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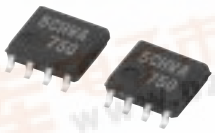
MITSUBISHI Nch POWER MOSFET

# FY5ACH-03A

HIGH-SPEED SWITCHING USE

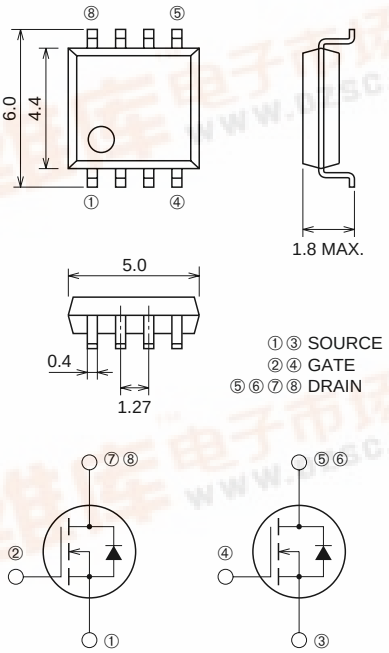
## FY5ACH-03A



- 2.5V DRIVE
- $V_{DSS}$ ..... 30V
- $r_{DS}$ (ON) (MAX) ..... 50mΩ
- $I_D$ ..... 5A

## OUTLINE DRAWING

Dimensions in mm




SOP-8

## APPLICATION

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

**MAXIMUM RATINGS** ($T_c$ = 25°C)

| Symbol | Parameter | Conditions | Ratings | Unit |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-source voltage | $V_{GS}$ = 0V | 30 | V |
| $V_{GSS}$ | Gate-source voltage | $V_{DS}$ = 0V | ±10 | V |
| $I_D$ | Drain current | | 5 | A |
| $I_{DM}$ | Drain current (Pulsed) | | 35 | A |
| $I_{DA}$ | Avalanche drain current (Pulsed) | L = 10μH | 5 | A |
| $I_S$ | Source current | | 1.7 | A |
| $I_{SM}$ | Source current (Pulsed) | | 6.8 | A |
| $P_D$ | Maximum power dissipation | | 1.6 | W |
| $T_{ch}$ | Channel temperature | | –55 ~ +150 | °C |
| $T_{stg}$ | Storage temperature | | –55 ~ +150 | °C |
| — | Weight | Typical value | 0.07 | g |



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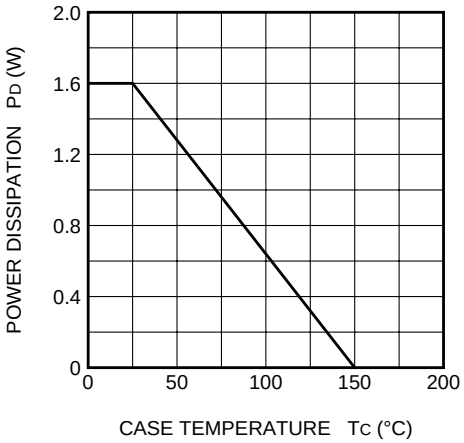
MITSUBISHI ELECTRIC

