

# FS7KM-12A

HIGH-SPEED SWITCHING USE

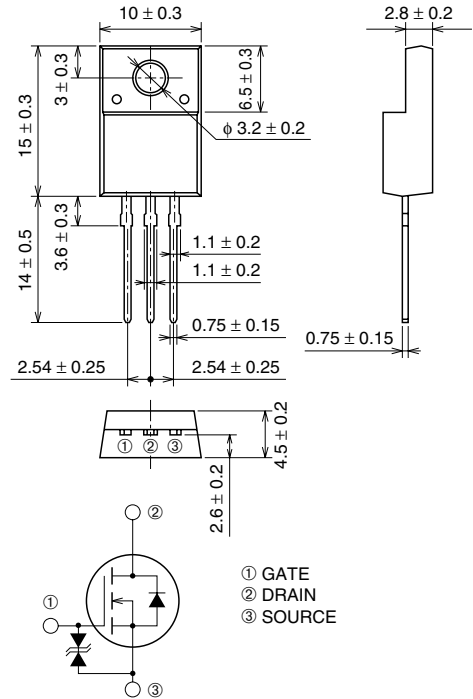
## FS7KM-12A



- 10V DRIVE
- $V_{DS}$  ..... 600V
- $r_{DS(ON)}$  (MAX) .....  $1.3\Omega$
- $I_D$  ..... 7A

## OUTLINE DRAWING

Dimensions in mm



TO-220FN

## APPLICATION

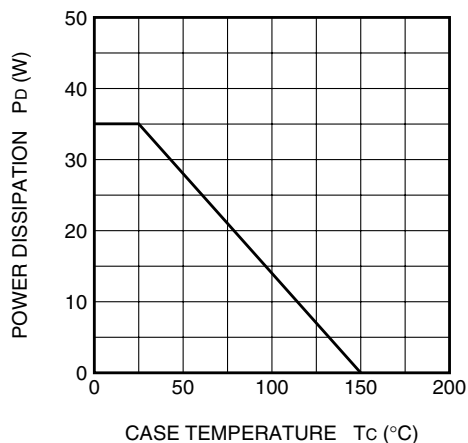
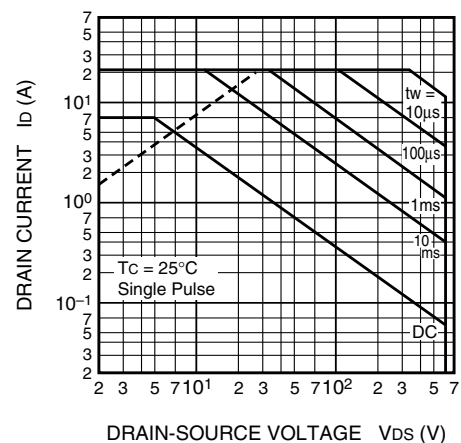
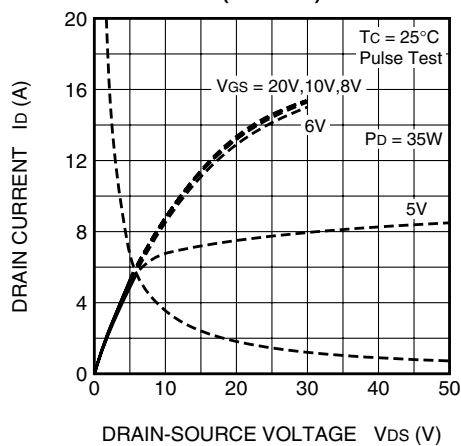
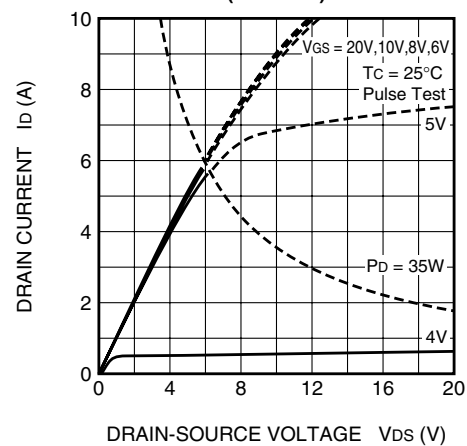
SMPS, AC-adapter, Power supply of Printer, Copier, TV, VCR. etc.

