

## 2SK1405

### Silicon N Channel MOS FET

REJ03G0945-0300

Rev.3.00

May 15, 2006

### Application

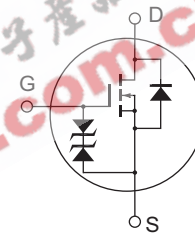
High speed power switching

### Features

- Low on-resistance
- High speed switching
- Low drive current
- Built-in fast diode ( $t_{rr} = 140$  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	$V_{GSS}$	$\pm 30$	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  $T_C = 25^\circ C$

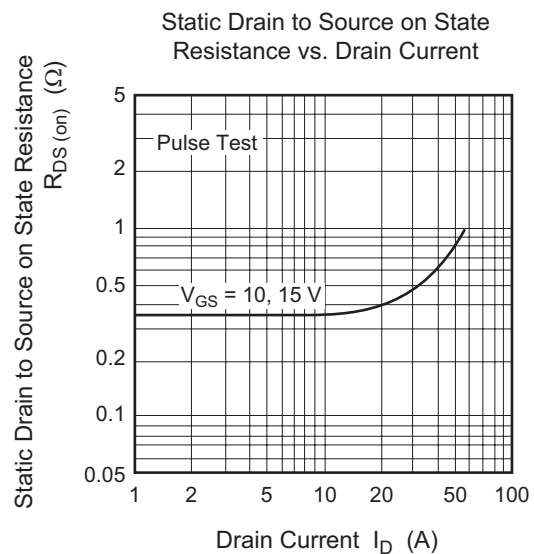
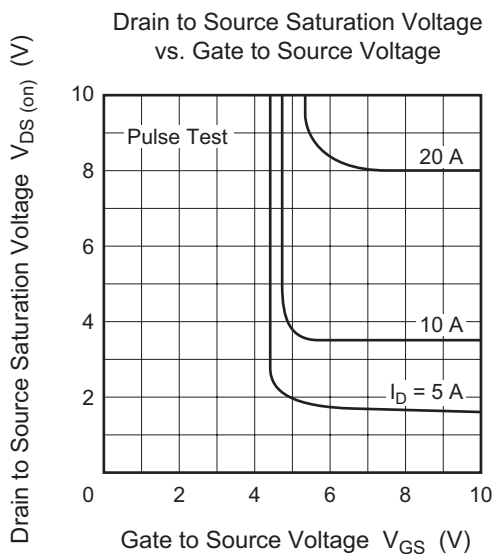
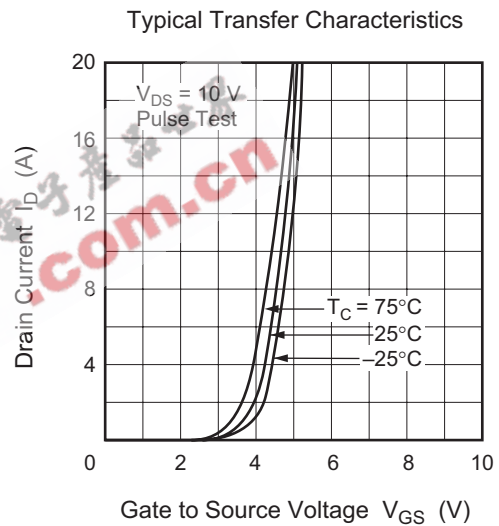
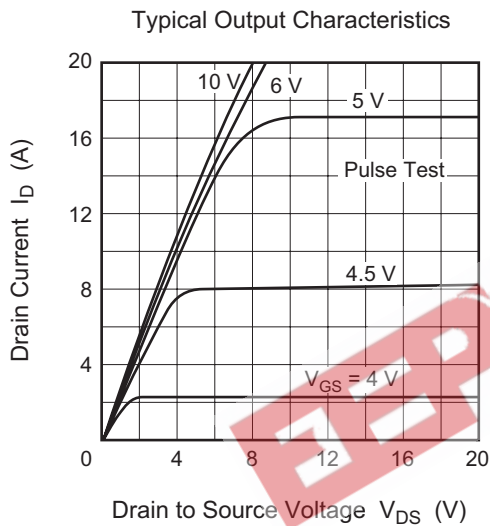
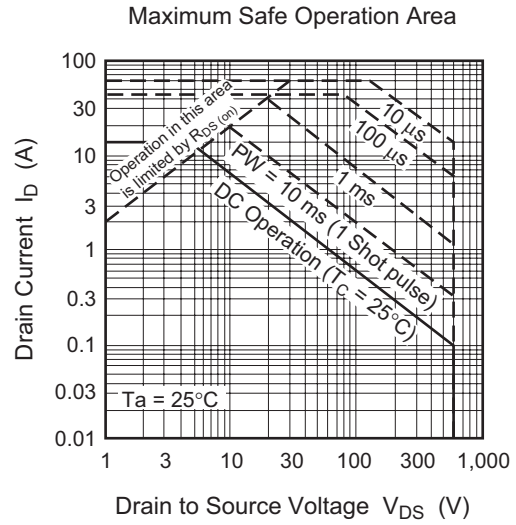
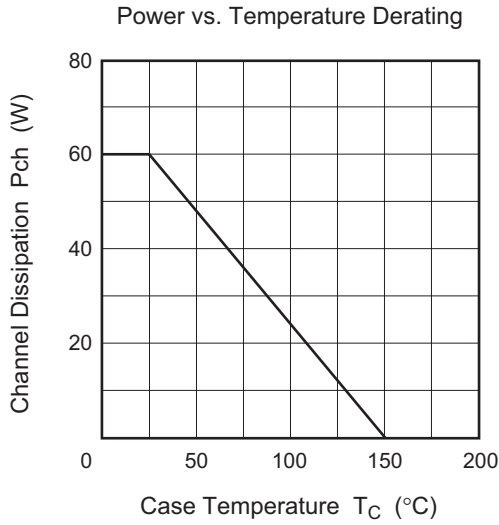
## Electrical Characteristics

