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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
for new design

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FX30KMJ-03

High-Speed Switching Use Pch Power MOS FET

REJ03G0260-0100

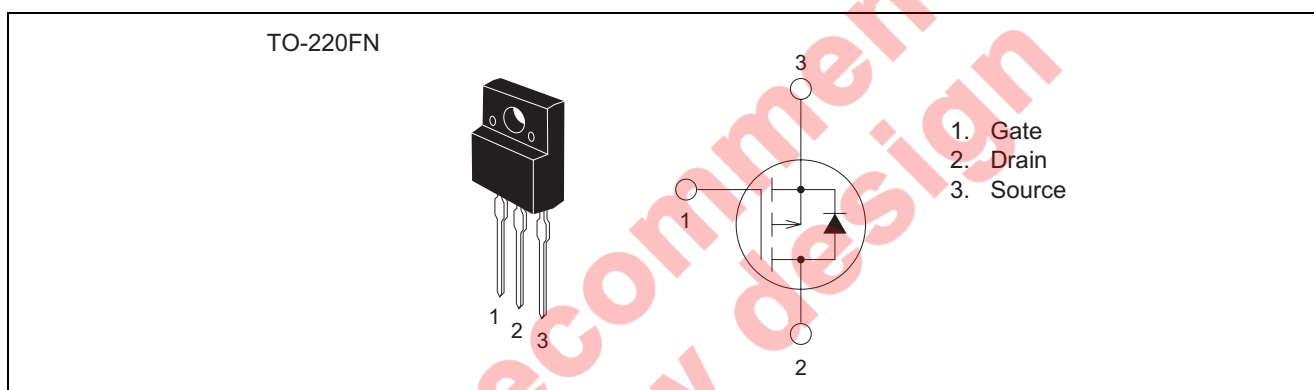
Rev.1.00

Aug.20.2004

Features

- Drive voltage : 4 V
- V_{DSS} : - 30 V
- $r_{DS(ON) (max)}$: 61 m Ω
- I_D : - 30 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 50 ns

Outline



Applications

Motor control, lamp control, solenoid control, DC-DC converters, etc.

Maximum Ratings

($T_c = 25^\circ\text{C}$)

| Parameter | Symbol | Rated | Unit | Conditions |
|----------------------------|-----------|--------------|------------------|----------------------------------|
| Drain-source voltage | V_{DSS} | -30 | V | $V_{GS} = 0\text{ V}$ |
| Gate-source voltage | V_{GSS} | ± 20 | V | $V_{DS} = 0\text{ V}$ |
| Drain current | I_D | -30 | A | |
| Drain current (Pulsed) | I_{DM} | -120 | A | |
| Avalanche current (Pulsed) | I_{DA} | -30 | A | $L = 10\ \mu\text{H}$ |
| Source current | I_S | -30 | A | |
| Source current (Pulsed) | I_{SM} | -120 | A | |
| Maximum power dissipation | P_D | 25 | W | |
| Channel temperature | T_{ch} | - 55 to +150 | $^\circ\text{C}$ | |
| Storage temperature | T_{stg} | - 55 to +150 | $^\circ\text{C}$ | |
| Isolation voltage | V_{iso} | 2000 | V | AC 1 minute, Terminal to case |
| Mass | — | 2.0 | g | Typical value |

