

# FS70KM-06

High-Speed Switching Use  
Nch Power MOS FET

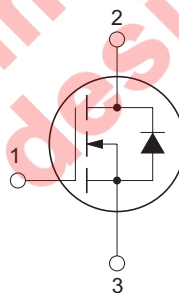
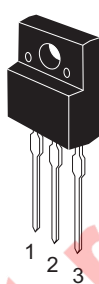
REJ03G1427-0200  
(Previous: MEJ02G0096-0101)  
Rev.2.00  
Aug 07, 2006

## Features

- Drive voltage : 10 V
- $V_{DSS}$  : 60 V
- $r_{DS(ON)(max)}$  : 7.5 m $\Omega$
- $I_D$  : 70 A
- Integrated Fast Recovery Diode (TYP.) : 85 ns
- Viso : 2000 V

## Outline

RENESAS Package code: PRSS0003AB-A  
(Package name: TO-220FN)



1. Gate
2. Drain
3. Source

## Applications

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

## Maximum Ratings

(T<sub>c</sub> = 25°C)

| Parameter                        | Symbol           | Ratings      | Unit | Conditions                           |
|----------------------------------|------------------|--------------|------|--------------------------------------|
| Drain-source voltage             | $V_{DSS}$        | 60           | V    | $V_{GS} = 0$ V                       |
| Gate-source voltage              | $V_{GSS}$        | $\pm 20$     | V    | $V_{DS} = 0$ V                       |
| Drain current                    | $I_D$            | 70           | A    |                                      |
| Drain current (Pulsed)           | $I_{DM}$         | 280          | A    |                                      |
| Avalanche drain current (Pulsed) | $I_{DA}$         | 70           | A    | $L = 100$ $\mu$ H                    |
| Source current                   | $I_S$            | 70           | A    |                                      |
| Source current (Pulsed)          | $I_{SM}$         | 280          | A    |                                      |
| Maximum power dissipation        | $P_D$            | 35           | W    |                                      |
| Channel temperature              | T <sub>ch</sub>  | – 55 to +150 | °C   |                                      |
| Storage temperature              | T <sub>stg</sub> | – 55 to +150 | °C   |                                      |
| Isolation voltage                | Viso             | 2000         | V    | AC for 1 minute,<br>Terminal to case |
| Mass                             | —                | 2.0          | g    | Typical value                        |

