

To all our customers

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Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

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# 2SJ546

## Silicon P Channel MOS FET High Speed Power Switching

**RENESAS**

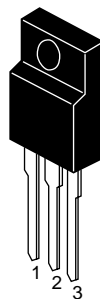
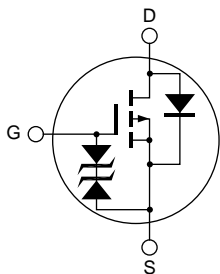
ADE-208-638A (Z)  
2nd. Edition  
Jul. 1998

### Features

- Low on-resistance  
 $R_{DS(on)} = 0.075\Omega$  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 <sub>DSS</sub>	−60	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	−15	A
Drain peak current	I <sub>D(pulse)</sub> <sup>Note1</sup>	−60	A
Body-drain diode reverse drain current	I <sub>DR</sub>	−15	A
Avalanche current	I <sub>AP</sub> <sup>Note3</sup>	−15	A
Avalanche energy	E <sub>AR</sub> <sup>Note3</sup>	19	mJ
Channel dissipation	Pch <sup>Note2</sup>	30	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	−55 to +150	°C

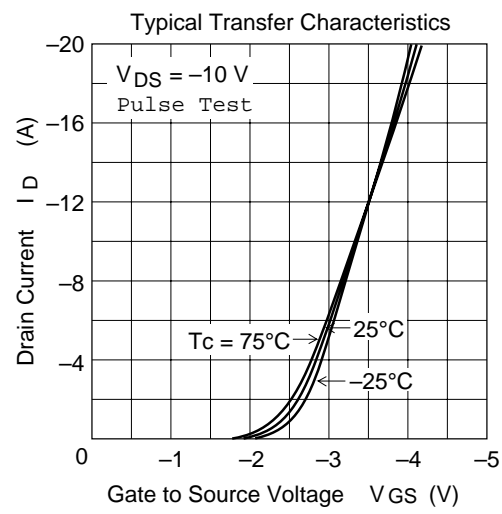
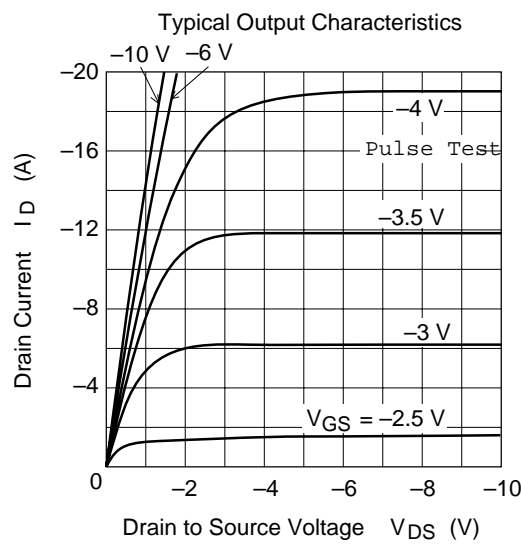
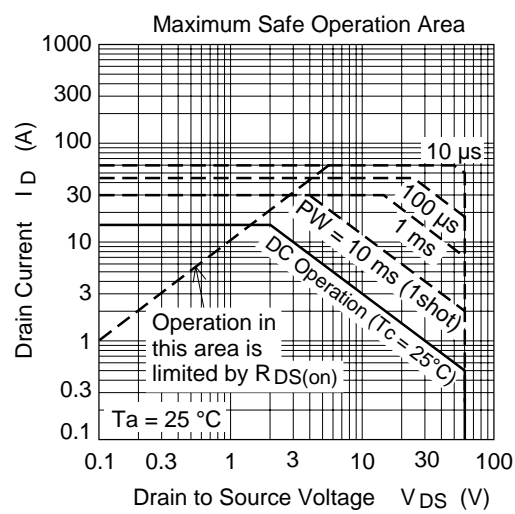
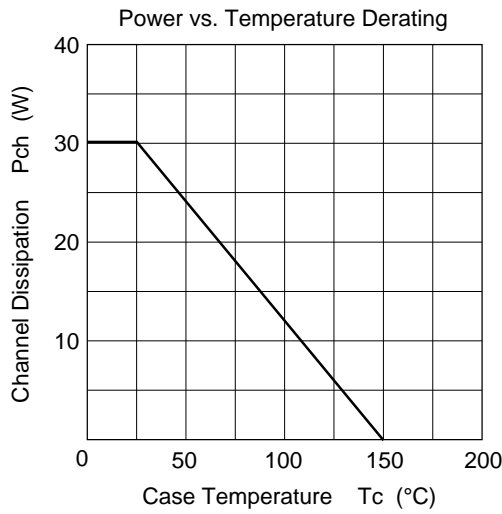
Note: 1. PW ≤ 10μs, duty cycle ≤ 1 %  
2. Value at Tc = 25°C  
3. Value at Tch = 25°C, Rg ≥ 50 Ω

