

2SJ533

Silicon P Channel MOS FET
High Speed Power Switching

HITACHI

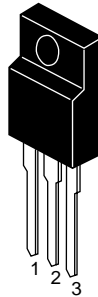
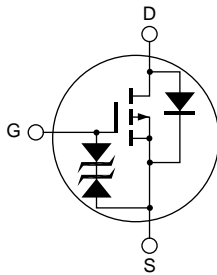
ADE-208-649B (Z)
3rd. Edition
Jun 1998

Features

- Low on-resistance
 $R_{DS(on)} = 0.028\Omega$ typ.
- Low drive current.
- 4V gate drive devices.
- High speed switching.

Outline

TO-220CFM



1. Gate
2. Drain
3. Source

Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|--|---------------------------------|-------------|------|
| Drain to source voltage | V_{DSS} | −60 | V |
| Gate to source voltage | V_{GSS} | ±20 | V |
| Drain current | I_D | −30 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note1} | −120 | A |
| Body-drain diode reverse drain current | I_{DR} | −30 | A |
| Avalanche current | I_{AP} ^{Note3} | −30 | A |
| Avalanche energy | E_{AR} ^{Note3} | 77 | mJ |
| Channel dissipation | P_{ch} ^{Note2} | 35 | W |
| Channel temperature | T_{ch} | 150 | °C |
| Storage temperature | T_{stg} | −55 to +150 | °C |

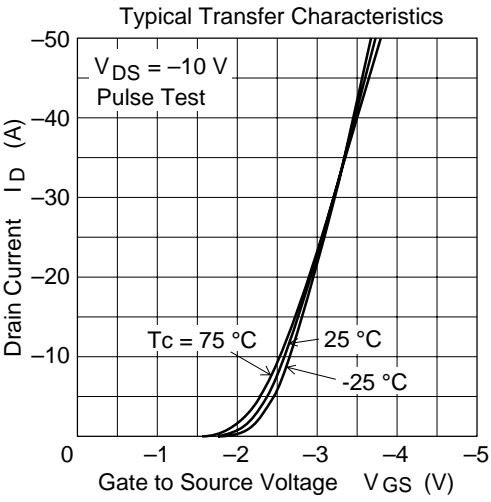
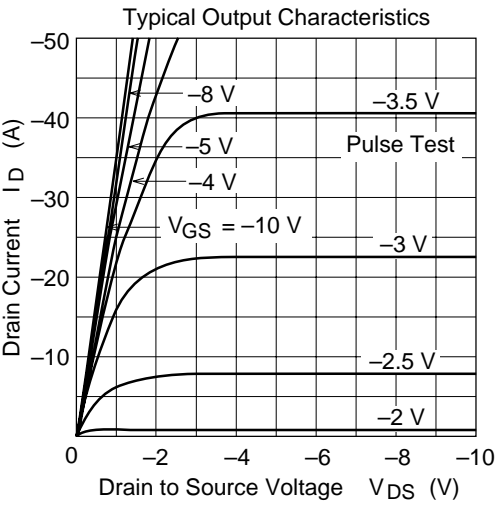
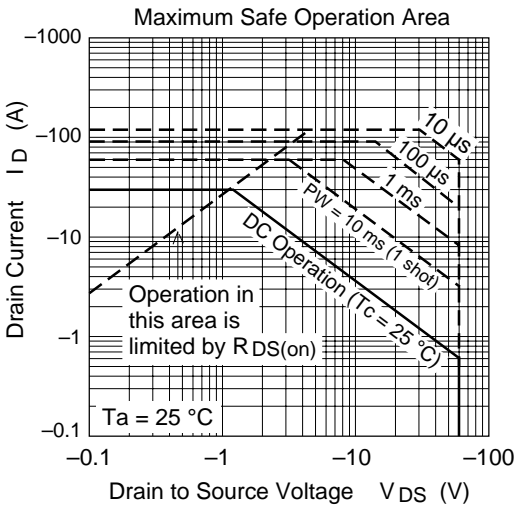
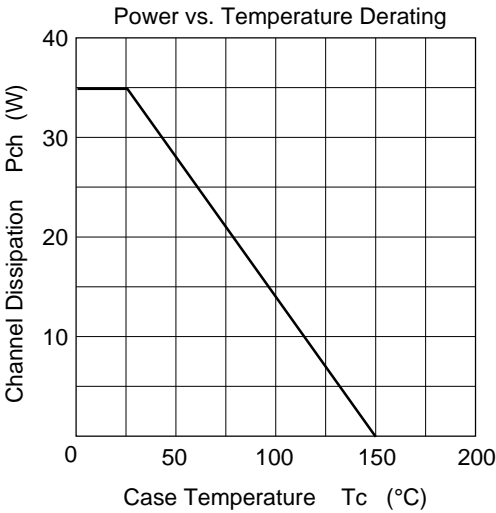
Note: 1. $PW \leq 10\mu s$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ C$
3. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50\ \Omega$

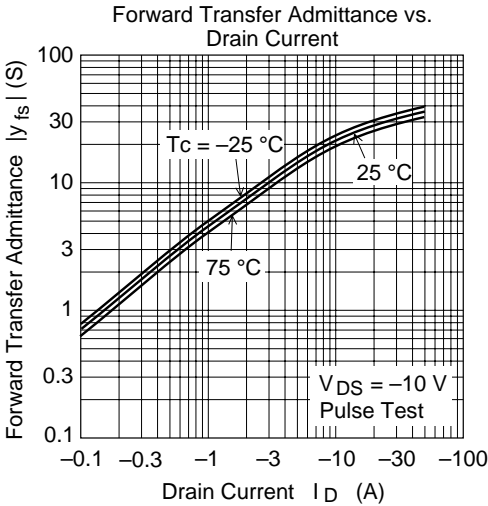
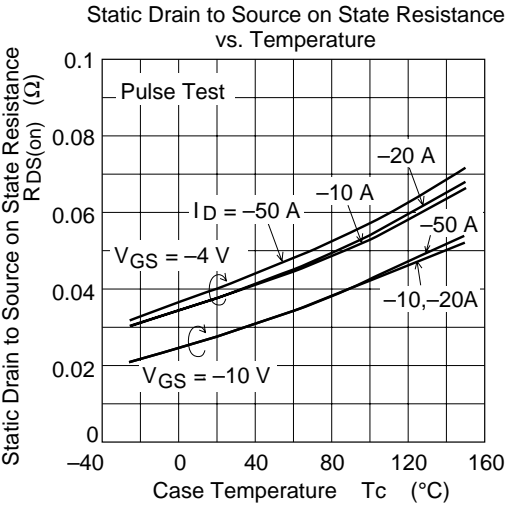
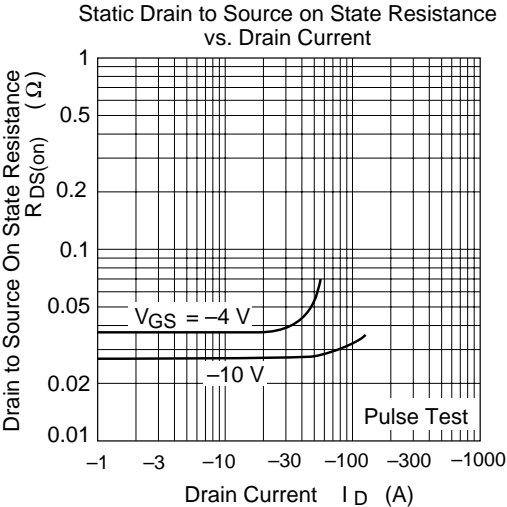
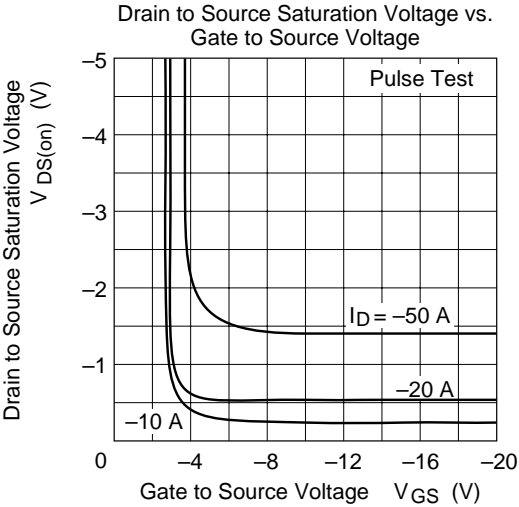
Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|------|-------|-------|------|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | −60 | — | — | V | $I_D = -10mA$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ±20 | — | — | V | $I_G = \pm 100\mu A$, $V_{DS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | −10 | μA | $V_{DS} = -60\ V$, $V_{GS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ±10 | μA | $V_{GS} = \pm 16V$, $V_{DS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | −1.0 | — | −2.0 | V | $I_D = -1mA$, $V_{DS} = -10V$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 0.028 | 0.037 | Ω | $I_D = -15A$, $V_{GS} = -10V$ ^{Note4} |
| | $R_{DS(on)}$ | — | 0.038 | 0.055 | Ω | $I_D = -15A$, $V_{GS} = -4V$ ^{Note4} |
| Forward transfer admittance | $ y_{fs} $ | 15 | 25 | — | S | $I_D = -15A$, $V_{DS} = -10V$ ^{Note4} |
| Input capacitance | C_{iss} | — | 2500 | — | pF | $V_{DS} = -10V$ |
| Output capacitance | C_{oss} | — | 1300 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | C_{rss} | — | 300 | — | pF | $f = 1MHz$ |
| Turn-on delay time | $t_{d(on)}$ | — | 25 | — | ns | $V_{GS} = -10V$, $I_D = -15A$ |
| Rise time | t_r | — | 150 | — | ns | $R_L = 2\ \Omega$ |
| Turn-off delay time | $t_{d(off)}$ | — | 350 | — | ns | |
| Fall time | t_f | — | 220 | — | ns | |
| Body–drain diode forward voltage | V_{DF} | — | −0.95 | — | V | $I_F = -30A$, $V_{GS} = 0$ |
| Body–drain diode reverse recovery time | t_{rr} | — | 100 | — | ns | $I_F = -30A$, $V_{GS} = 0$ $diF/dt = 50A/\mu s$ |

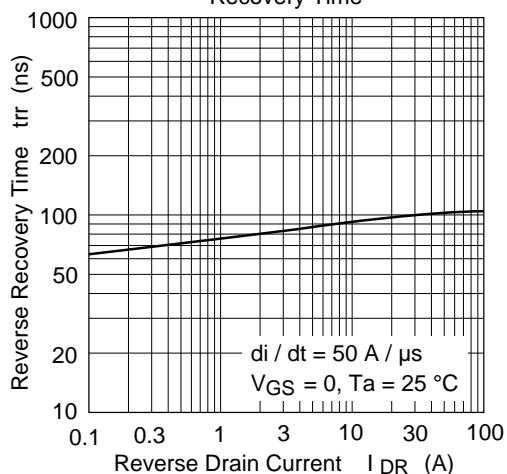
Note: 4. Pulse test

Main Characteristics

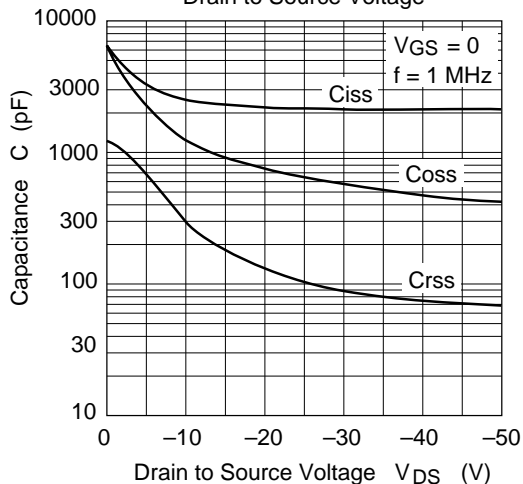




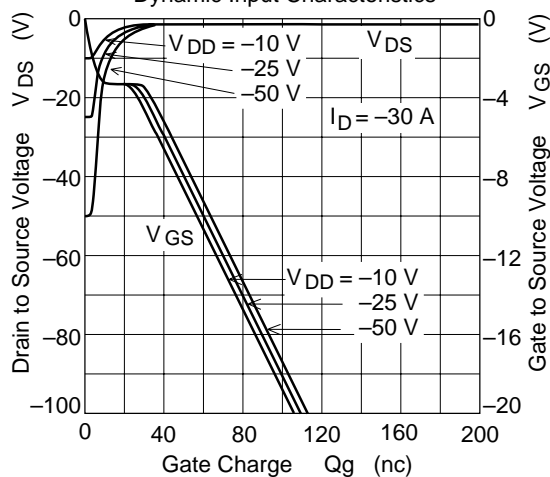
Body-Drain Diode Reverse Recovery Time



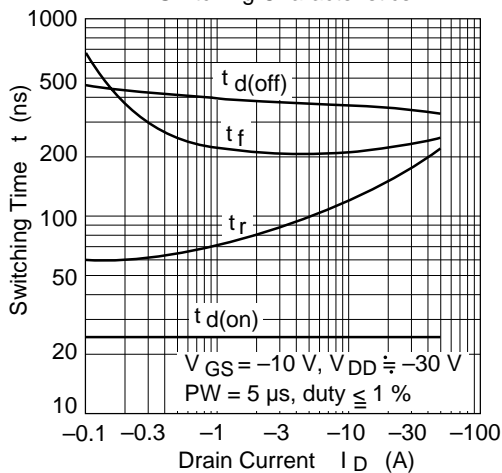
Typical Capacitance vs. Drain to Source Voltage

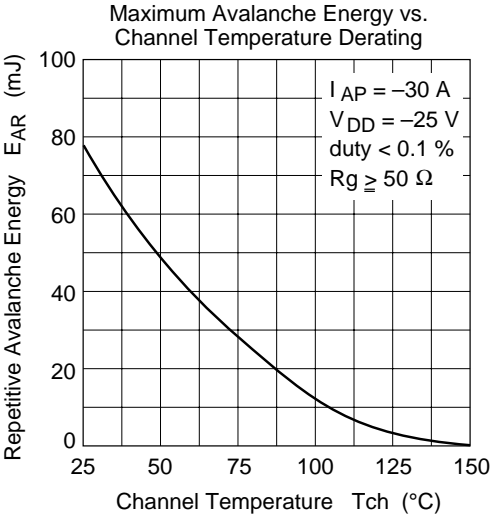
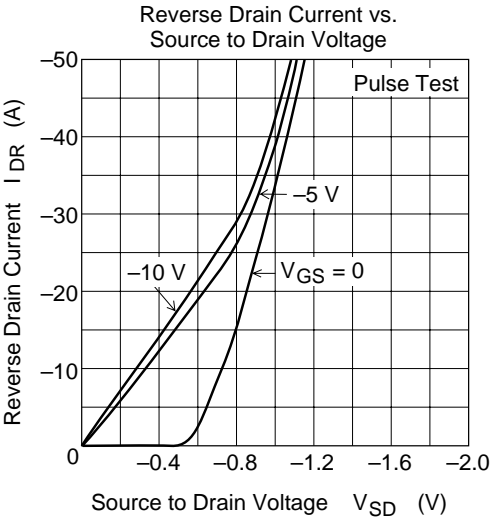


Dynamic Input Characteristics

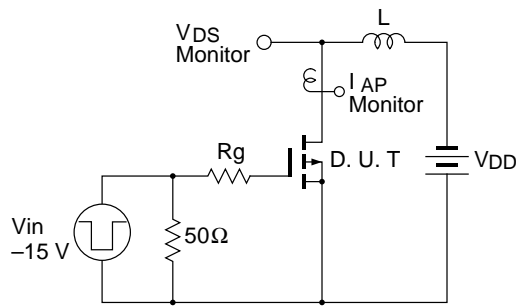


Switching Characteristics

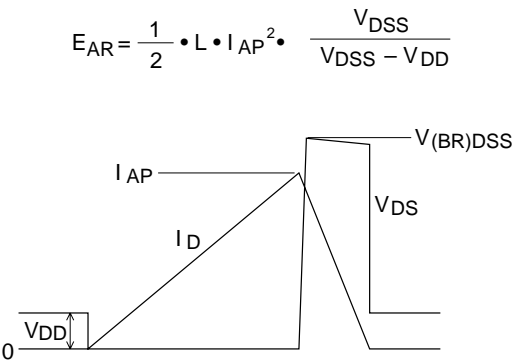


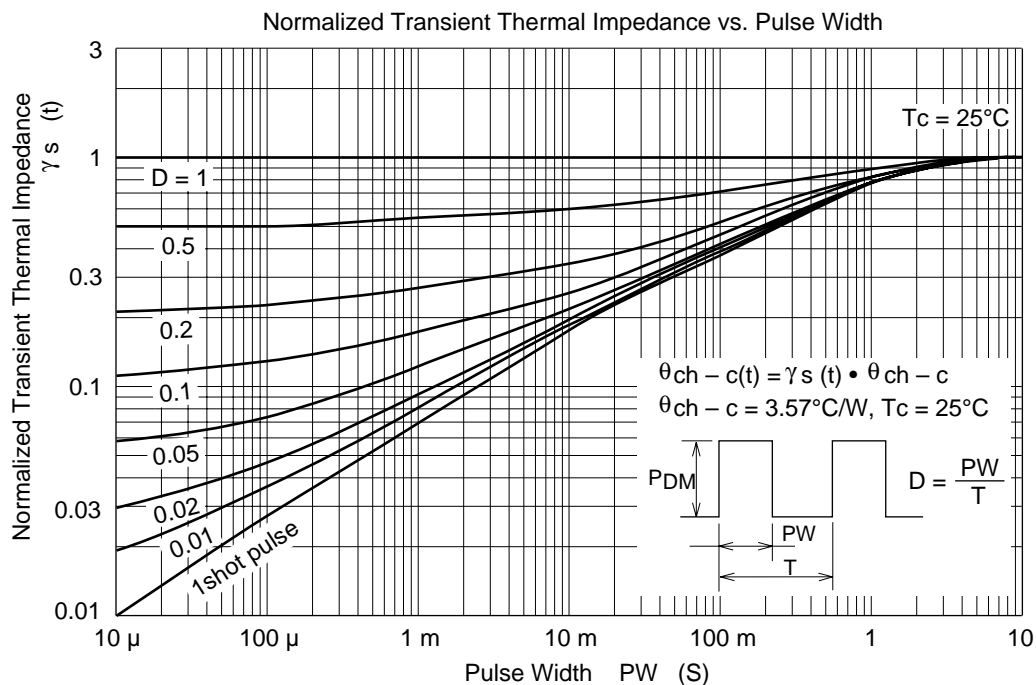


Avalanche Test Circuit

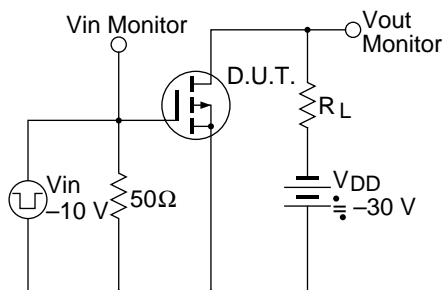


Avalanche Waveform

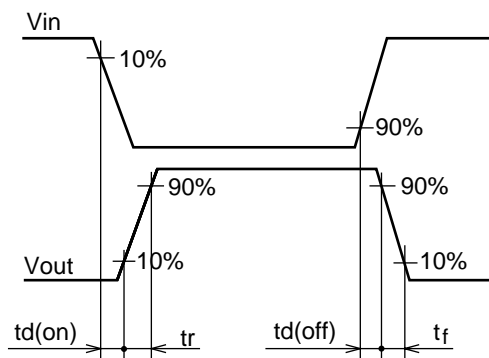




