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

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Keep safety first in your circuit designs!

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2SK1405

Silicon N-Channel MOS FET

RENESAS

ADE-208-1285 (Z)
1st. Edition
Mar. 2001

Application

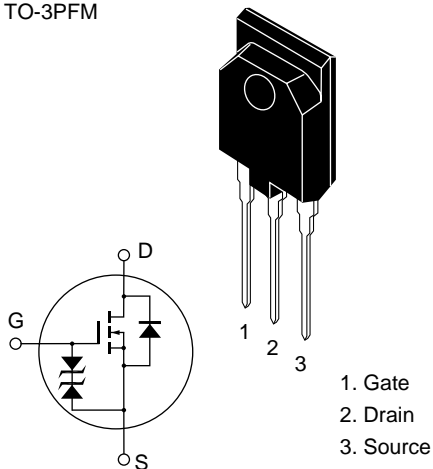
High speed power switching

Features

- Low on-resistance
- High speed switching
- Low drive current
- Built-in fast diode ($t_{tr} = 140$ ns)
- Suitable for motor control, switching regulator, DC-DC converter

Outline

TO-3PFM



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V _{DSS}	600	V
Gate to source voltage	V _{GSS}	±30	V
Drain current	I _D	15	A
Drain peak current	I _{D(pulse)} ^{*1}	60	A
Body to drain diode reverse drain current	I _{DR}	15	A
Channel dissipation	Pch ^{*2}	60	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

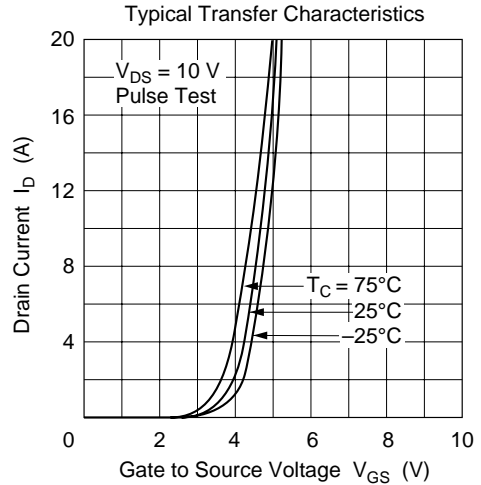
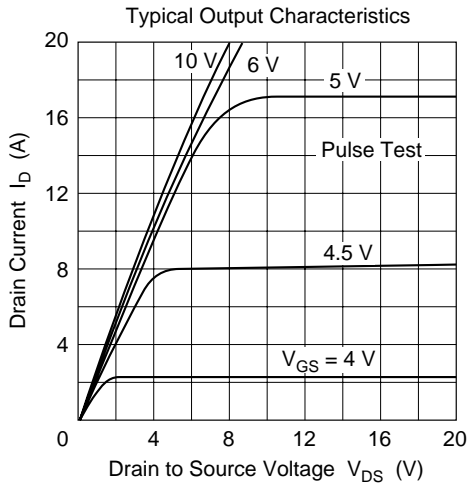
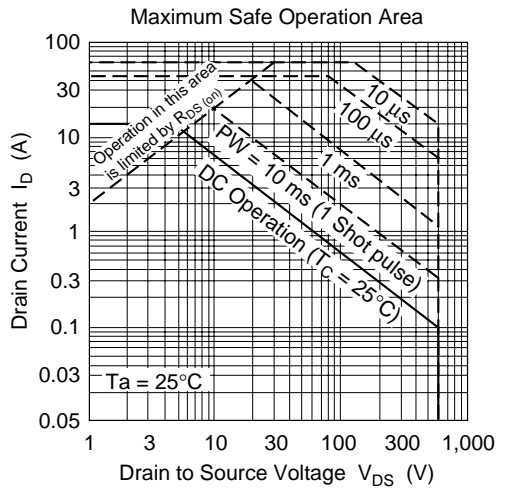
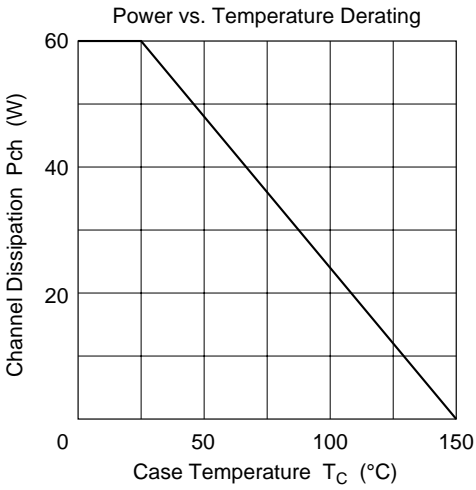
Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