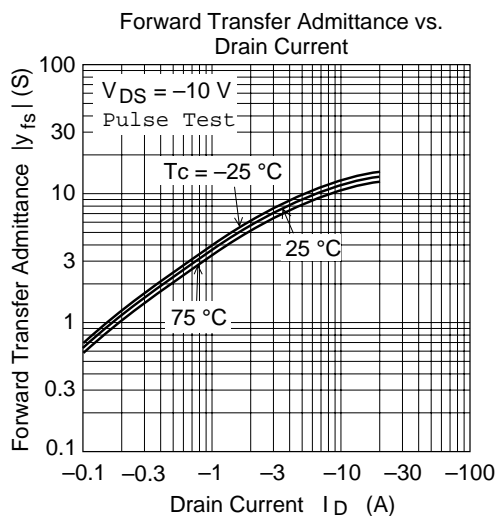
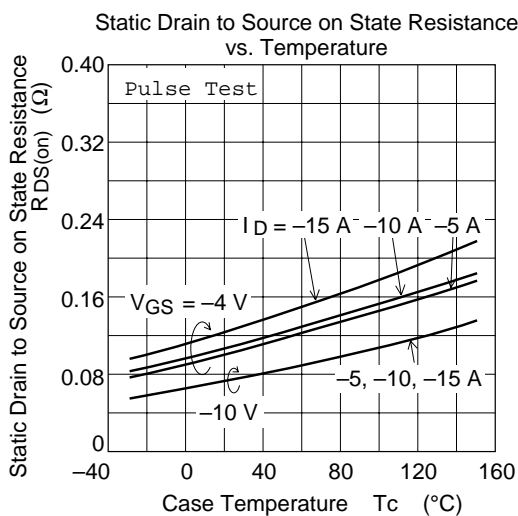
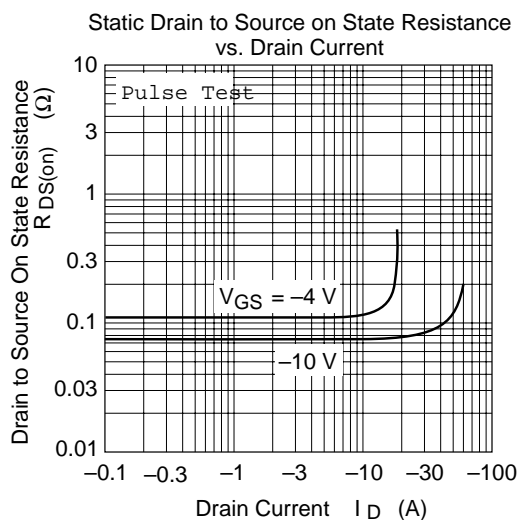
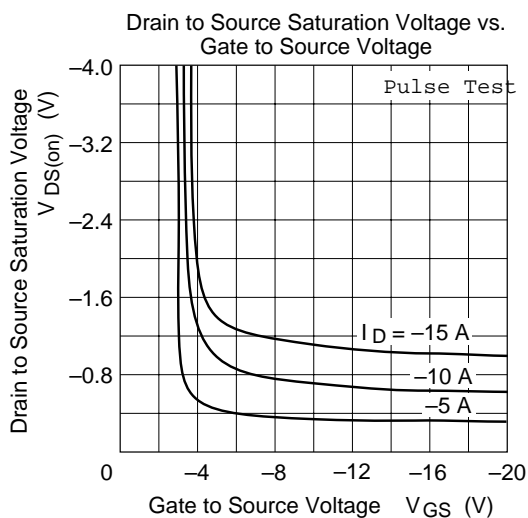
## Electrical Characteristics (Ta = 25°C)

