

2SK1405

Silicon N Channel MOS FET

REJ03G0945-0300

Rev.3.00

May 15, 2006

Application

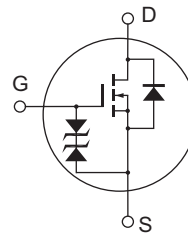
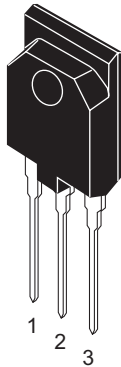
High speed power switching

Features

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

Outline

RENESAS Package code: PRSS0003ZA-A
(Package name: TO-3PFM)



1. Gate
2. Drain
3. Source

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	P_{ch}^{*2}	60	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 $T_C = 25^\circ C$

Electrical Characteristics

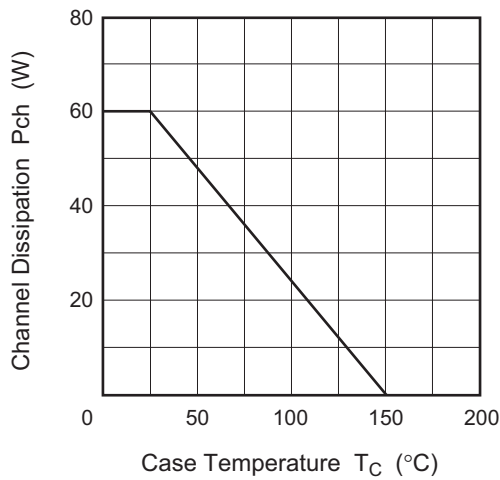
(Ta = 25°C)

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	$I_G = \pm 100 \mu A$, $V_{DS} = 0$
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	$I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}^{*3}$
Forward transfer admittance	$ y_{fs} $	9	14	—	S	$I_D = 8 \text{ A}$, $V_{DS} = 10 \text{ V}^{*3}$
Input capacitance	C_{iss}	—	3150	—	pF	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	780	—	pF	
Reverse transfer capacitance	C_{rss}	—	110	—	pF	
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$I_D = 8 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_L = 3.75 \Omega$
Rise time	t_r	—	120	—	ns	
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	$I_F = 15 \text{ A}$, $V_{GS} = 0$, $di_F/dt = 100 \text{ A}/\mu s$