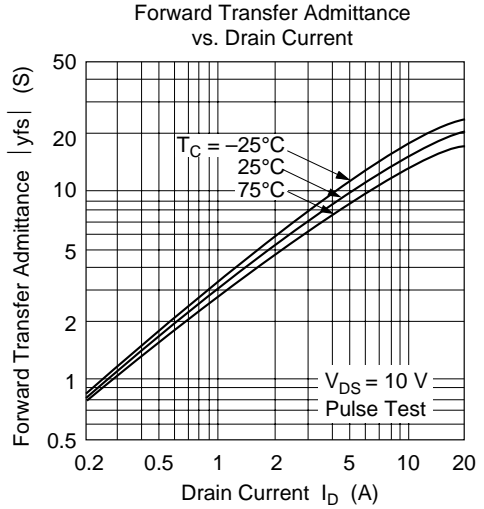
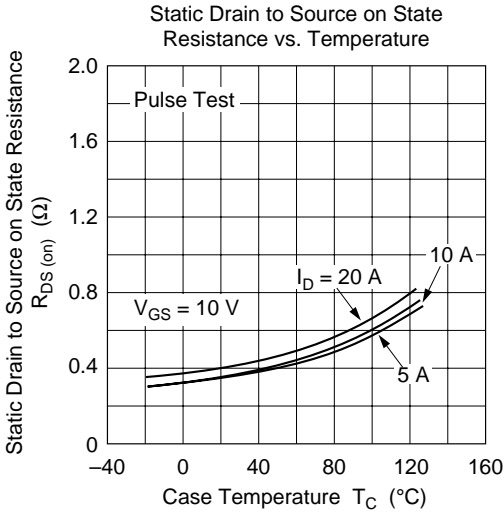
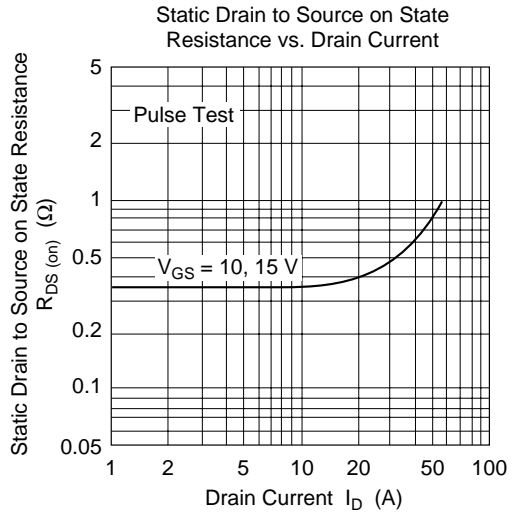
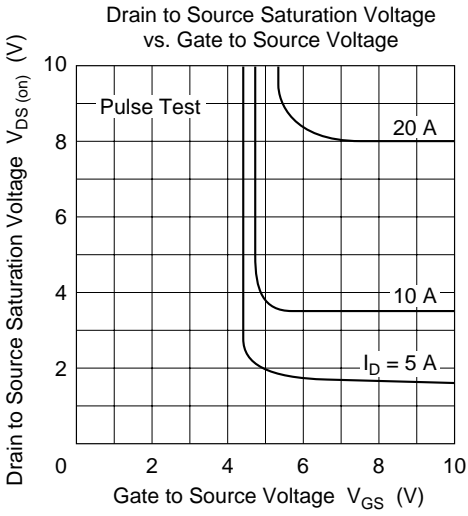
2. Value at T_c = 25°C

Electrical Characteristics (Ta = 25°C)

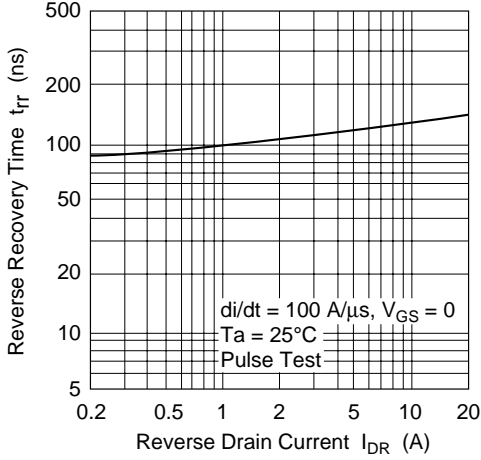
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 30	—	—	V	$I_G = \pm 100 \mu\text{A}, V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	250	μA	$V_{DS} = 500 \text{ V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	3.0	V	$I_D = 1 \text{ mA}, V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.35	0.50	Ω	$I_D = 8 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	9	14	—	S	$I_D = 8 \text{ A}, V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	C_{iss}	—	3150	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0,$
Output capacitance	C_{oss}	—	780	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance	C_{rss}	—	110	—	pF	
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$I_D = 8 \text{ A}, V_{GS} = 10 \text{ V},$
Rise time	t_r	—	120	—	ns	$R_L = 3.75 \Omega$
Turn-off delay time	$t_{d(off)}$	—	240	—	ns	
Fall time	t_f	—	100	—	ns	
Body to drain diode forward voltage	V_{DF}	—	1.0	—	V	$I_F = 15 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	140	—	ns	$I_F = 15 \text{ A}, V_{GS} = 0,$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