## MAXIMUM RATINGS (T<sub>c</sub> = 25°C)

| Symbol    | Parameter                  | Conditions                       | Ratings    | Unit |
|-----------|----------------------------|----------------------------------|------------|------|
| $V_{DS}$  | Drain-source voltage       | $V_{GS} = 0V$                    | 600        | V    |
| $V_{GSS}$ | Gate-source voltage        | $V_{DS} = 0V$                    | ±30        | V    |
| $I_D$     | Drain current              |                                  | 7          | A    |
| $I_{DM}$  | Drain current (Pulsed)     |                                  | 21         | A    |
| $I_{DA}$  | Avalanche current (Pulsed) | $L = 200\mu H$                   | 7          | A    |
| $P_D$     | Maximum power dissipation  |                                  | 35         | W    |
| $T_{ch}$  | Channel temperature        |                                  | -55 ~ +150 | °C   |
| $T_{stg}$ | Storage temperature        |                                  | -55 ~ +150 | °C   |
| $V_{iso}$ | Isolation voltage          | AC for 1minute, Terminal to case | 2000       | V    |
| —         | Weight                     | Typical value                    | 2.0        | g    |

**ELECTRICAL CHARACTERISTICS** ( $T_{ch} = 25^{\circ}\text{C}$ )

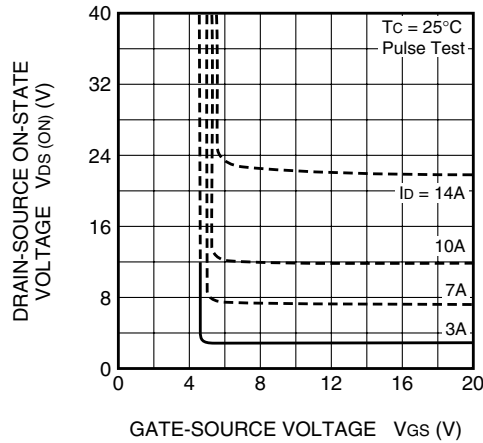
| Symbol         | Parameter                        | Test conditions                                                                                    | Limits   |      |          | Unit                 |
|----------------|----------------------------------|----------------------------------------------------------------------------------------------------|----------|------|----------|----------------------|
|                |                                  |                                                                                                    | Min.     | Typ. | Max.     |                      |
| $V_{(BR)DSS}$  | Drain-source breakdown voltage   | $I_D = 1\text{mA}$ , $V_{GS} = 0\text{V}$                                                          | 600      | —    | —        | V                    |
| $V_{(BR)GSS}$  | Gate-source breakdown voltage    | $I_{GS} = \pm 100\mu\text{A}$ , $V_{DS} = 0\text{V}$                                               | $\pm 30$ | —    | —        | V                    |
| $I_{GSS}$      | Gate-source leakage current      | $V_{GS} = \pm 25\text{V}$ , $V_{DS} = 0\text{V}$                                                   | —        | —    | $\pm 10$ | $\mu\text{A}$        |
| $I_{DSS}$      | Drain-source leakage current     | $V_{DS} = 600\text{V}$ , $V_{GS} = 0\text{V}$                                                      | —        | —    | 1        | mA                   |
| $V_{GS(th)}$   | Gate-source threshold voltage    | $I_D = 1\text{mA}$ , $V_{DS} = 10\text{V}$                                                         | 2.5      | 3.0  | 3.5      | V                    |
| $r_{DS(on)}$   | Drain-source on-state resistance | $I_D = 3\text{A}$ , $V_{GS} = 10\text{V}$                                                          | —        | 1.0  | 1.3      | $\Omega$             |
| $V_{DS(on)}$   | Drain-source on-state voltage    | $I_D = 3\text{A}$ , $V_{GS} = 10\text{V}$                                                          | —        | 3.0  | 3.9      | V                    |
| $ y_{fs} $     | Forward transfer admittance      | $I_D = 3\text{A}$ , $V_{DS} = 10\text{V}$                                                          | 4.2      | 7.0  | —        | S                    |
| $C_{iss}$      | Input capacitance                | $V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$                                   | —        | 1100 | —        | pF                   |
| $C_{oss}$      | Output capacitance               |                                                                                                    | —        | 100  | —        | pF                   |
| $C_{rss}$      | Reverse transfer capacitance     |                                                                                                    | —        | 25   | —        | pF                   |
| $t_{d(on)}$    | Turn-on delay time               | $V_{DD} = 200\text{V}$ , $I_D = 3\text{A}$ , $V_{GS} = 10\text{V}$ , $R_{GEN} = R_{GS} = 50\Omega$ | —        | 20   | —        | ns                   |
| $t_r$          | Rise time                        |                                                                                                    | —        | 25   | —        | ns                   |
| $t_{d(off)}$   | Turn-off delay time              |                                                                                                    | —        | 150  | —        | ns                   |
| $t_f$          | Fall time                        |                                                                                                    | —        | 35   | —        | ns                   |
| $V_{SD}$       | Source-drain voltage             | $I_S = 3\text{A}$ , $V_{GS} = 0\text{V}$                                                           | —        | 1.5  | 2.0      | V                    |
| $R_{th(ch-c)}$ | Thermal resistance               | Channel to case                                                                                    | —        | —    | 3.57     | $^{\circ}\text{C/W}$ |

