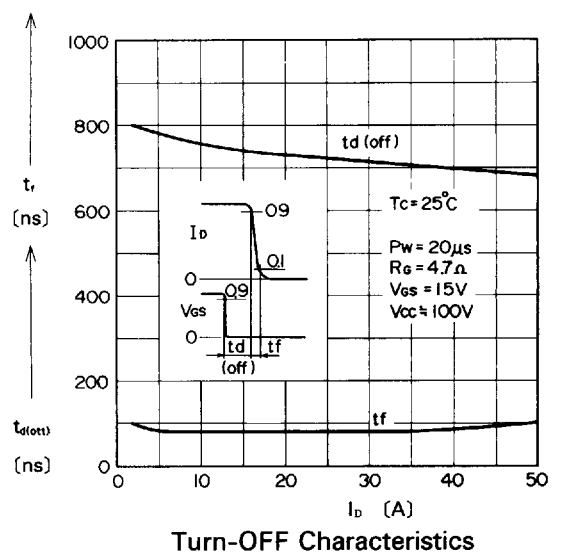
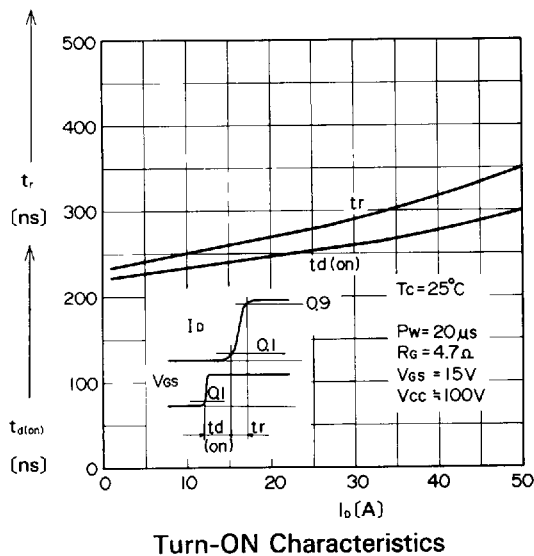
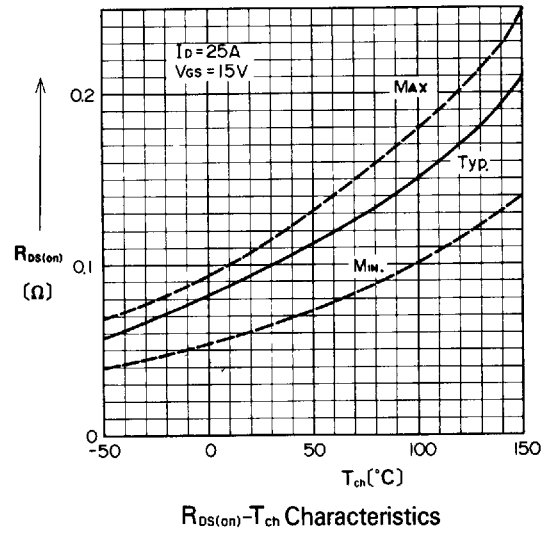
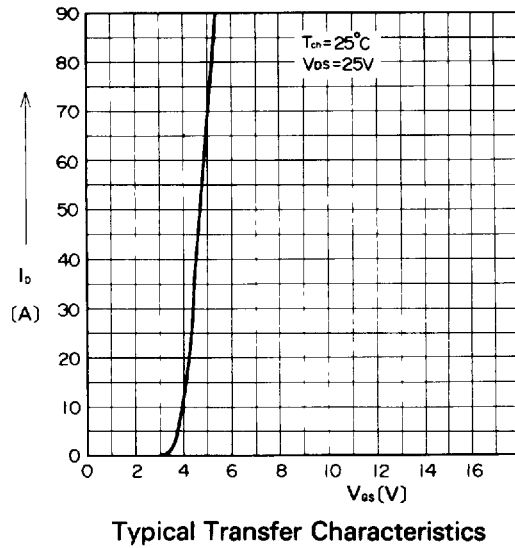
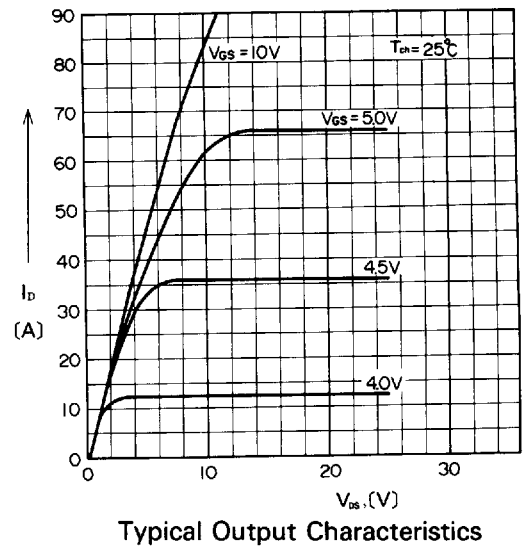
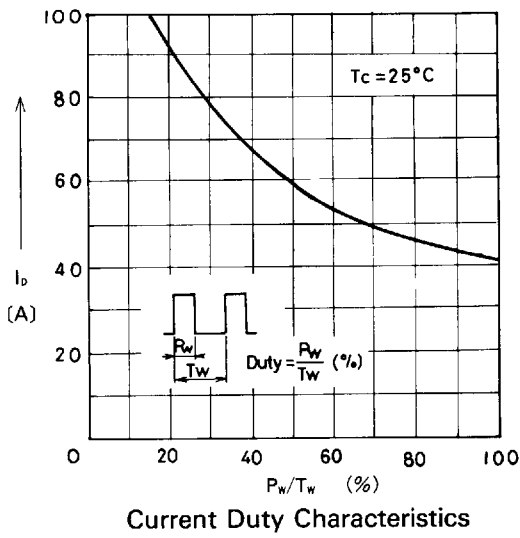
### Outline Drawings