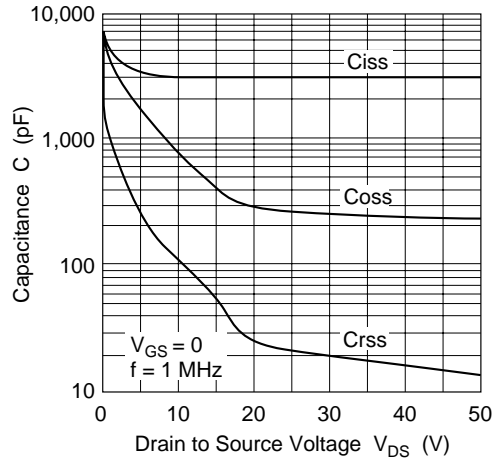




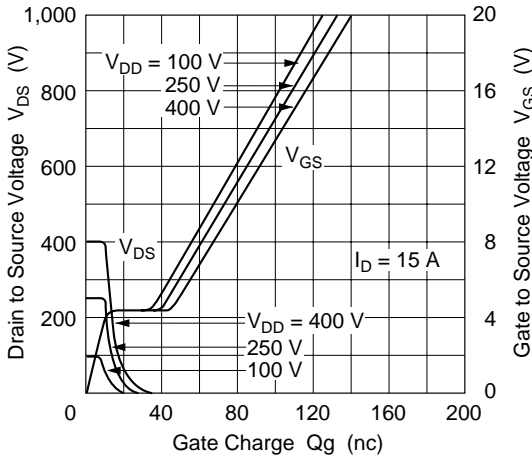
Body to Drain Diode Reverse Recovery Time



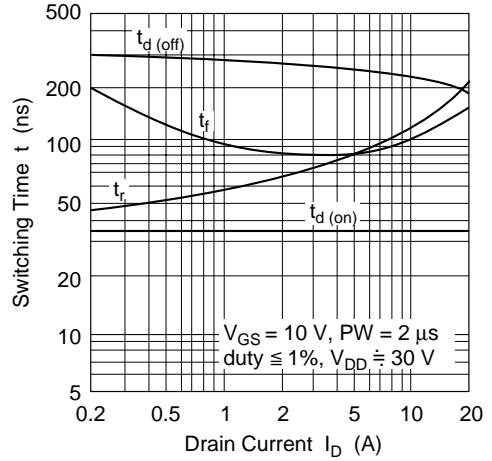
Typical Capacitance vs. Drain to Source Voltage