**PERFORMANCE CURVES****POWER DISSIPATION DERATING CURVE****MAXIMUM SAFE OPERATING AREA****OUTPUT CHARACTERISTICS (TYPICAL)****OUTPUT CHARACTERISTICS (TYPICAL)**

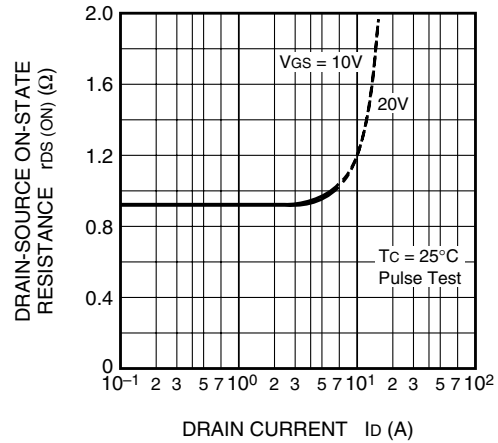
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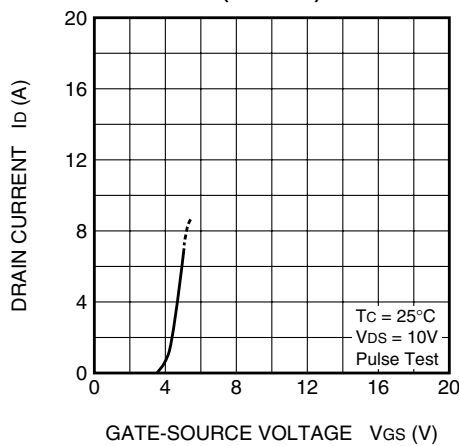
ON-STATE VOLTAGE VS.  
GATE-SOURCE VOLTAGE  
(TYPICAL)



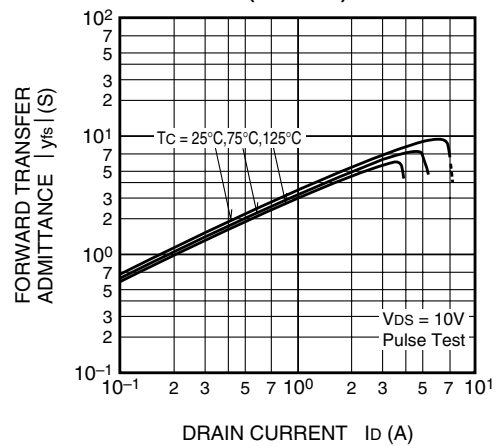
ON-STATE RESISTANCE VS.  
DRAIN CURRENT  
(TYPICAL)



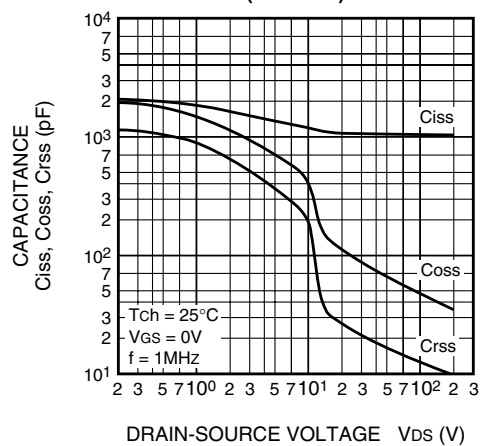
TRANSFER CHARACTERISTICS  
(TYPICAL)



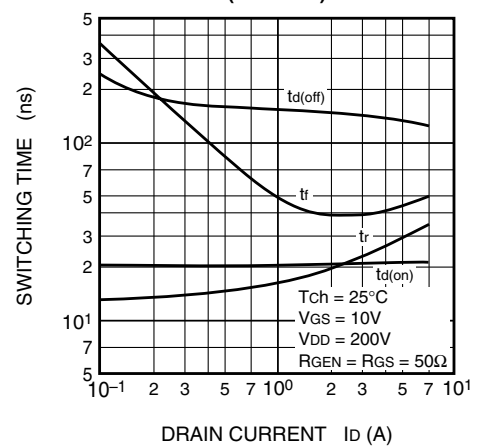
FORWARD TRANSFER ADMITTANCE  
VS. DRAIN CURRENT  
(TYPICAL)