## ELECTRICAL CHARACTERISTICS (Tch = 25°C)

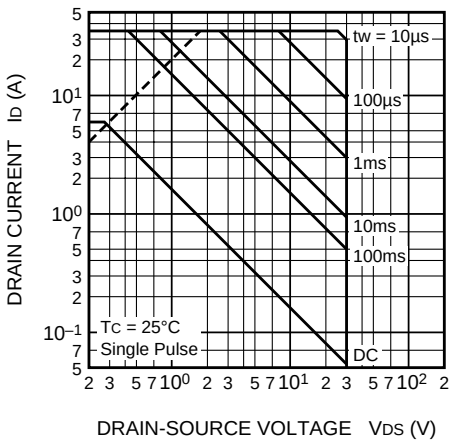
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{(BR)DSS}$ | Drain-source breakdown voltage | $I_D$ = 1mA, $V_{DS}$ = 0V | 30 | — | — | V |
| $I_{GSS}$ | Gate-source leakage current | $V_{GS}$ = ±10V, $V_{DS}$ = 0V | — | — | ±0.1 | μA |
| $I_{DSS}$ | Drain-source leakage current | $V_{DS}$ = 30V, $V_{GS}$ = 0V | — | — | 0.1 | mA |
| $V_{GS(th)}$ | Gate-source threshold voltage | $I_D$ = 1mA, $V_{DS}$ = 10V | 0.5 | 0.9 | 1.3 | V |
| $r_{DS(ON)}$ | Drain-source on-state resistance | $I_D$ = 5A, $V_{GS}$ = 4V | — | 40 | 50 | mΩ |
| $r_{DS(ON)}$ | Drain-source on-state resistance | $I_D$ = 2.5A, $V_{GS}$ = 2.5V | — | 52 | 80 | mΩ |
| $V_{DS(ON)}$ | Drain-source on-state voltage | $I_D$ = 5A, $V_{GS}$ = 4V | — | 0.20 | 0.25 | V |
| $\lvert y_{fs} \rvert$ | Forward transfer admittance | $I_D$ = 5A, $V_{DS}$ = 10V | — | 11 | — | S |
| $C_{iss}$ | Input capacitance | $V_{DS}$ = 10V, $V_{GS}$ = 0V, f = 1MHz | — | 750 | — | pF |
| $C_{oss}$ | Output capacitance | | — | 180 | — | pF |
| $C_{rss}$ | Reverse transfer capacitance | | — | 80 | — | pF |
| $t_{d(on)}$ | Turn-on delay time | $V_{DD}$ = 15V, $I_D$ = 2.5A, $V_{GS}$ = 4V, $R_{GEN}$ = $R_{GS}$ = 50Ω | — | 18 | — | ns |
| $t_r$ | Rise time | | — | 45 | — | ns |
| $t_{d(off)}$ | Turn-off delay time | | — | 52 | — | ns |
| $t_f$ | Fall time | | — | 44 | — | ns |
| $V_{SD}$ | Source-drain voltage | $I_S$ = 1.7A, $V_{GS}$ = 0V | — | 0.75 | 1.1 | V |
| $R_{th(ch-a)}$ | Thermal resistance | Channel to ambient | — | — | 78.1 | °C/W |
| $t_{rr}$ | Reverse recovery time | $I_S$ = 1.7A, dis/dt = –50A/μs | — | 100 | — | ns |

## PERFORMANCE CURVES

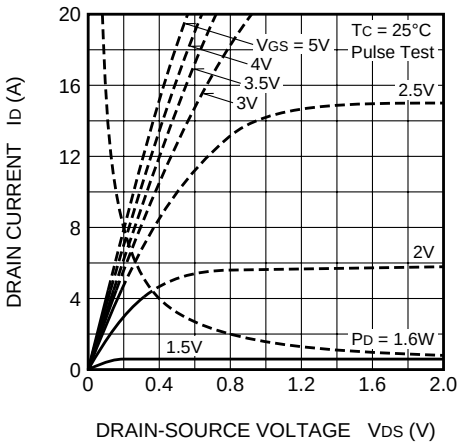
### POWER DISSIPATION DERATING CURVE



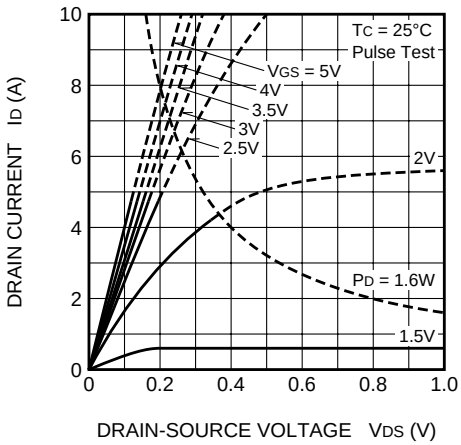

### MAXIMUM SAFE OPERATING AREA



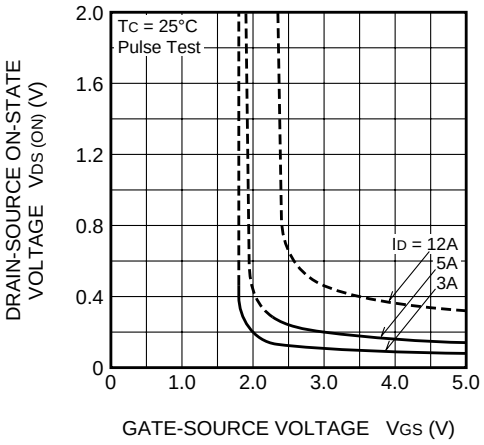

### OUTPUT CHARACTERISTICS (TYPICAL)



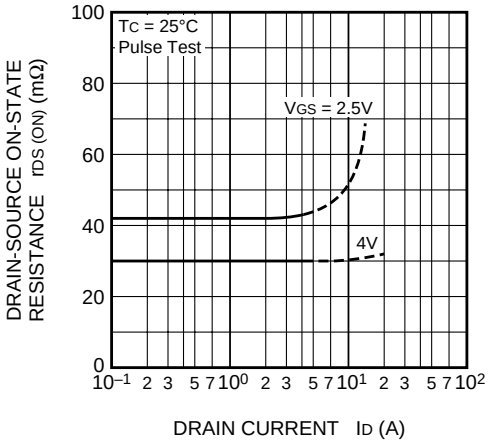

### OUTPUT CHARACTERISTICS (TYPICAL)



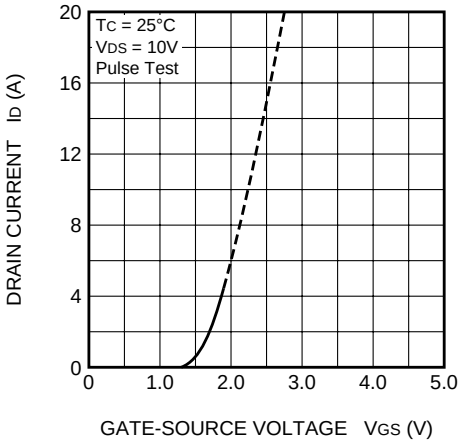
**ON-STATE VOLTAGE VS. GATE-SOURCE VOLTAGE (TYPICAL)**