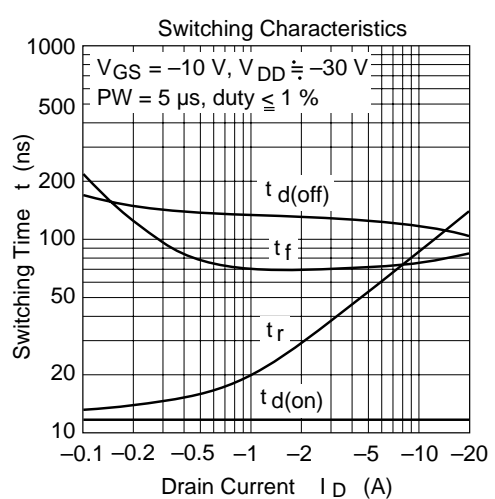
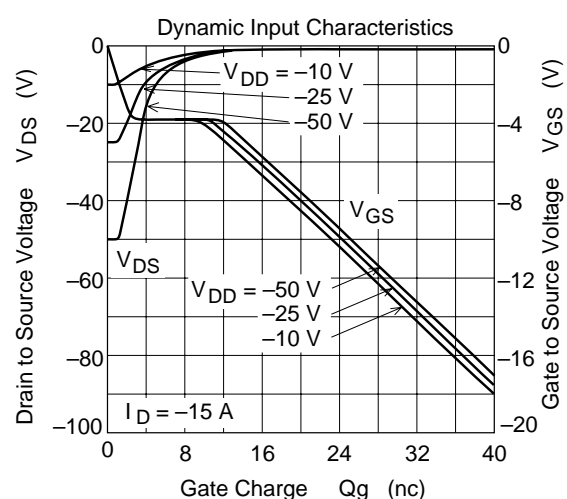
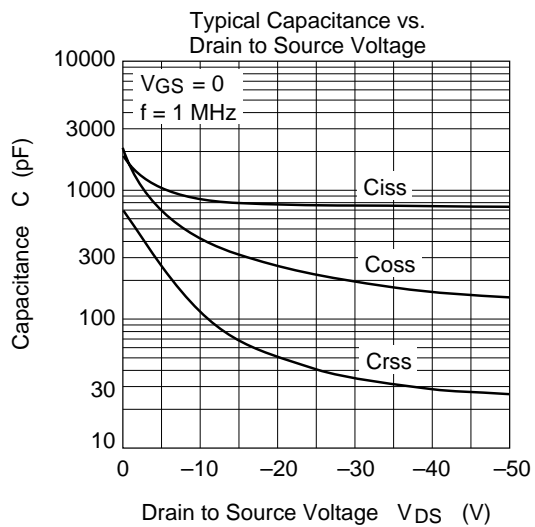
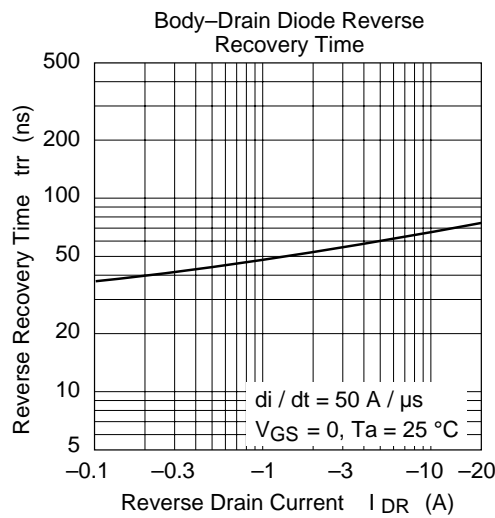
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -10mA, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100\mu A, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	-10	$\mu A$	$V_{DS} = -60V, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu A$	$V_{GS} = \pm 16V, V_{DS} = 0$
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	$R_{DS(on)}$	—	0.075	0.095	$\Omega$	$I_D = -8A, V_{GS} = -10V$ <sup>Note4</sup>
	$R_{DS(on)}$	—	0.105	0.155	$\Omega$	$I_D = -8A, V_{GS} = -4V$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	6.5	11	—	S	$I_D = -8A, V_{DS} = 10V$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	850	—	pF	$V_{DS} = -10V$
Output capacitance	$C_{oss}$	—	420	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	110	—	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$	—	12	—	ns	$V_{GS} = -10V, I_D = -8A$
Rise time	$t_r$	—	75	—	ns	$R_L = 3.75\Omega$
Turn-off delay time	$t_{d(off)}$	—	125	—	ns	
Fall time	$t_f$	—	75	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	-1.1	—	V	$I_F = -15A, V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	70	—	ns	$I_F = -15A, V_{GS} = 0$ $diF/dt = 50A/\mu s$