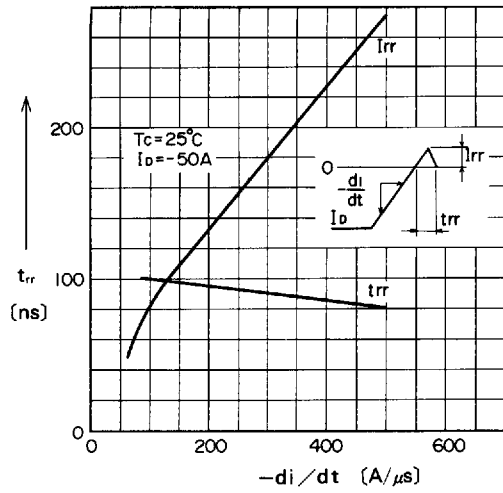


### Equivalent Circuit Schematic

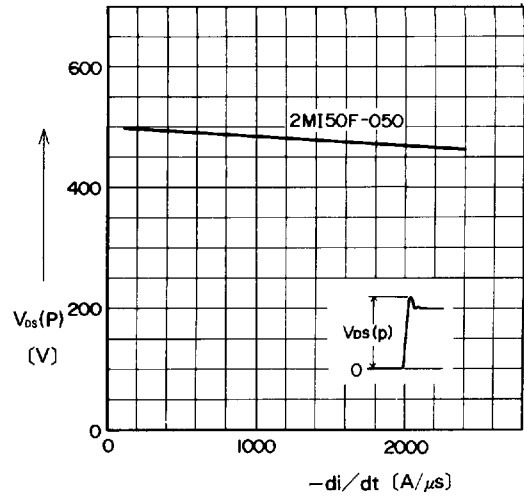


■ Characteristics

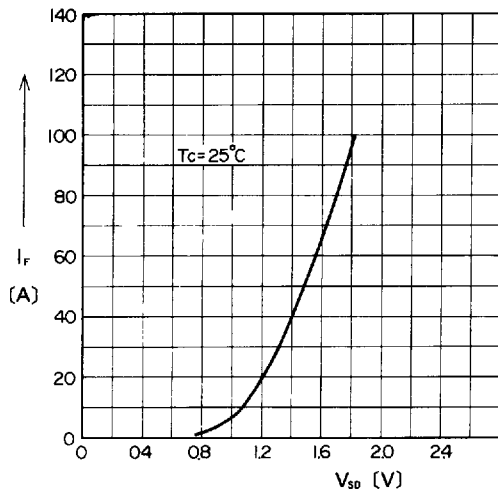




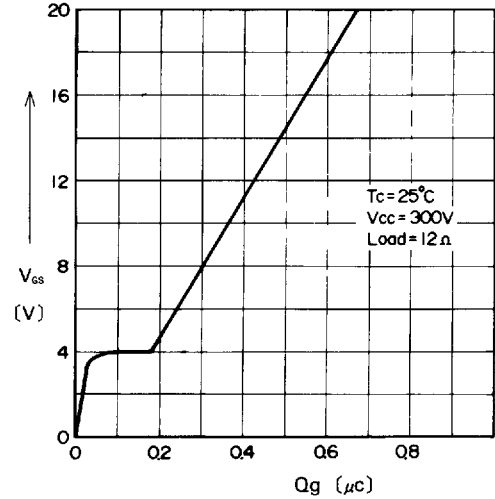
Reverse Recovery Characteristics



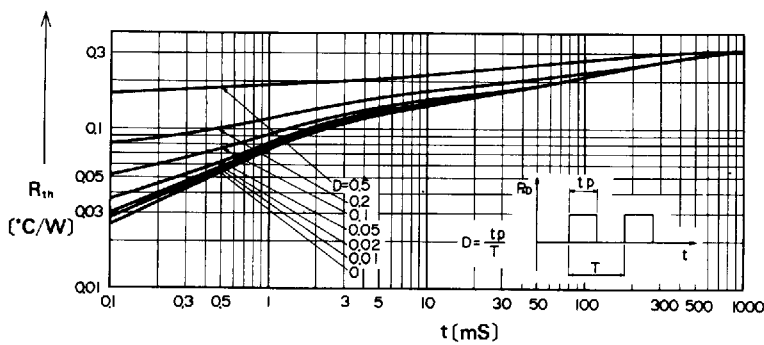
Max. Allowable  $di/dt$  at toff



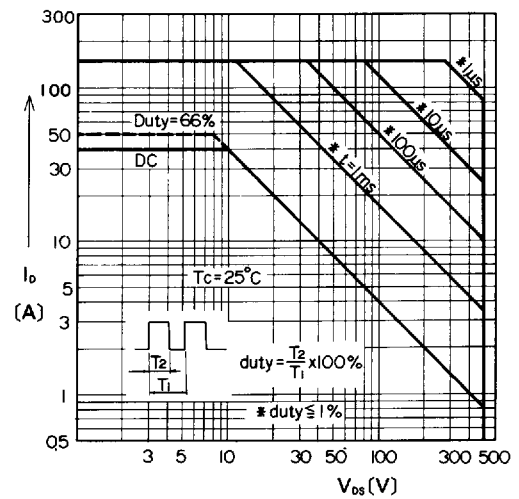
Forward Voltage of FWD



Typical Input Charge



Transient Thermal Impedance



Safe Operating Area