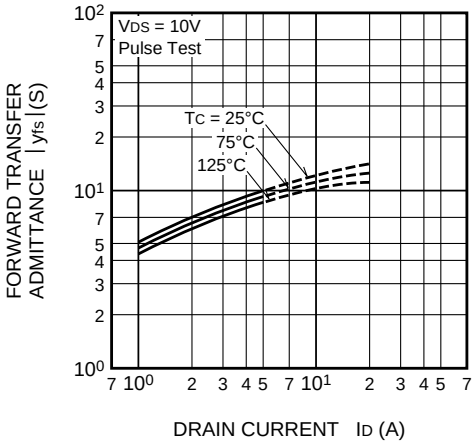

**ON-STATE RESISTANCE VS. DRAIN CURRENT (TYPICAL)**



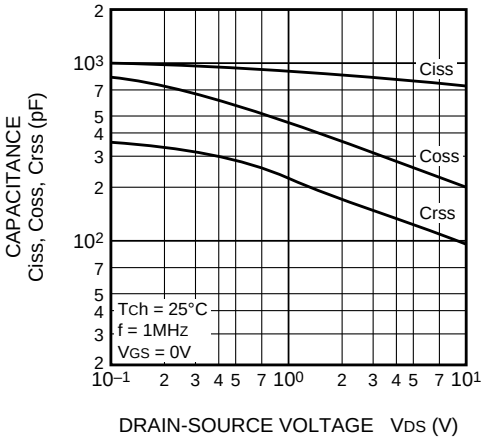

**TRANSFER CHARACTERISTICS (TYPICAL)**



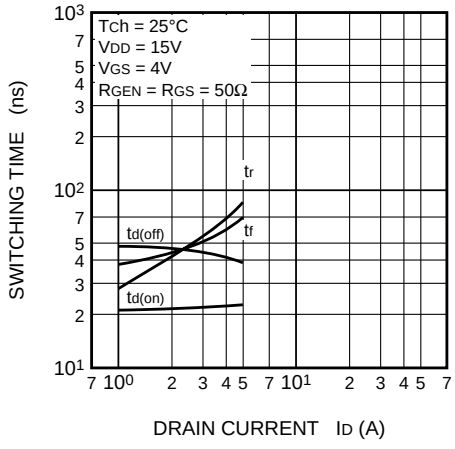

**FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT (TYPICAL)**



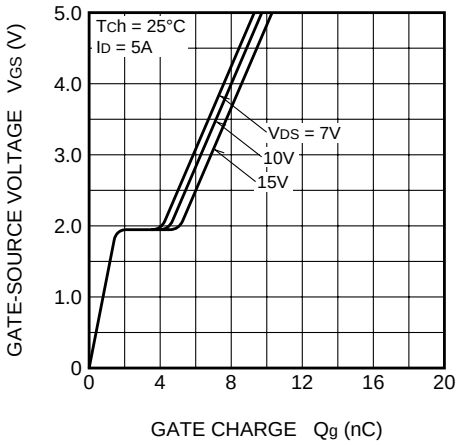

**CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)**



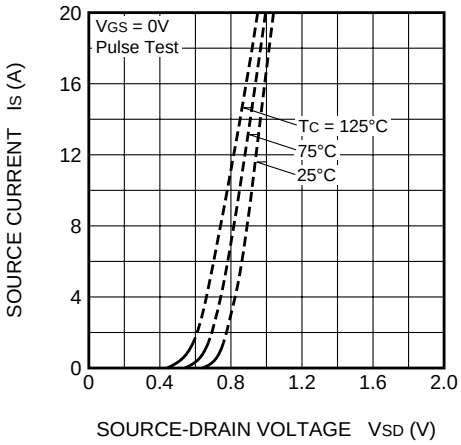

**SWITCHING CHARACTERISTICS (TYPICAL)**



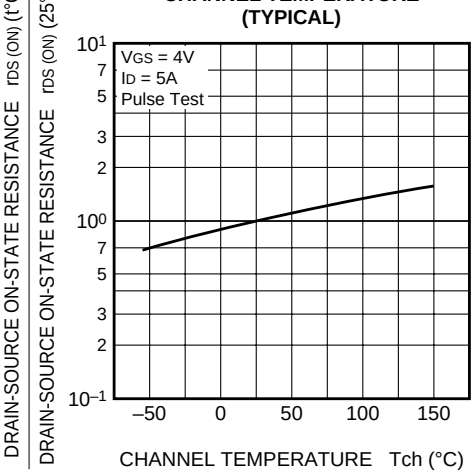
**GATE-SOURCE VOLTAGE VS. GATE CHARGE (TYPICAL)**



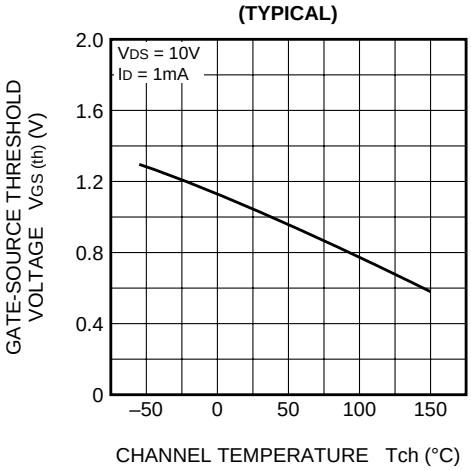

**SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)**



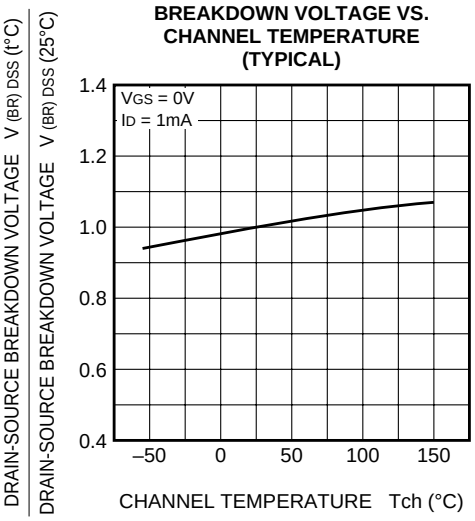

**ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)**

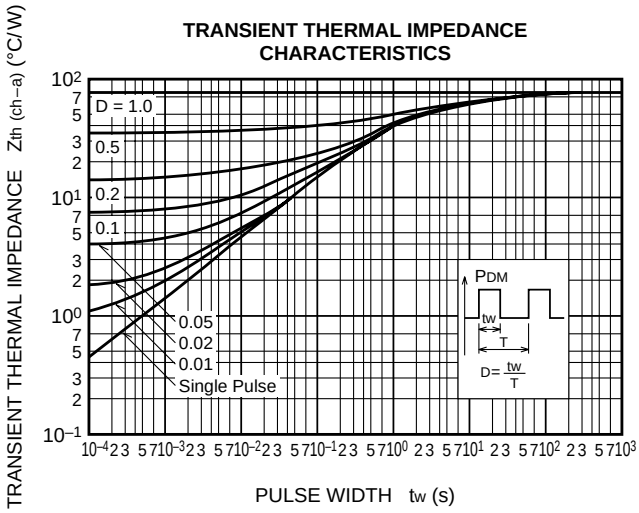



**THRESHOLD VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)**




**BREAKDOWN VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)**




**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS**