



# H5N5006FM

Silicon N Channel MOS FET  
High Speed Power Switching

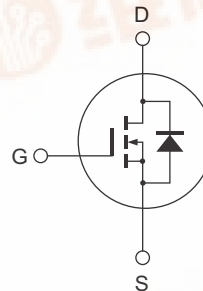
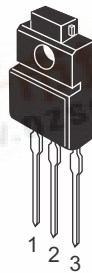
REJ03G1114-0200  
(Previous: ADE-208-1112)  
Rev.2.00  
Sep 07, 2005

## Features

- Low on-resistance:  $R_{DS(on)} = 2.5 \Omega$  typ.
- Low leakage current:  $I_{DSS} = 1 \mu A$  max (at  $V_{DS} = 500 V$ )
- High speed switching:  $t_f = 15 ns$  typ (at  $V_{GS} = 10 V, V_{DD} = 250 V, I_D = 1.5 A$ )
- Low gate charge:  $Q_g = 14 nC$  typ (at  $V_{DD} = 400 V, V_{GS} = 10 V, I_D = 3 A$ )
- Avalanche ratings

## Outline

RENESAS Package code: PRSS0003AD-A  
(Package name: TO-220FM)



1. Gate
2. Drain
3. Source

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	$V_{DSS}$	500	V
Gate to source voltage	$V_{GSS}$	±30	V
Drain current	$I_D$	3	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	12	A
Body-drain diode reverse drain current	$I_{DR}$	3	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ <sup>Note 1</sup>	12	A
Avalanche current	$I_{AP}$ <sup>Note 3</sup>	3	A
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	25	W
Channel to case thermal Impedance	$\theta_{ch-c}$	5.0	°C/W
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$ 2. Value at  $T_c = 25^\circ C$ 3.  $T_{ch} \leq 150^\circ C$ 