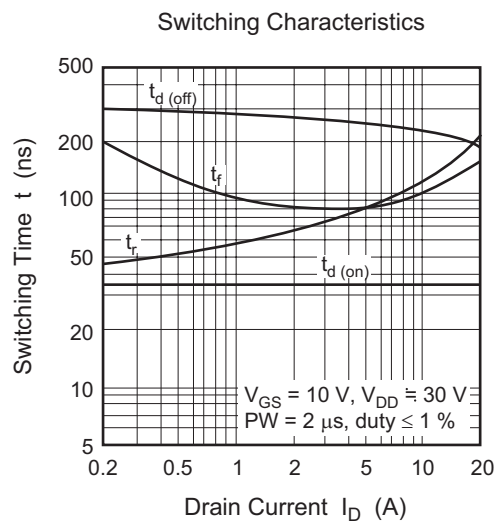
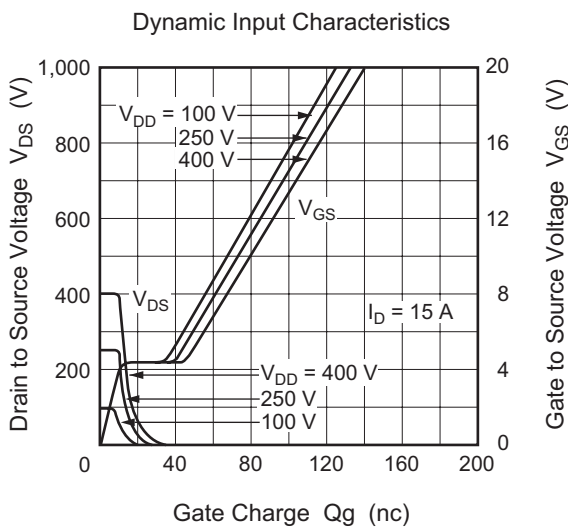
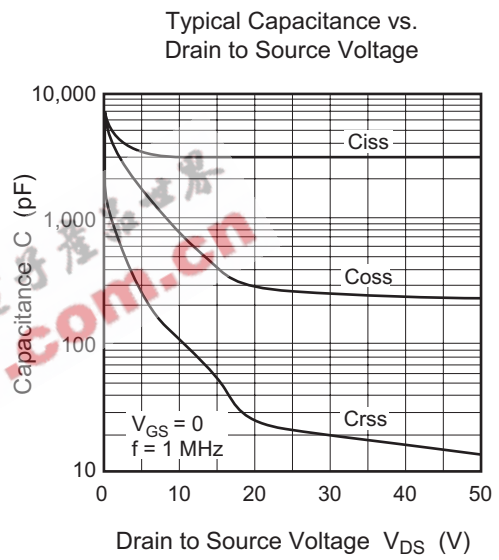
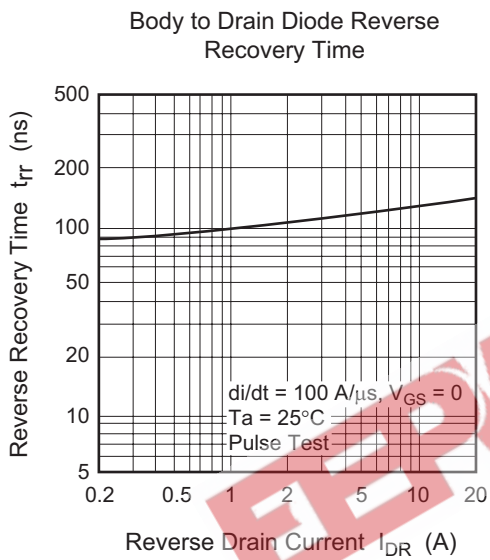
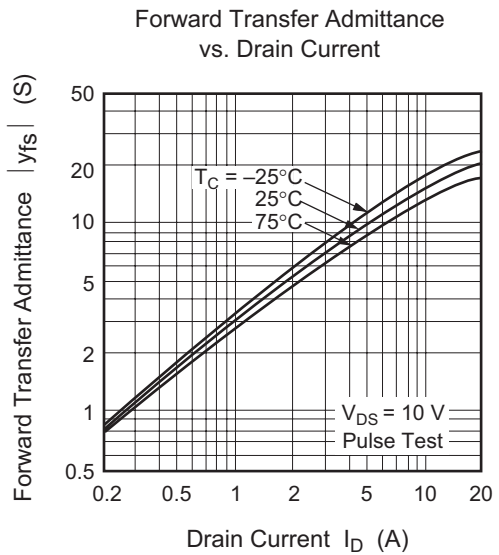
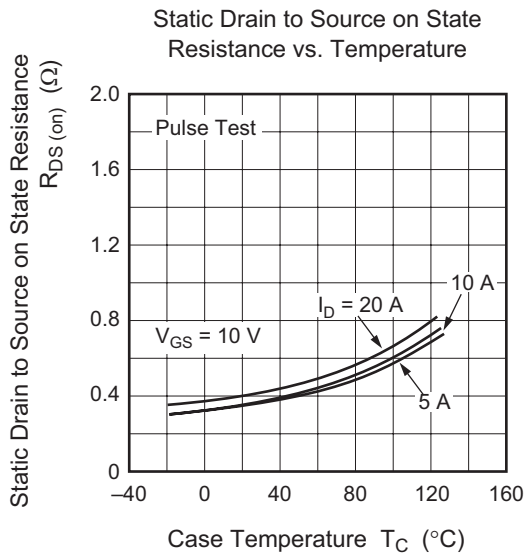
(Ta = 25°C)