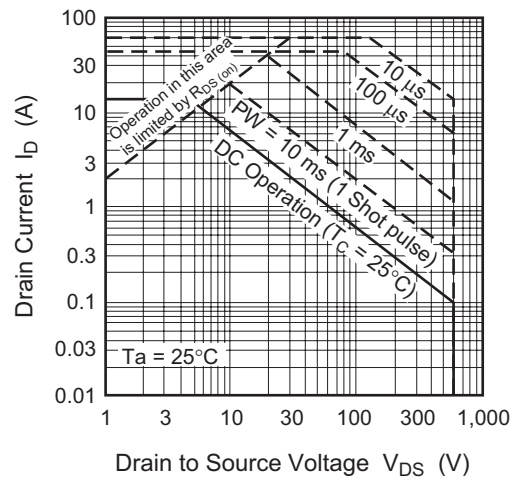
Note: 3. Pulse test

Main Characteristics

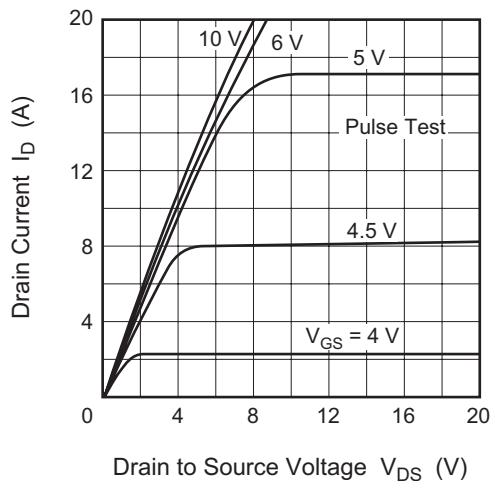
Power vs. Temperature Derating



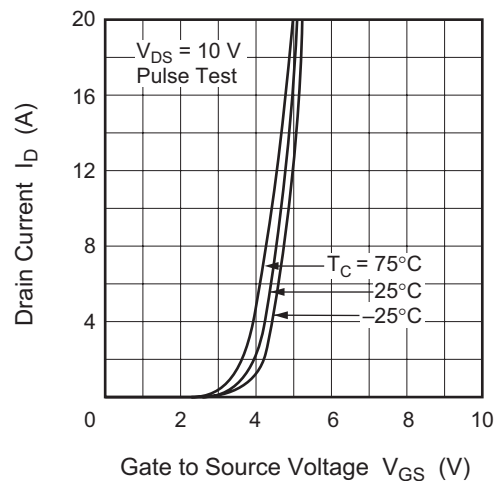
Maximum Safe Operation Area



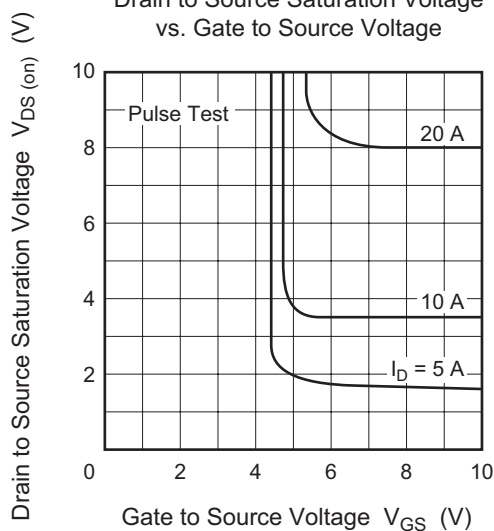
Typical Output Characteristics



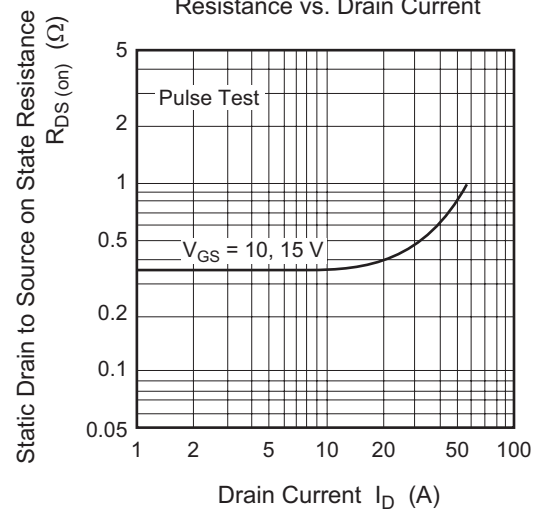
Typical Transfer Characteristics