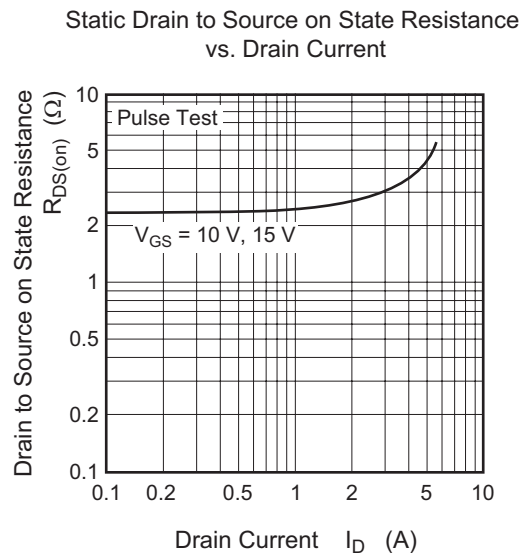
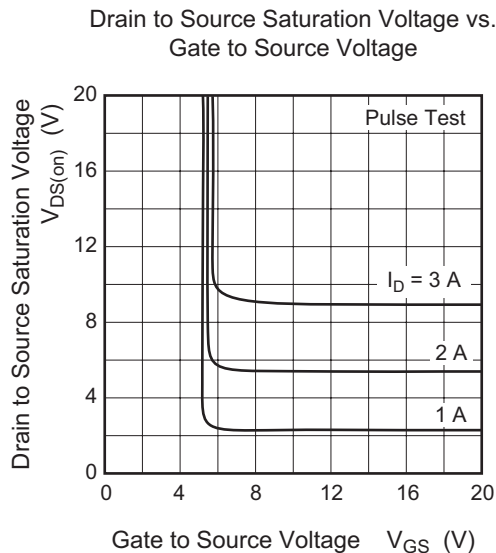
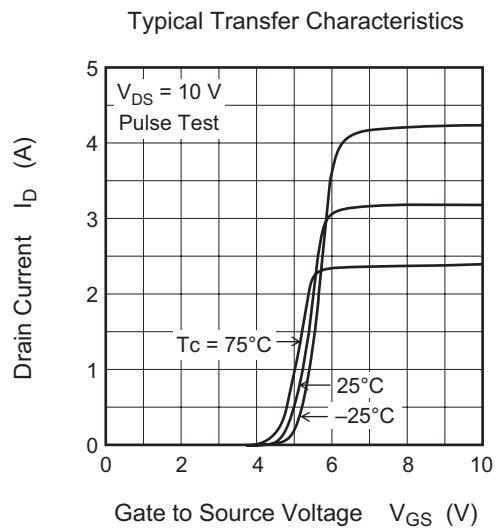
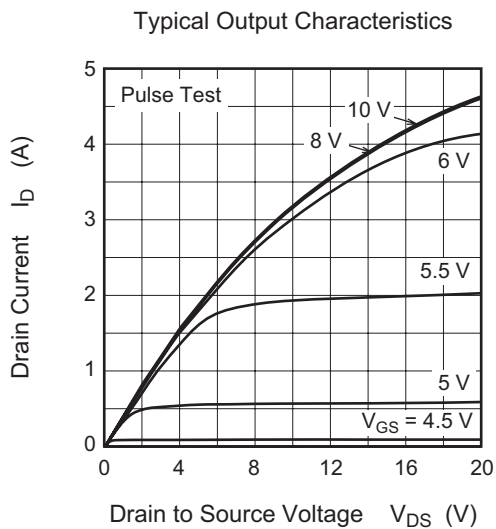
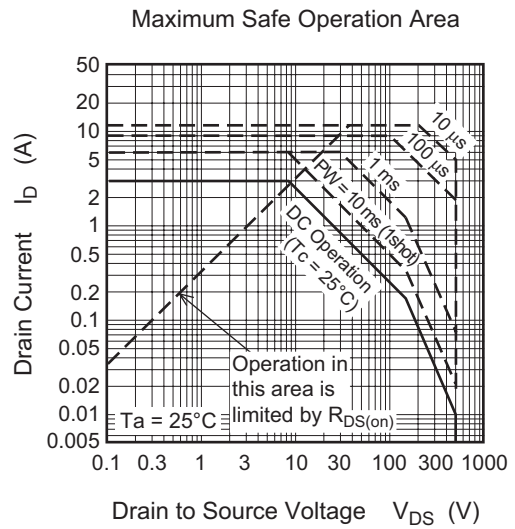
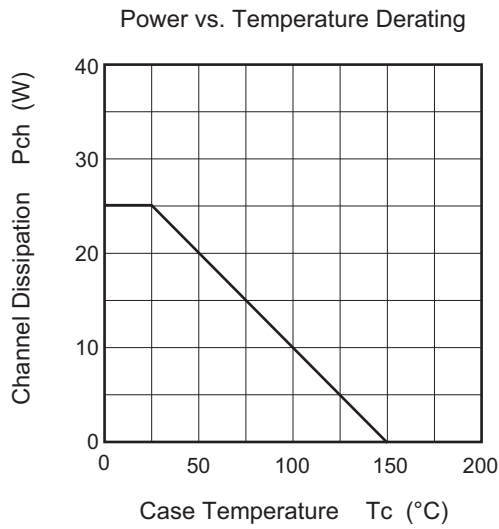
## Electrical Characteristics