Note: 4. Pulse test

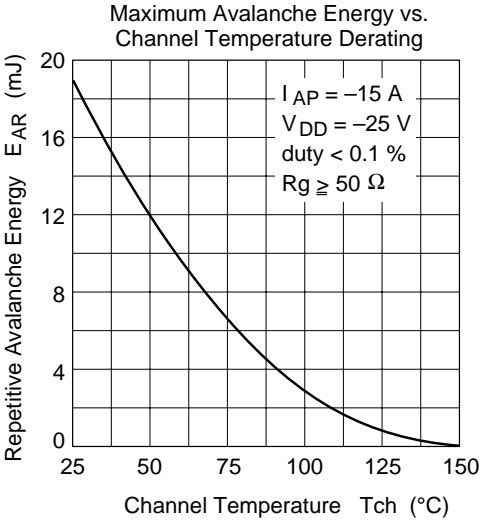
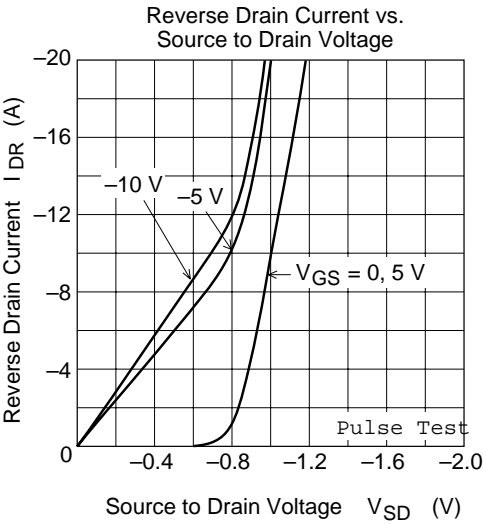
Main Characteristics