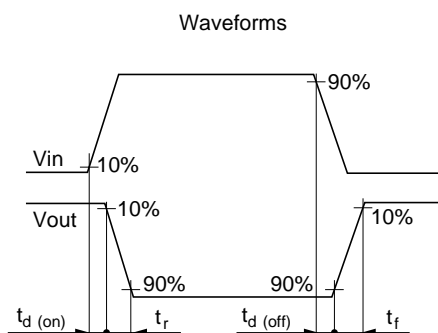
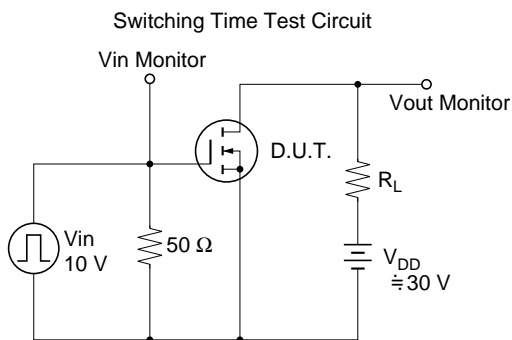
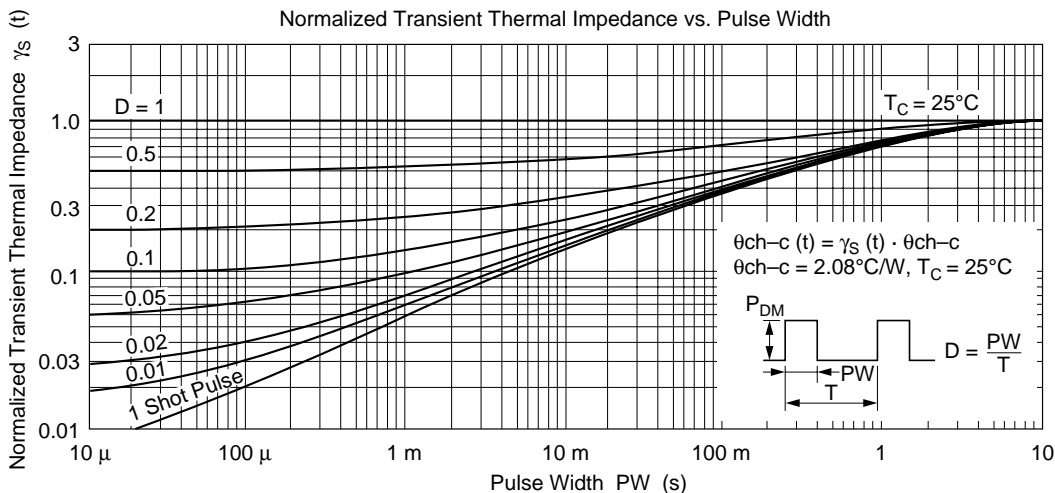
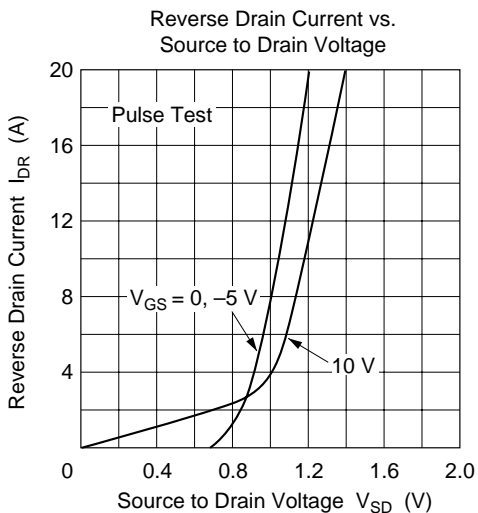


Dynamic Input Characteristics



Switching Characteristics

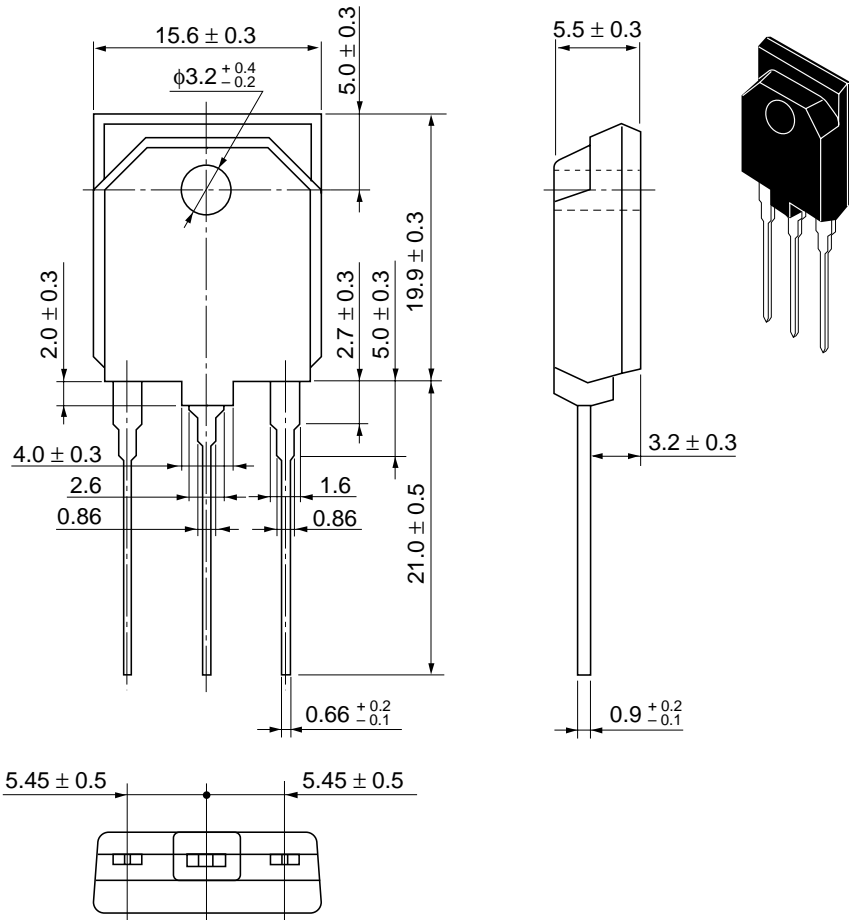




Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	TO-3PFP
JEDEC	—
EIAJ	—
Mass (reference value)	5.2 g

Cautions

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