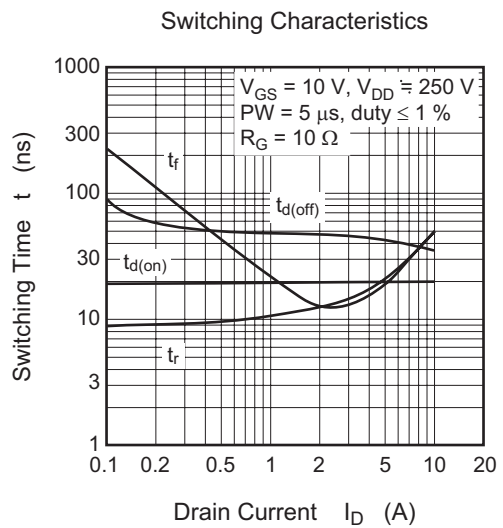
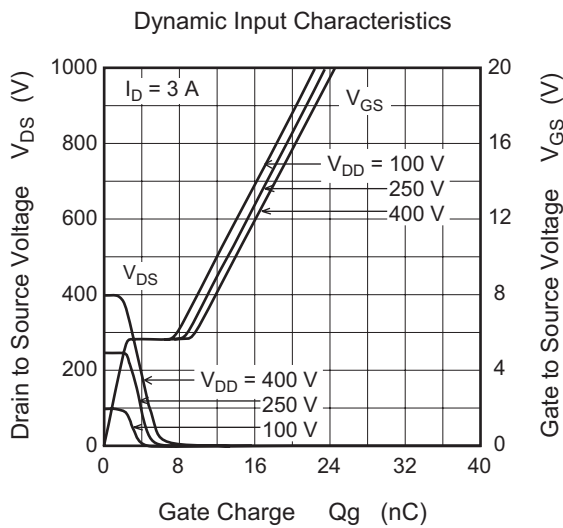
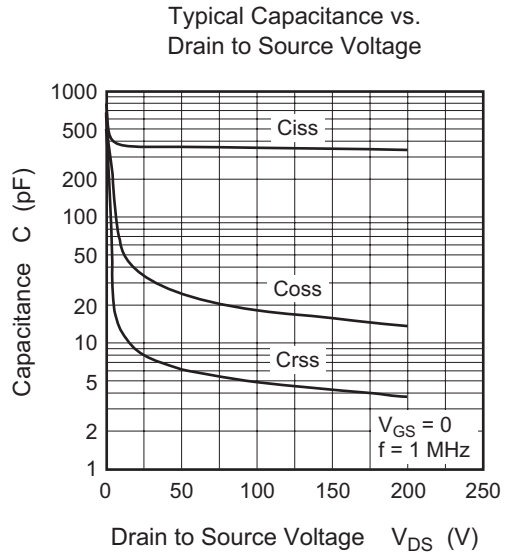
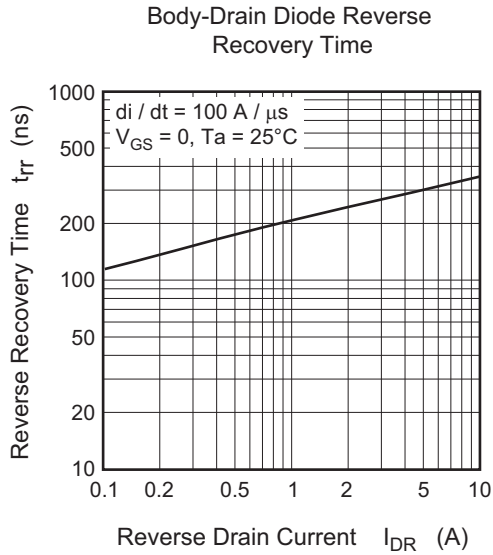
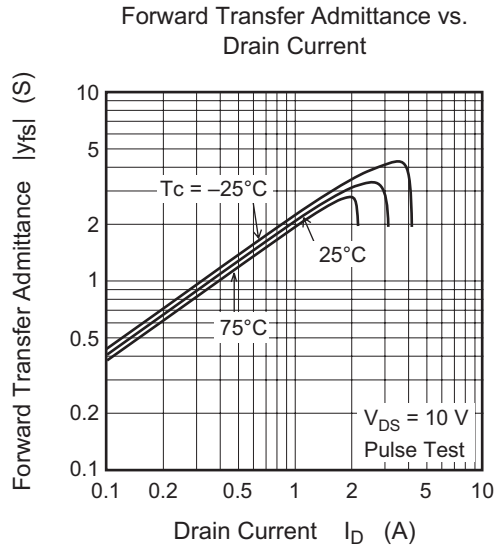
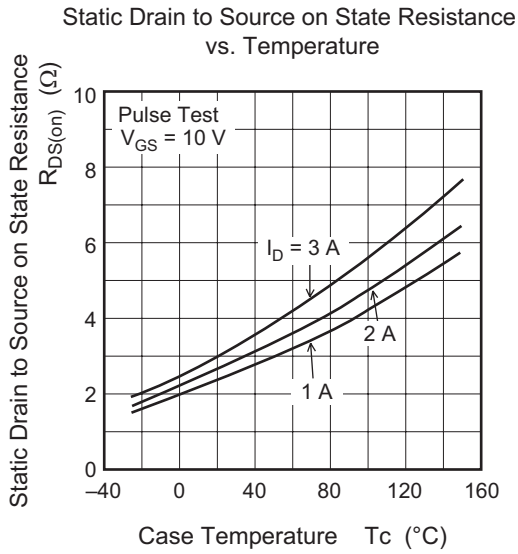
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±0.1	μA	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	μA	$V_{DS} = 500 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	2.5	3.0	Ω	$I_D = 1.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 4</sup>
Forward transfer admittance	$ y_{fs} $	1.5	2.5	—	S	$I_D = 1.5 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 4</sup>
Input capacitance	$C_{iss}$	—	365	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	$C_{oss}$	—	35	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	8	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	20	—	ns	$I_D = 1.5 \text{ A}$
Rise time	$t_r$	—	12	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	48	—	ns	$R_L = 167 \Omega$
Fall time	$t_f$	—	15	—	ns	$R_g = 10 \Omega$
Total gate charge	$Q_g$	—	14	—	nC	$V_{DD} = 400 \text{ V}$
Gate to source charge	$Q_{gs}$	—	2	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	8	—	nC	$I_D = 3 \text{ A}$
Body-drain diode forward voltage	$V_{DF}$	—	0.85	1.3	V	$I_F = 3 \text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	270	—	ns	$I_F = 3 \text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery charge	$Q_{rr}$	—	0.8	—	μC	$di_F/dt = 100 \text{ A}/\mu s$