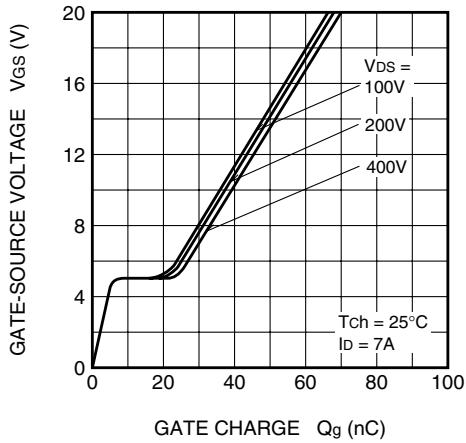
CAPACITANCE VS.  
DRAIN-SOURCE VOLTAGE  
(TYPICAL)



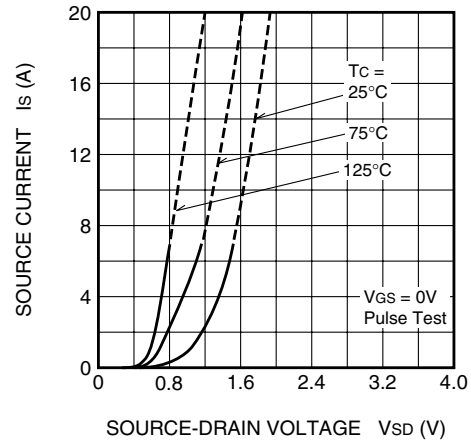
SWITCHING CHARACTERISTICS  
(TYPICAL)



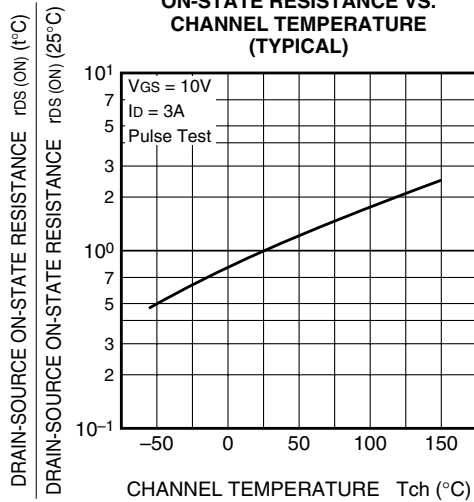
GATE-SOURCE VOLTAGE  
VS. GATE CHARGE  
(TYPICAL)



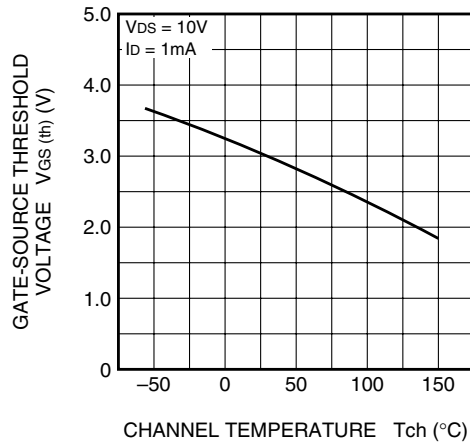
SOURCE-DRAIN DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



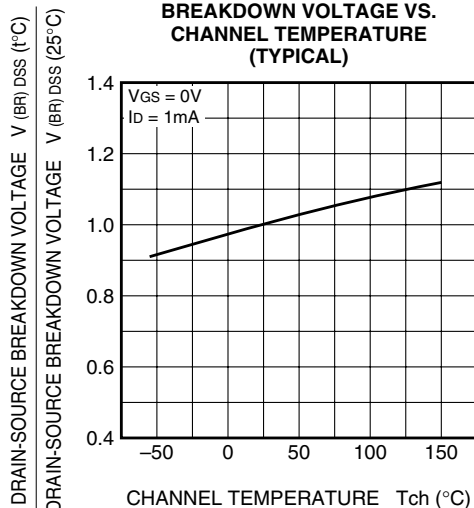
ON-STATE RESISTANCE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



THRESHOLD VOLTAGE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



BREAKDOWN VOLTAGE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS