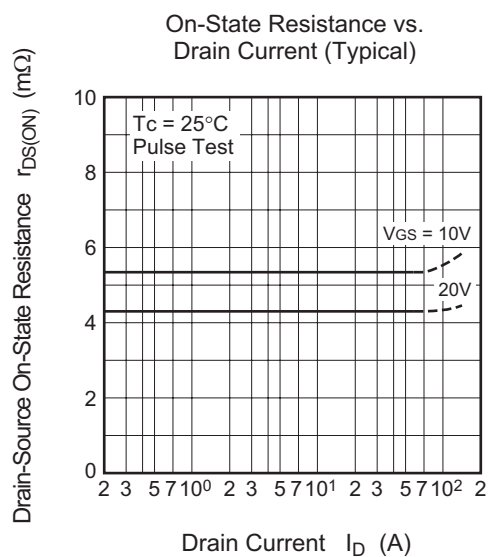
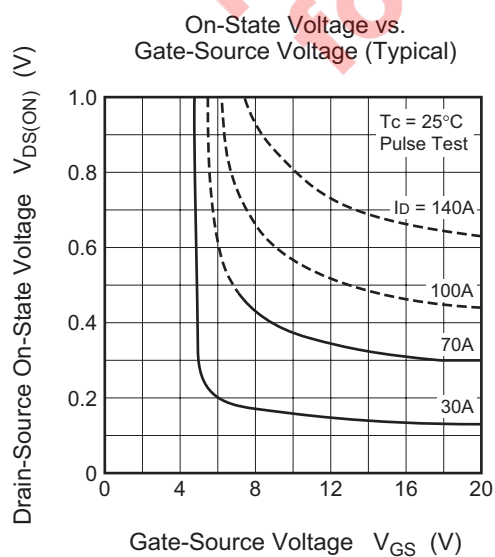
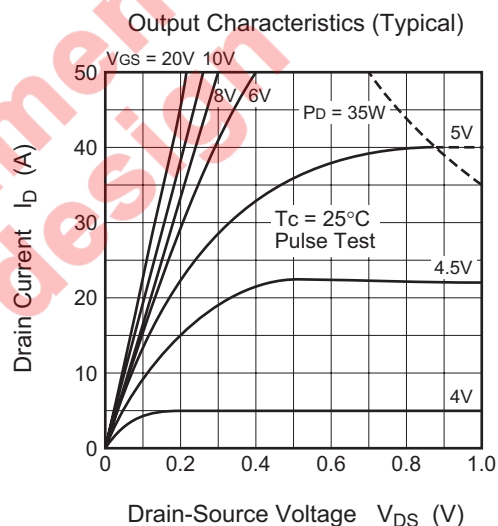
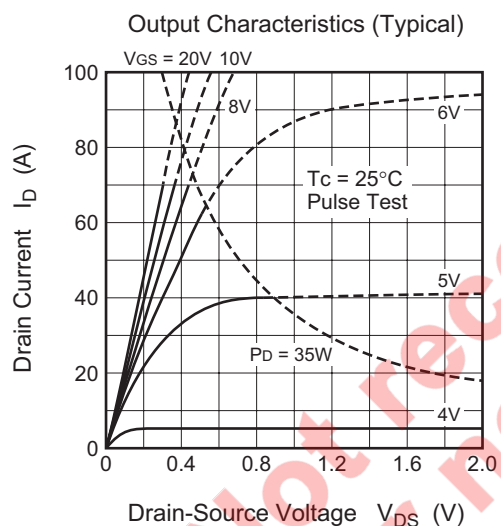
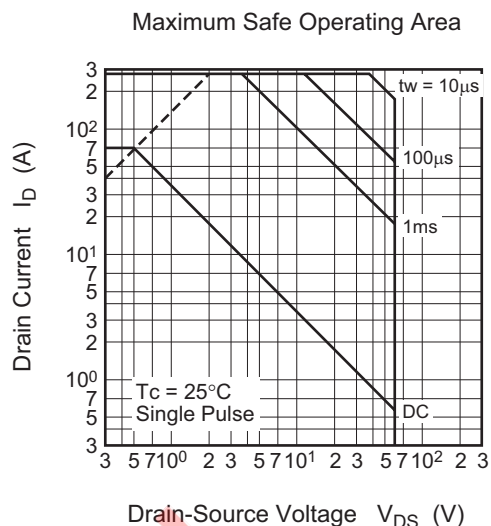
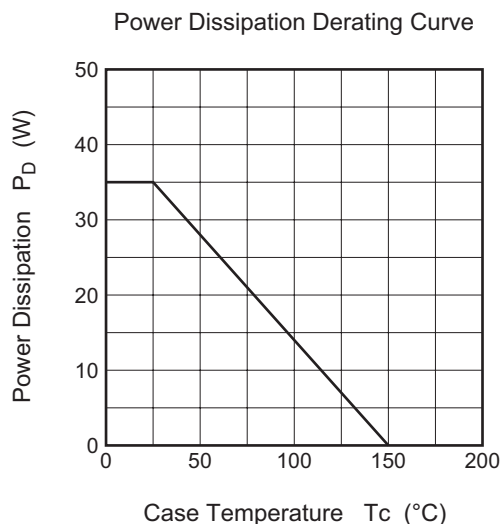
## Electrical Characteristics

(T<sub>ch</sub> = 25°C)