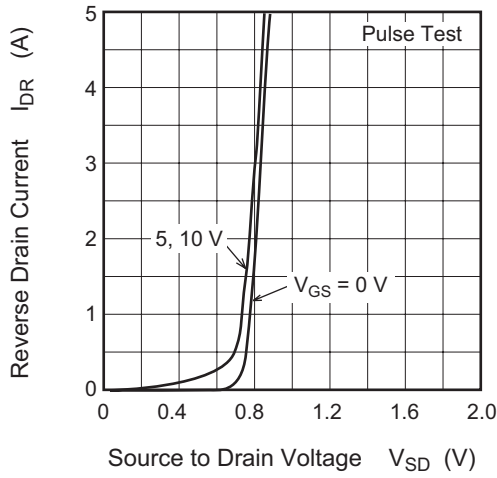
Note: 4. Pulse test

Main Characteristics

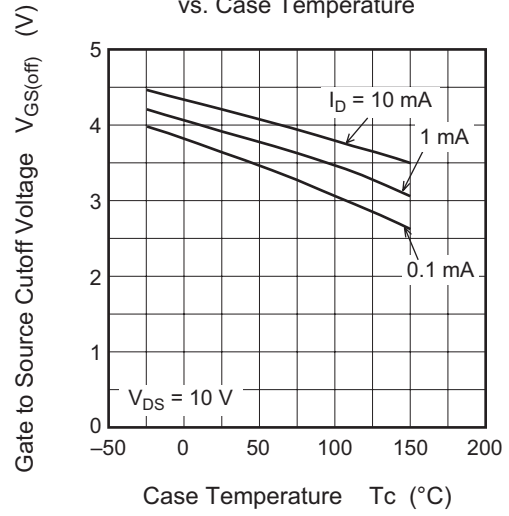




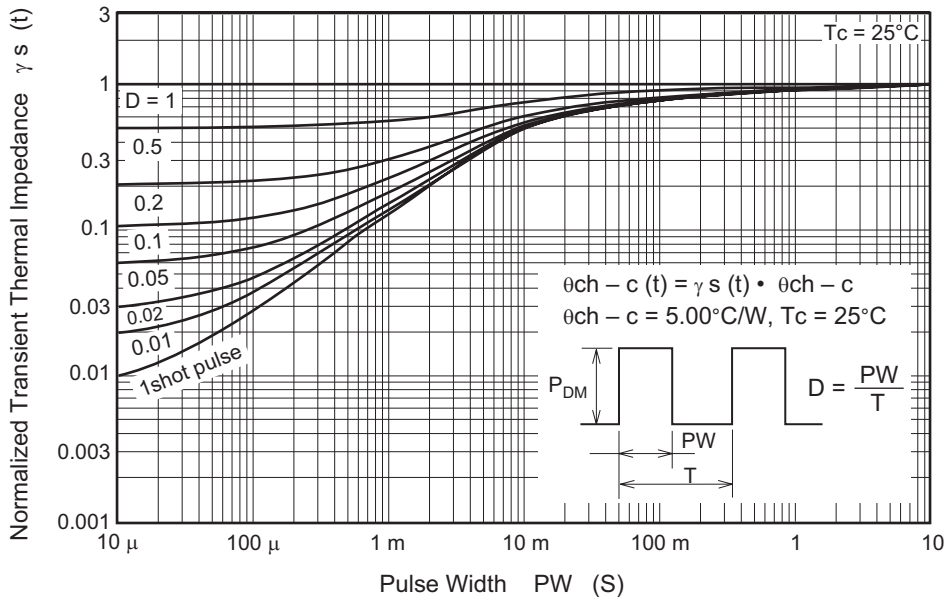
Reverse Drain Current vs. Source to Drain Voltage



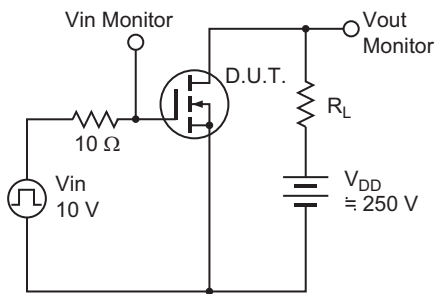
Gate to Source Cutoff Voltage vs. Case Temperature