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	$V_{(BR)GSS}$	$\pm 30$	—	—	V	$I_G = \pm 100 \mu A$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu A$	$V_{GS} = \pm 25 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	250	$\mu A$	$V_{DS} = 500 \text{ V}$ , $V_{GS} = 0$
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	$\Omega$	$I_D = 8 \text{ A}$ , $V_{GS} = 10 \text{ V}^{*3}$
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	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ ,
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	$I_F = 15 \text{ A}$ , $V_{GS} = 0$ , $di_F/dt = 100 \text{ A}/\mu s$

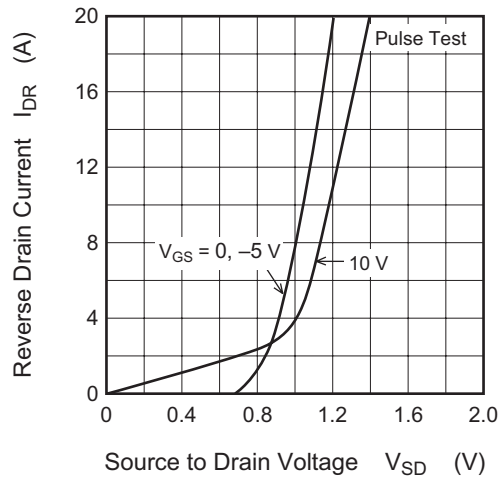
Note: 3. Pulse test

Main Characteristics

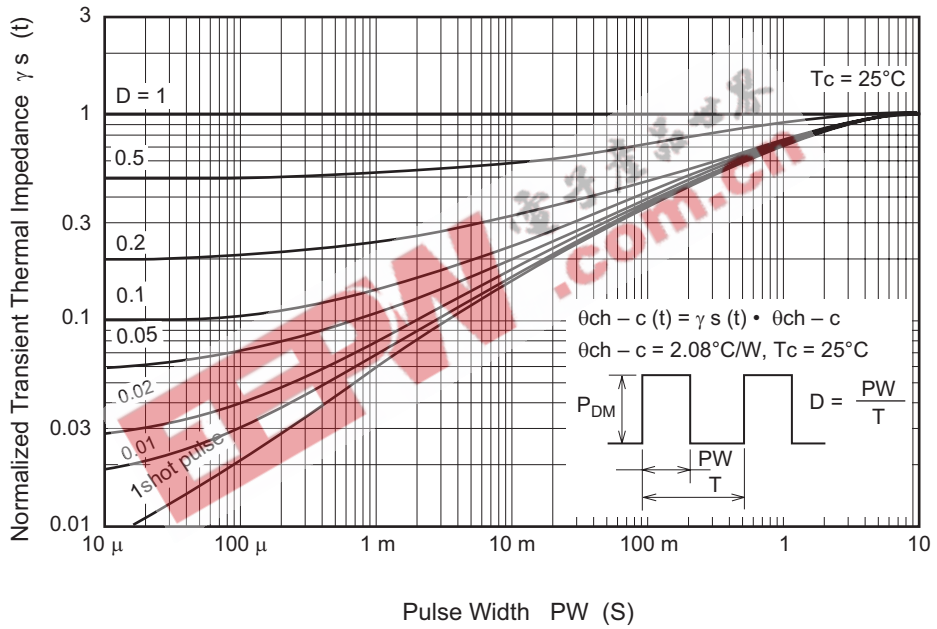




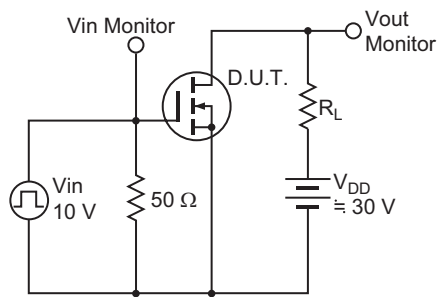
Reverse Drain Current vs. Source to Drain Voltage



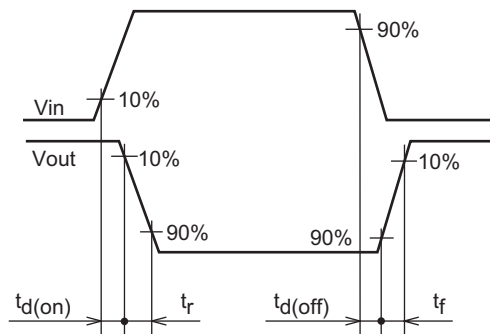
Normalized Transient Thermal Impedance vs. Pulse Width



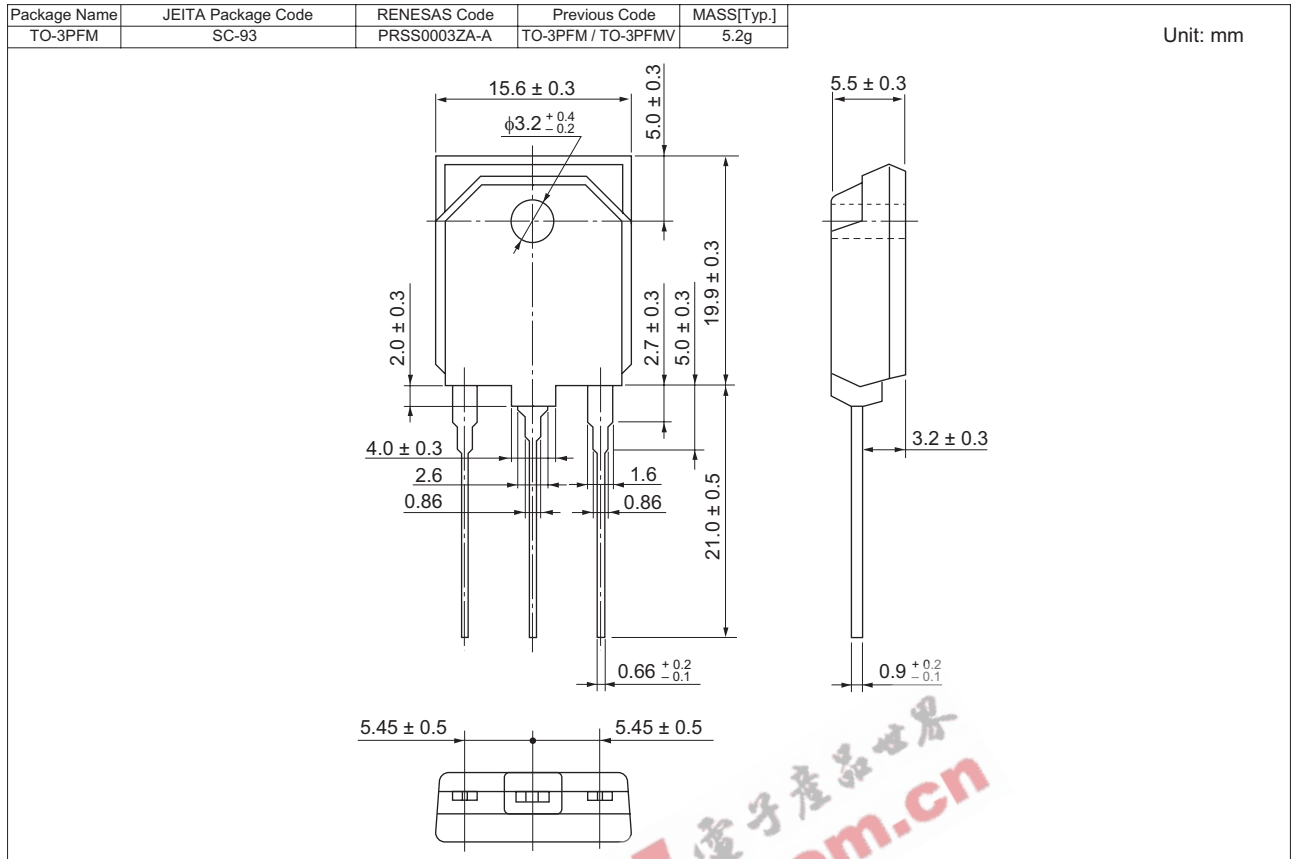
Switching Time Test Circuit



Waveform



### Package Dimensions



### 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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