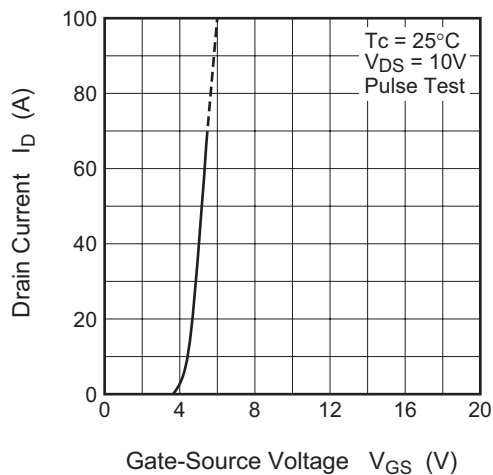
| Parameter                        | Symbol         | Min | Typ   | Max       | Unit                 | Test Conditions                                                                                                 |
|----------------------------------|----------------|-----|-------|-----------|----------------------|-----------------------------------------------------------------------------------------------------------------|
| Drain-source breakdown voltage   | $V_{(BR)DSS}$  | 60  | —     | —         | V                    | $I_D = 1 \text{ mA}$ , $V_{GS} = 0 \text{ V}$                                                                   |
| Gate-source leakage current      | $I_{GSS}$      | —   | —     | $\pm 0.1$ | $\mu\text{A}$        | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0 \text{ V}$                                                            |
| Drain-source leakage current     | $I_{DSS}$      | —   | —     | 0.1       | mA                   | $V_{DS} = 60 \text{ V}$ , $V_{GS} = 0 \text{ V}$                                                                |
| Gate-source threshold voltage    | $V_{GS(th)}$   | 2.0 | 3.0   | 4.0       | V                    | $I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$                                                                  |
| Drain-source on-state resistance | $r_{DS(on)}$   | —   | 5.7   | 7.5       | $\text{m}\Omega$     | $I_D = 35 \text{ A}$ , $V_{GS} = 10 \text{ V}$                                                                  |
| Drain-source on-state voltage    | $V_{DS(on)}$   | —   | 0.200 | 0.263     | V                    | $I_D = 35 \text{ A}$ , $V_{GS} = 10 \text{ V}$                                                                  |
| Forward transfer admittance      | $ y_{fs} $     | 50  | 70    | —         | S                    | $I_D = 35 \text{ A}$ , $V_{DS} = 10 \text{ V}$                                                                  |
| Input capacitance                | $C_{iss}$      | —   | 6540  | —         | pF                   | $V_{DS} = 10 \text{ V}$ , $V_{GS} = 0 \text{ V}$ ,<br>$f = 1 \text{ MHz}$                                       |
| Output capacitance               | $C_{oss}$      | —   | 1640  | —         | pF                   |                                                                                                                 |
| Reverse transfer capacitance     | $C_{rss}$      | —   | 790   | —         | pF                   |                                                                                                                 |
| Turn-on delay time               | $t_{d(on)}$    | —   | 95    | —         | ns                   | $V_{DD} = 30 \text{ V}$ , $I_D = 35 \text{ A}$ ,<br>$V_{GS} = 10 \text{ V}$ ,<br>$R_{GEN} = R_{GS} = 50 \Omega$ |
| Rise time                        | $t_r$          | —   | 195   | —         | ns                   |                                                                                                                 |
| Turn-off delay time              | $t_{d(off)}$   | —   | 290   | —         | ns                   |                                                                                                                 |
| Fall time                        | $t_f$          | —   | 210   | —         | ns                   |                                                                                                                 |
| Source-drain voltage             | $V_{SD}$       | —   | 1.0   | 1.5       | V                    | $I_S = 35 \text{ A}$ , $V_{GS} = 0 \text{ V}$                                                                   |
| Thermal resistance               | $R_{th(ch-c)}$ | —   | —     | 3.57      | $^{\circ}\text{C/W}$ | Channel to case                                                                                                 |
| Reverse recovery time            | $t_{rr}$       | —   | 85    | —         | ns                   | $I_S = 70 \text{ A}$ , $d_i/d_t = -100 \text{ A}/\mu\text{s}$                                                   |