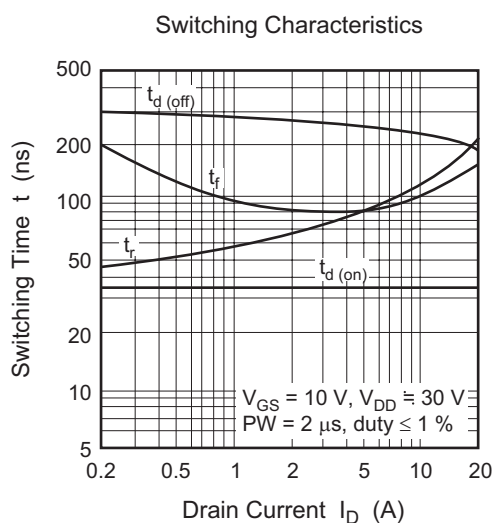
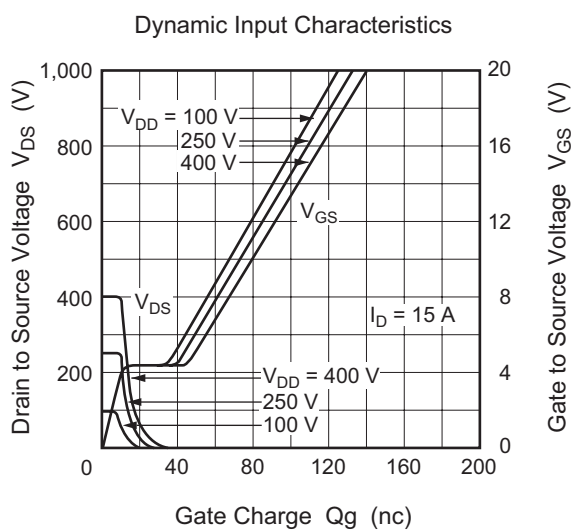
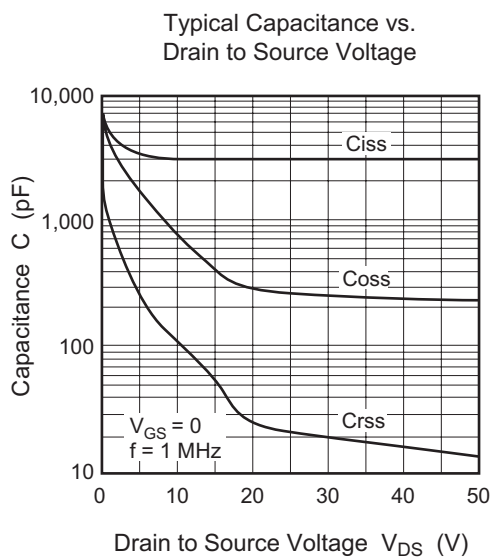
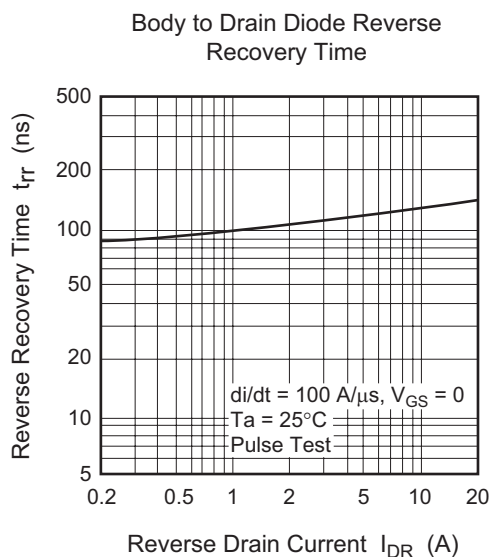
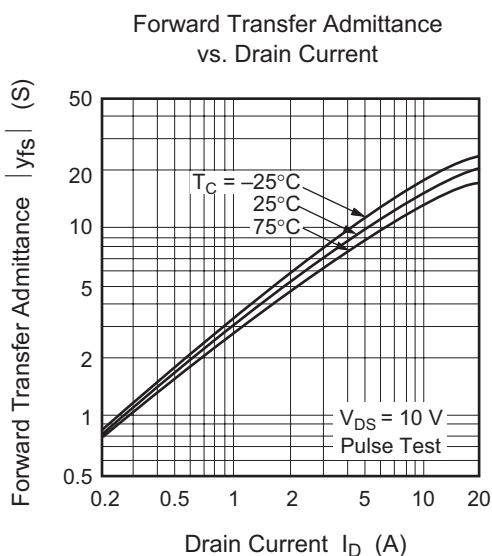
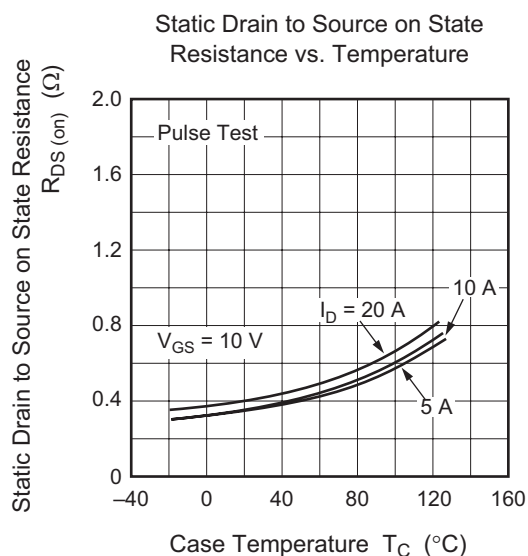


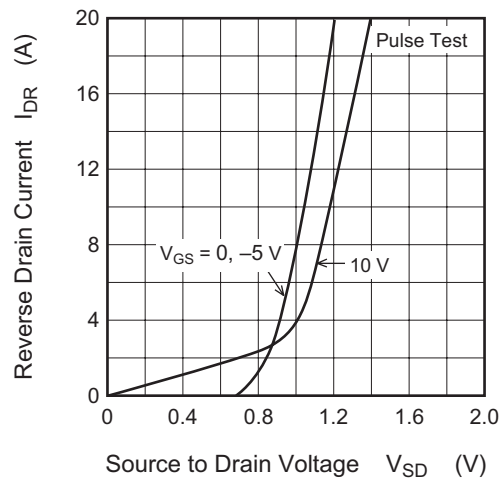
Drain to Source Saturation Voltage vs. Gate to Source Voltage



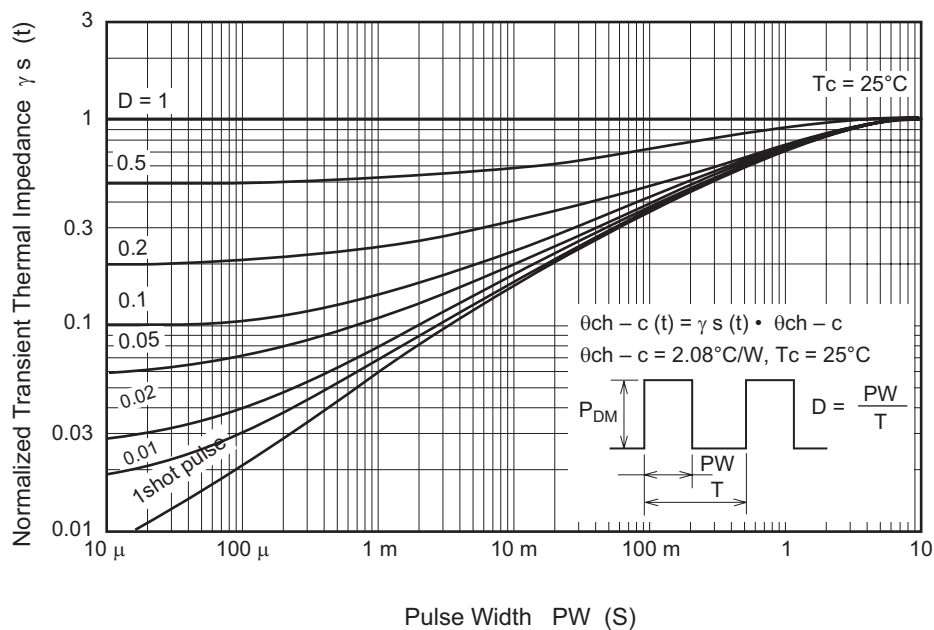
Static Drain to Source on State Resistance vs. Drain Current



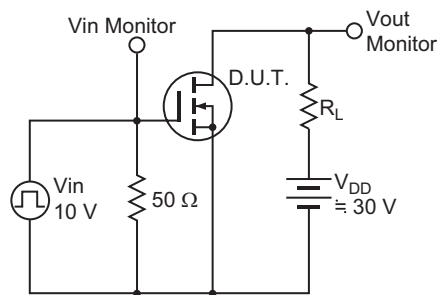


Reverse Drain Current vs.
Source to Drain Voltage

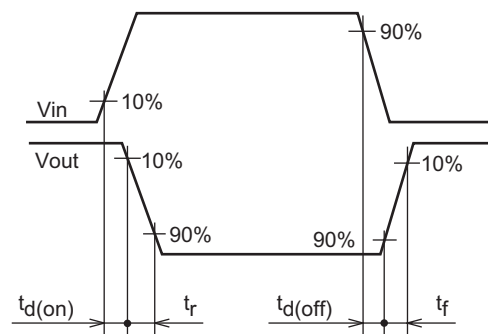
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



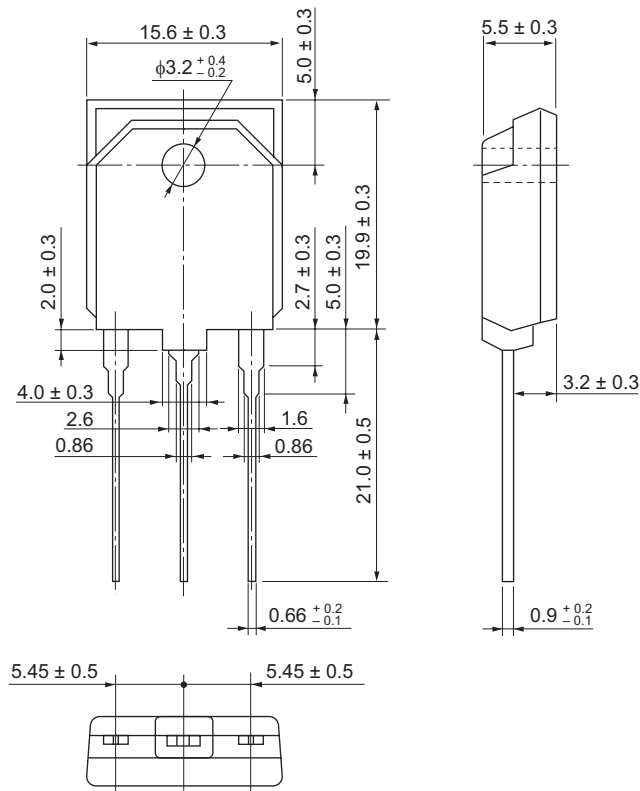
Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-3PFM	SC-93	PRSS0003ZA-A	TO-3PFM / TO-3PFMV	5.2g

Unit: mm



Ordering Information

Part Name	Quantity	Shipping Container
2SK1405-E	360 pcs	Box (Tube)

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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