Switching Time Test Circuit

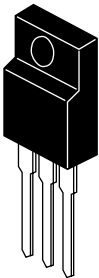
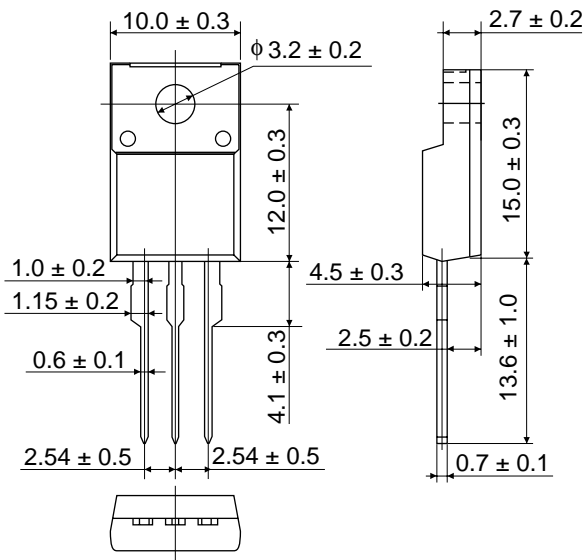


Waveform



Package Dimensions

Unit: mm



| | |
|--------------|-----------|
| Hitachi Code | TO-220CFM |
| EIAJ | — |
| JEDEC | — |

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