Not recommended  
for new design

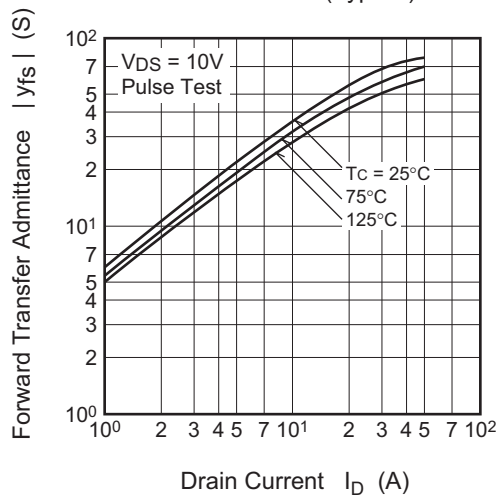
## Performance Curves



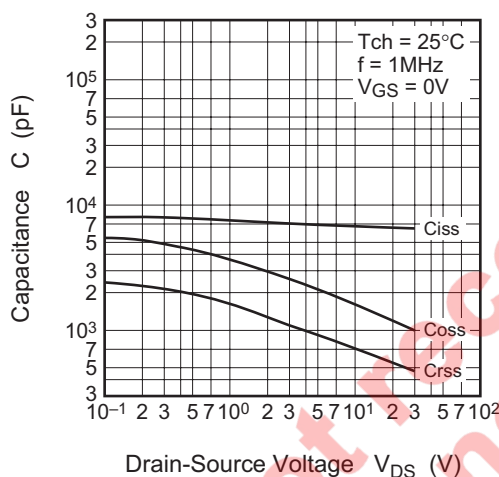
Transfer Characteristics (Typical)



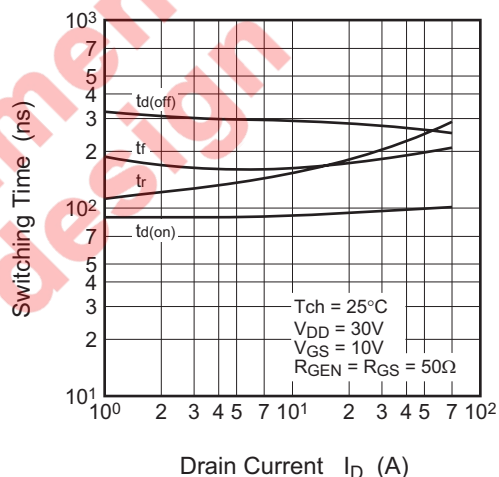
Forward Transfer Admittance vs. Drain Current (Typical)



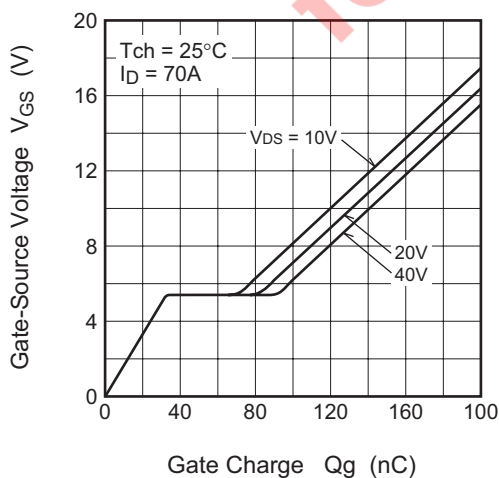
Capacitance vs. Drain-Source Voltage (Typical)



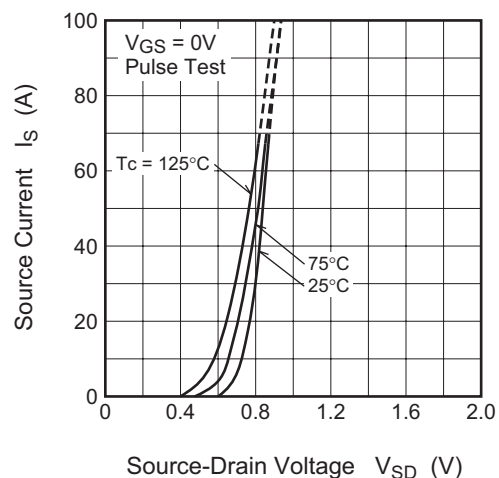
Switching Characteristics (Typical)