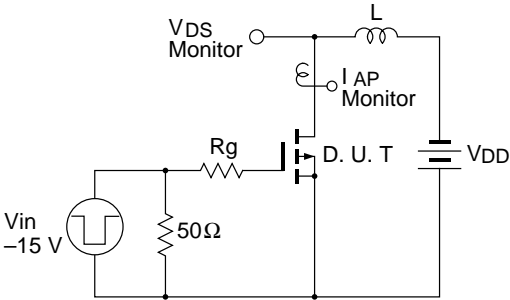






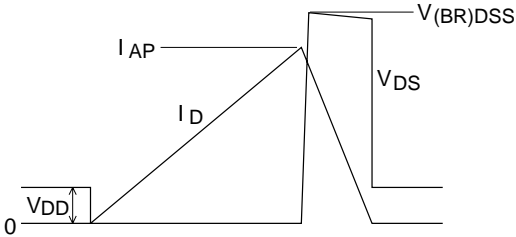


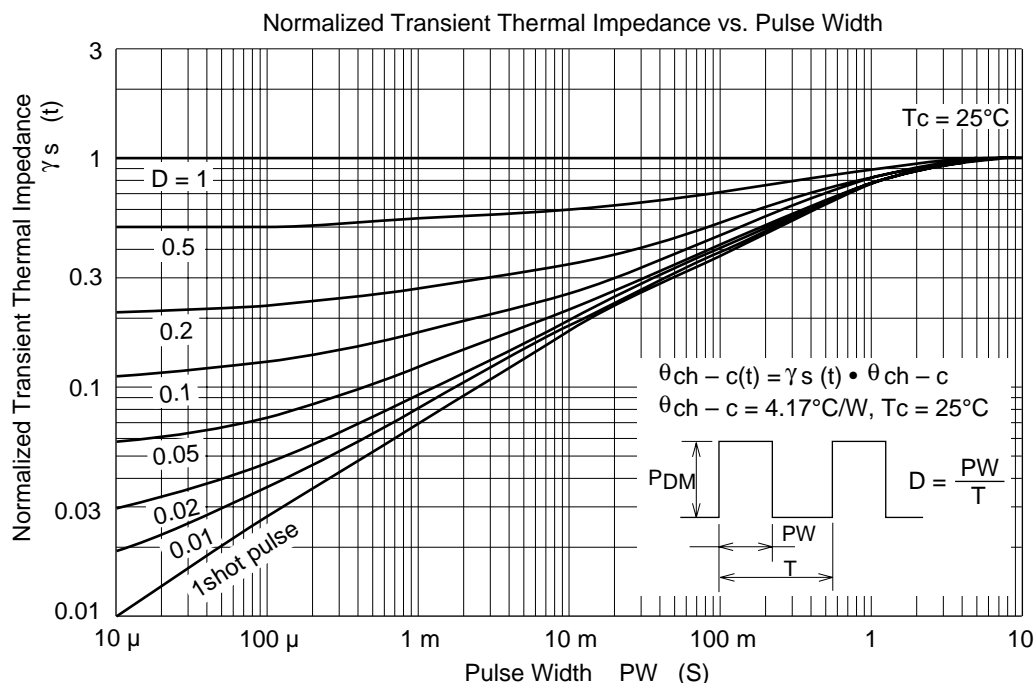
Avalanche Test Circuit



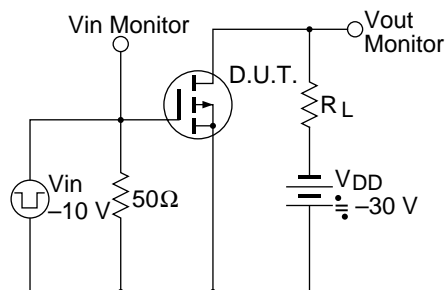
Avalanche Waveform

$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$

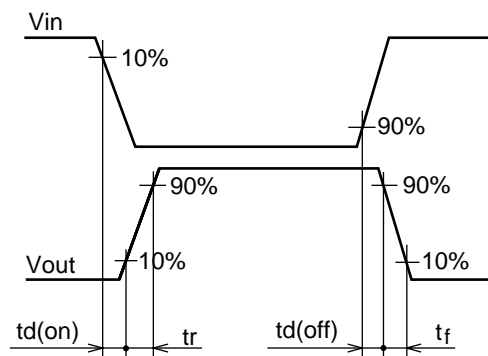




Switching Time Test Circuit

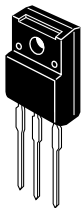
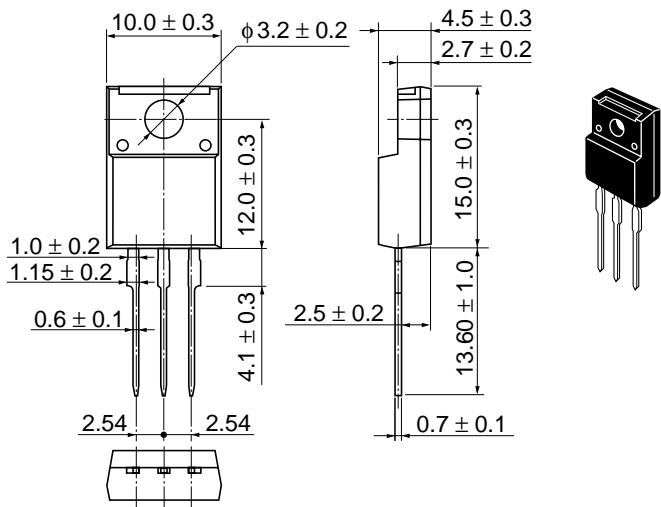


Waveform



Package Dimensions

As of January, 2001  
Unit: mm



Hitachi Code	TO-220CFM
JEDEC	—
EIAJ	—
Mass (reference value)	1.9 g

## Cautions

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