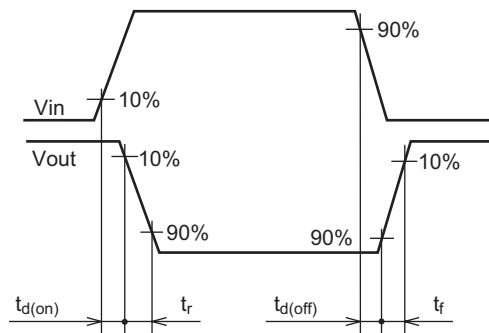
Normalized Transient Thermal Impedance vs. Pulse Width



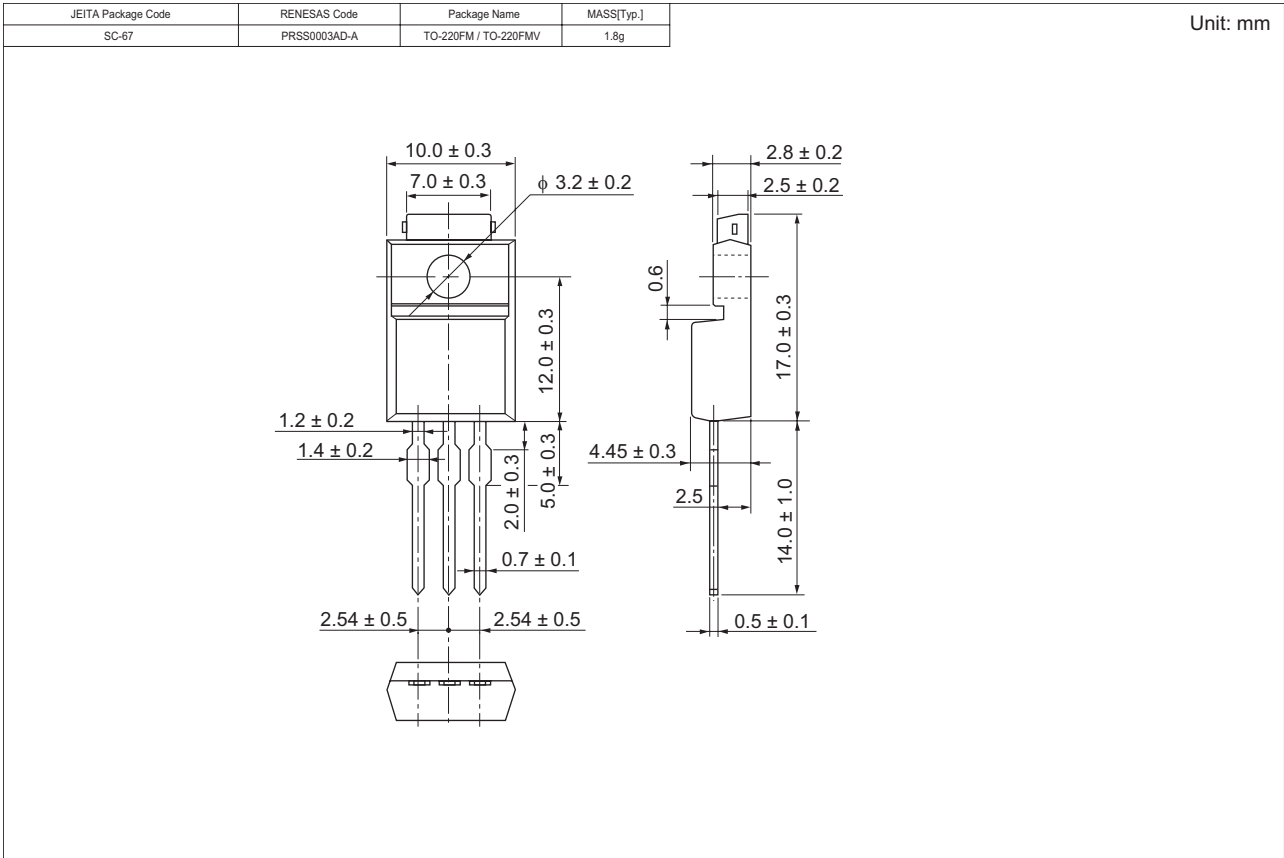
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
H5N5006FM-E	500 pcs	Box (Sack)

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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