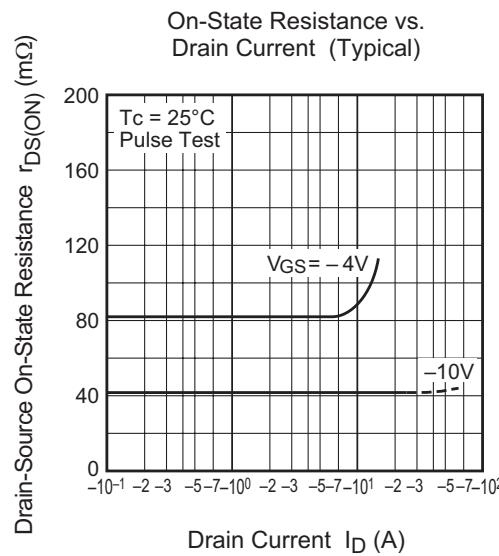
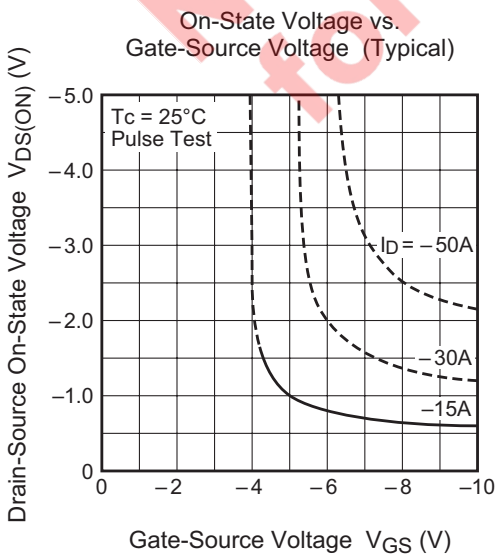
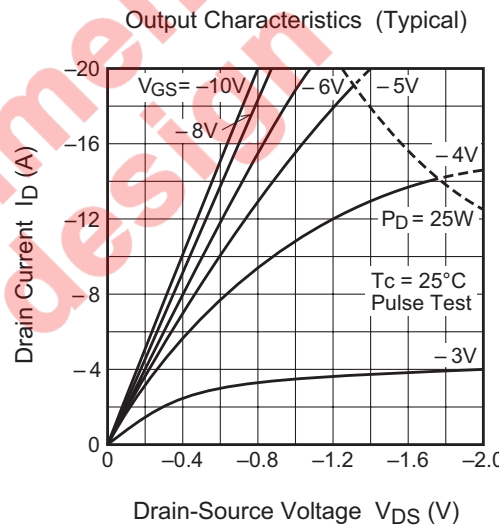
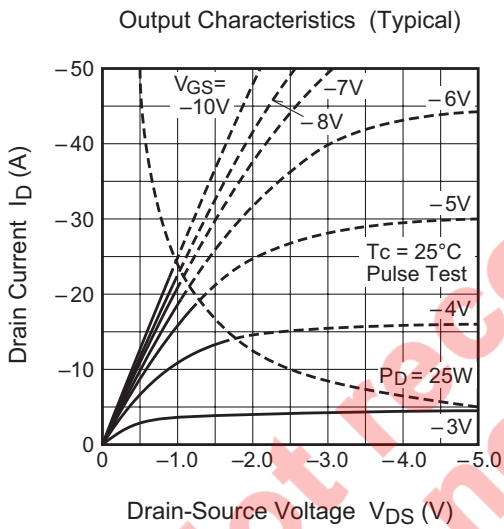
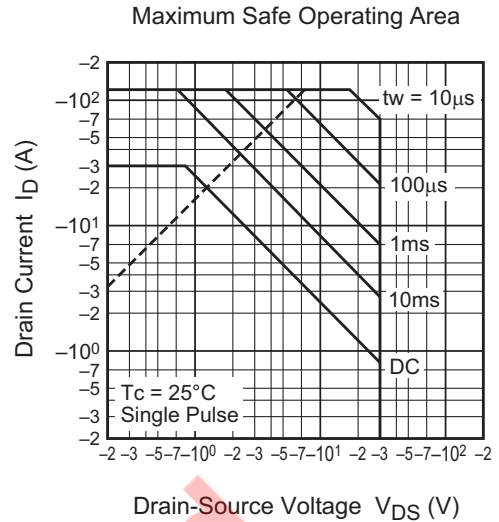
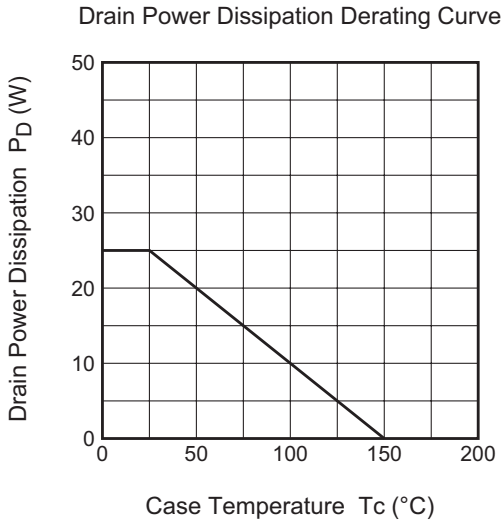
Electrical Characteristics

(Tch = 25°C)

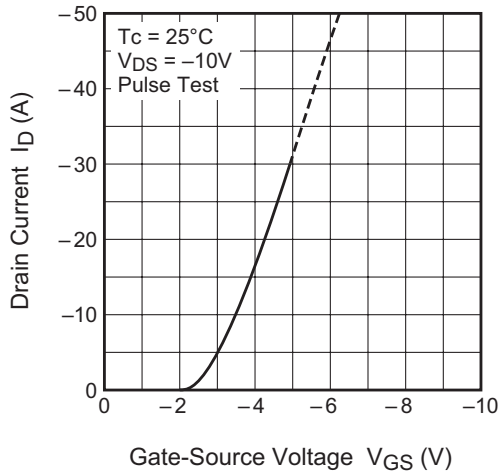
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test conditions |
|----------------------------------|----------------|------|-------|-----------|----------------------|--|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | -30 | — | — | V | $I_D = -1 \text{ mA}$, $V_{GS} = 0 \text{ V}$ |
| Gate-source leakage current | I_{GSS} | — | — | ± 0.1 | μA | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$ |
| Drain-source leakage current | I_{DSS} | — | — | -0.1 | mA | $V_{DS} = -30 \text{ V}$, $V_{GS} = 0 \text{ V}$ |
| Gate-source threshold voltage | $V_{GS(th)}$ | -1.3 | -1.8 | -2.3 | V | $I_D = -1 \text{ mA}$, $V_{DS} = -10 \text{ V}$ |
| Drain-source on-state resistance | $r_{DS(ON)}$ | — | 48 | 61 | m Ω | $I_D = -15 \text{ A}$, $V_{GS} = -10 \text{ V}$ |
| Drain-source on-state resistance | $r_{DS(ON)}$ | — | 96 | 120 | m Ω | $I_D = -5 \text{ A}$, $V_{GS} = -4 \text{ V}$ |
| Drain-source on-state voltage | $V_{DS(ON)}$ | — | -0.72 | -0.92 | V | $I_D = -15 \text{ A}$, $V_{GS} = -10 \text{ V}$ |
| Forward transfer admittance | $ y_{fs} $ | — | 11.9 | — | S | $I_D = -15 \text{ A}$, $V_{DS} = -10 \text{ V}$ |
| Input capacitance | C_{iss} | — | 2460 | — | pF | $V_{DS} = -10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 410 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 170 | — | pF | |
| Turn-on delay time | $t_{d(on)}$ | — | 20 | — | ns | $V_{DD} = -15 \text{ V}$, $I_D = -15 \text{ A}$, $V_{GS} = -10 \text{ V}$, $R_{GEN} = R_{GS} = 50 \Omega$ |
| Rise time | t_r | — | 84 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 123 | — | ns | |
| Fall time | t_f | — | 60 | — | ns | |
| Source-drain voltage | V_{SD} | — | -1.0 | -1.5 | V | $I_S = -15 \text{ A}$, $V_{GS} = 0 \text{ V}$ |
| Thermal resistance | $R_{th(ch-c)}$ | — | — | 5.00 | $^{\circ}\text{C/W}$ | Channel to case |
| Reverse recovery time | t_{rr} | — | 50 | — | ns | $I_S = -15 \text{ A}$, $dis/dt = 50 \text{ A}/\mu\text{s}$ |

Not recommended
for new design

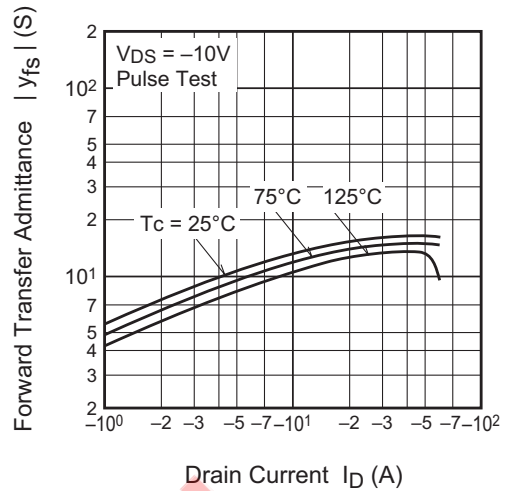
Performance Curves



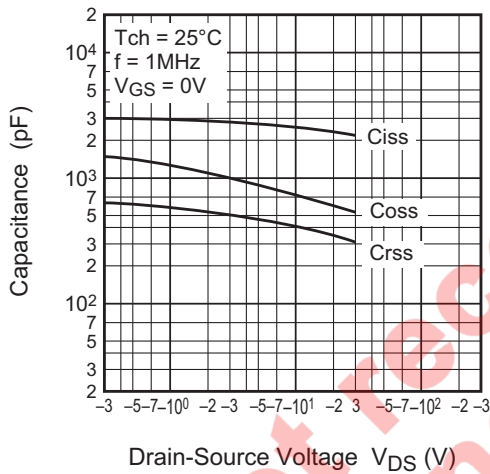
Transfer Characteristics (Typical)



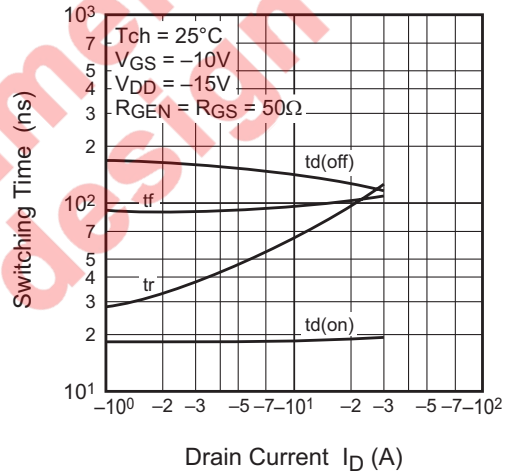
Forward Transfer Admittance vs. Drain Current (Typical)



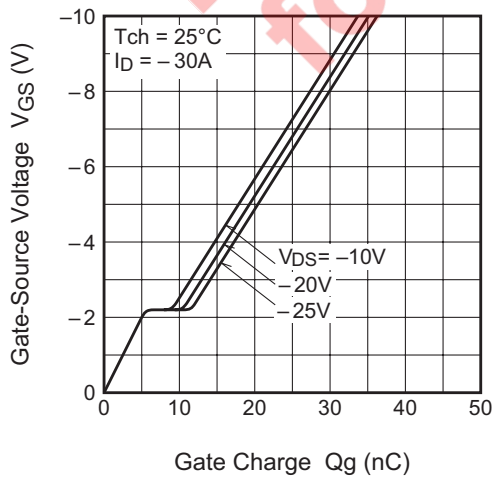
Capacitance vs. Drain-Source Voltage (Typical)



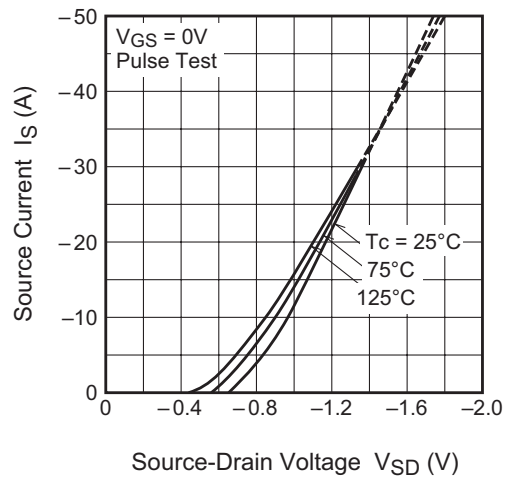
Switching Characteristics (Typical)

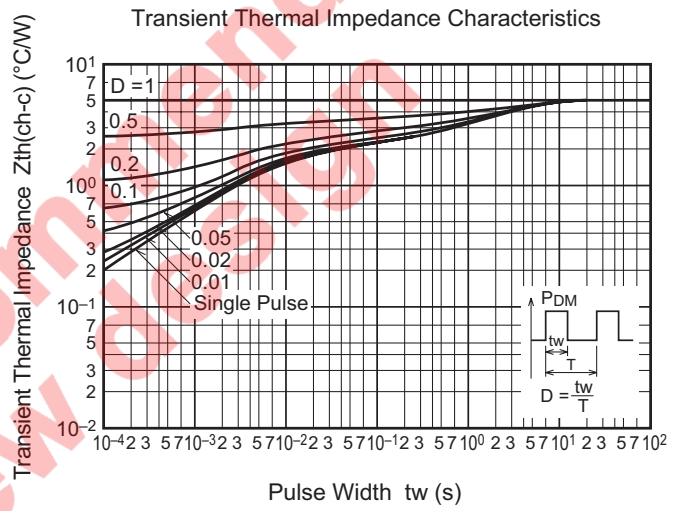
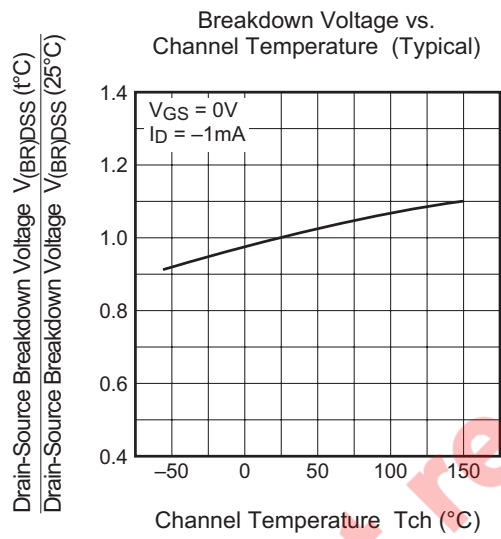
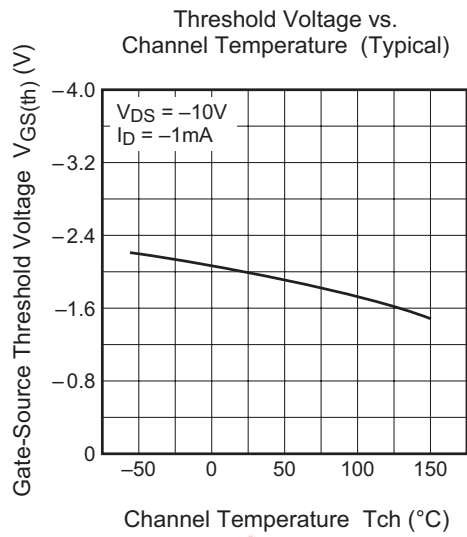
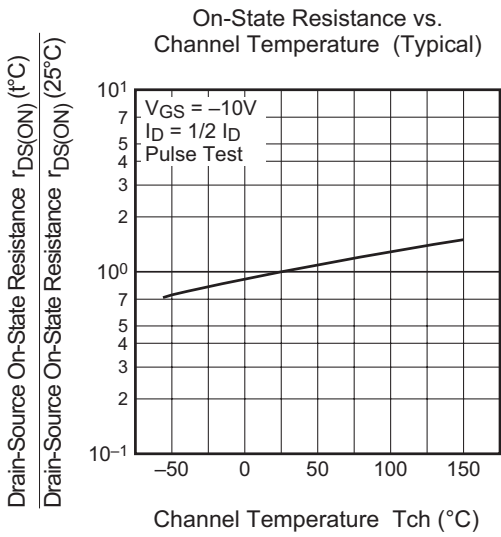