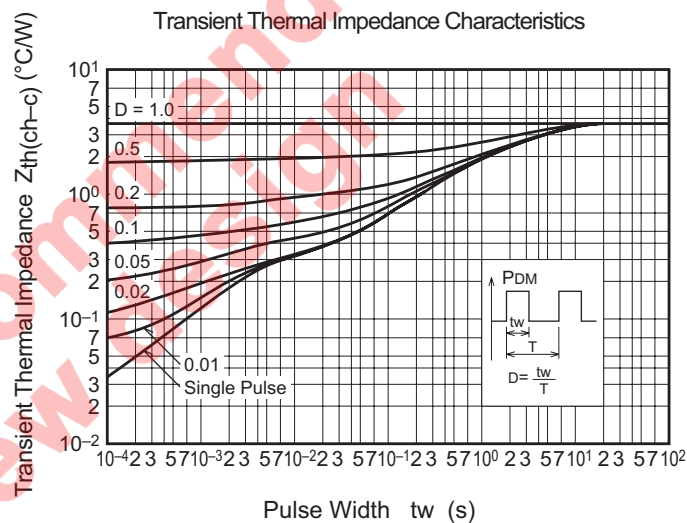
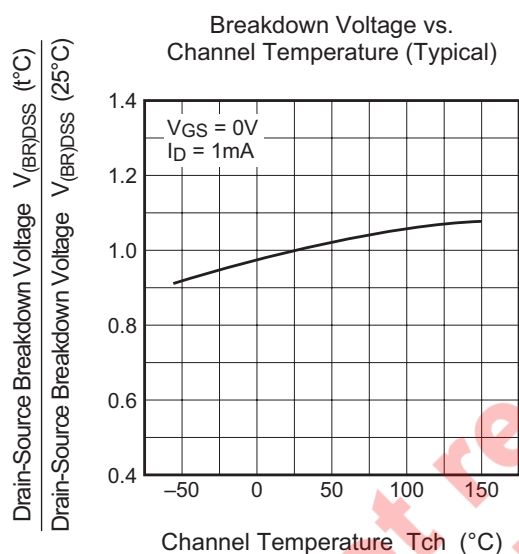
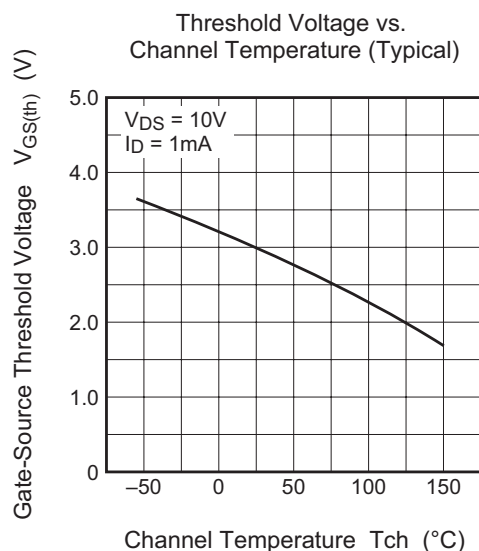
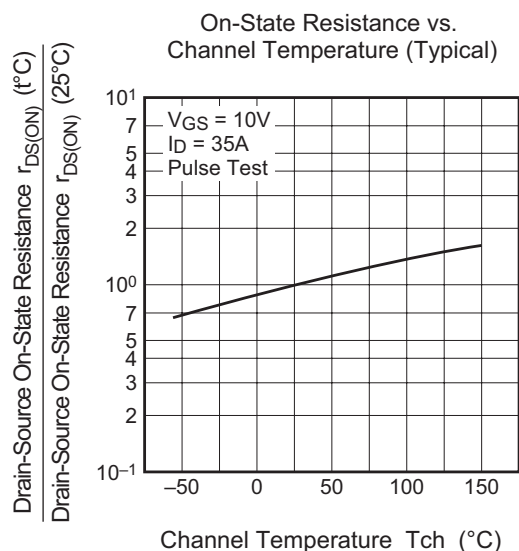


Gate-Source Voltage vs. Gate Charge (Typical)

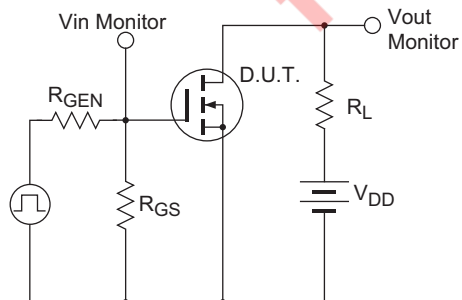


Source-Drain Diode Forward Characteristics (Typical)

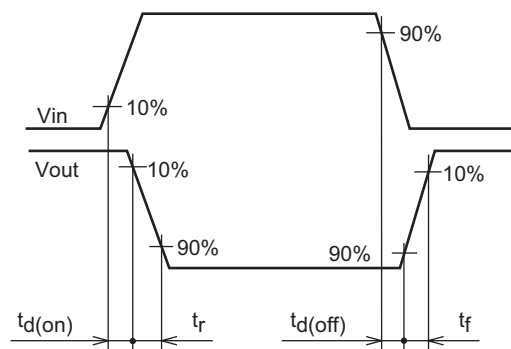




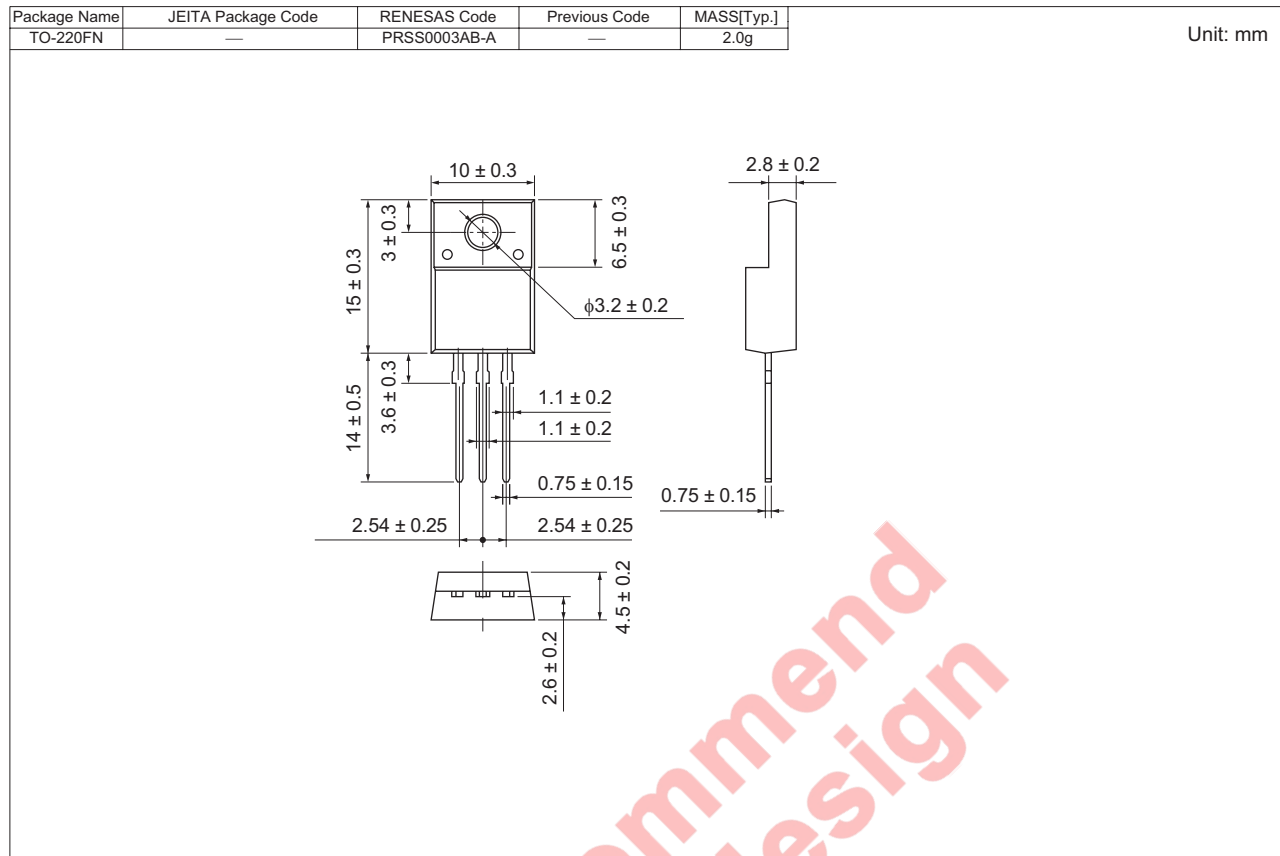
Switching Time Measurement Circuit



Switching Waveform



## Package Dimensions



## Order Code

| Lead form     | Standard packing        | Quantity | Standard order code           | Standard order code example |
|---------------|-------------------------|----------|-------------------------------|-----------------------------|
| Straight type | Plastic Magazine (Tube) | 50       | Type name                     | FS70KM-06                   |
| Lead form     | Plastic Magazine (Tube) | 50       | Type name – Lead forming code | FS70KM-06-A8                |

Note : Please confirm the specification about the shipping in detail.

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