Gate-Source Voltage vs. Gate Charge (Typical)

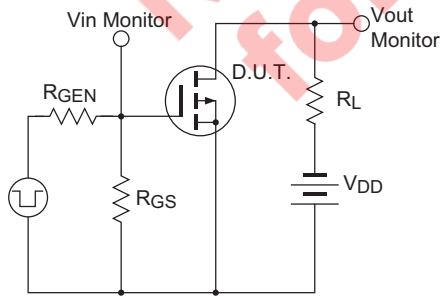


Source-Drain Diode Forward Characteristics (Typical)

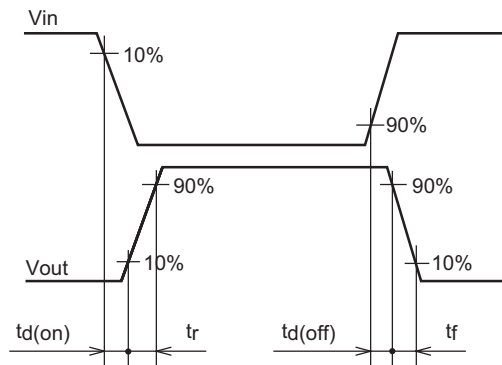




Switching Time Measurement Circuit



Switching Waveform



Package Dimensions

TO-220FN

| | | | |
|-------------------|------------|----------------------------|---------------|
| EIAJ Package Code | JEDEC Code | Mass (g) (reference value) | Lead Material |
| — | — | 2.0 | Cu alloy |

Technical drawings showing dimensions for the TO-220FN package. Dimensions include: 10 ± 0.3, 3 ± 0.3, 15 ± 0.3, 6.5 ± 0.3, φ 3.2 ± 0.2, 14 ± 0.5, 3.6 ± 0.3, 1.1 ± 0.2, 0.75 ± 0.15, 2.54 ± 0.25, 2.8 ± 0.2, 0.75 ± 0.15, 4.5 ± 0.2, and 2.6 ± 0.2.

Note 1) The dimensional figures indicate representative values unless otherwise the tolerance is specified.

| Symbol | Dimension in Millimeters | | |
|----------------|--------------------------|-----|-----|
| | Min | Typ | Max |
| A | — | — | — |
| A ₁ | — | — | — |
| A ₂ | — | — | — |
| b | — | — | — |
| D | — | — | — |
| E | — | — | — |
| e | — | — | — |
| x | — | — | — |
| y | — | — | — |
| y ₁ | — | — | — |
| ZD | — | — | — |
| ZE | — | — | — |

Order Code

| Lead form | Standard packing | Quantity | Standard order code | Standard order code example |
|---------------|-------------------------|----------|-------------------------------|-----------------------------|
| Straight type | Plastic Magazine (Tube) | 50 | Type name | FX30KMJ-03 |
| Lead form | Plastic Magazine (Tube) | 50 | Type name – Lead forming code | FX30KMJ-03-A8 |

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