

# 2SK2978

## Silicon N Channel MOS FET High Speed Power Switching

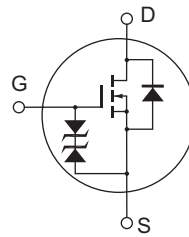
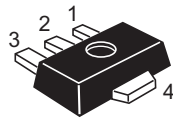
REJ03G1060-0500  
(Previous: ADE-208-659C)  
Rev.5.00  
Sep.07,2005

### Features

- Low on-resistance  
 $R_{DS(on)} = 0.09 \Omega$  typ. ( $V_{GS} = 4 \text{ V}$ ,  $I_D = 1.5 \text{ A}$ )
- Low drive current
- High speed switching
- 2.5 V gate drive devices.

### Outline

RENESAS Package code: PLZZ0004CA-A  
(Package name: UPAK<sup>®</sup>)



1. Gate
2. Drain
3. Source
4. Drain

Note: Marking is "ZY"

\*UPAK is a trademark of Renesas Technology Corp.

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DS}$	20	V
Gate to source voltage	$V_{GS}$	$\pm 10$	V
Drain current	$I_D$	2.5	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	5	A
Body-drain diode reverse drain current	$I_{DR}$	2.5	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	1	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. When using the alumina ceramic board (12.5 x 20 x 0.7 mm)

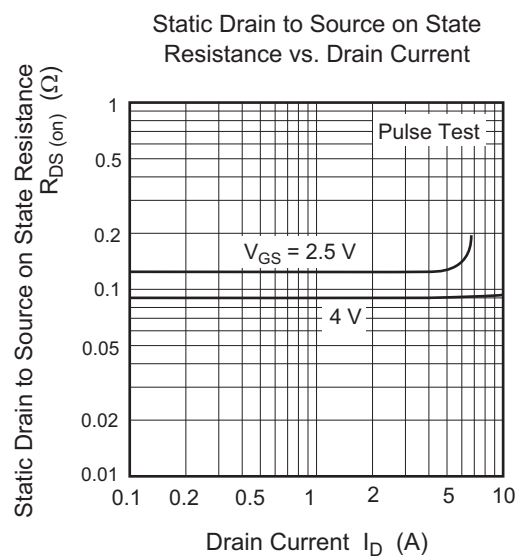
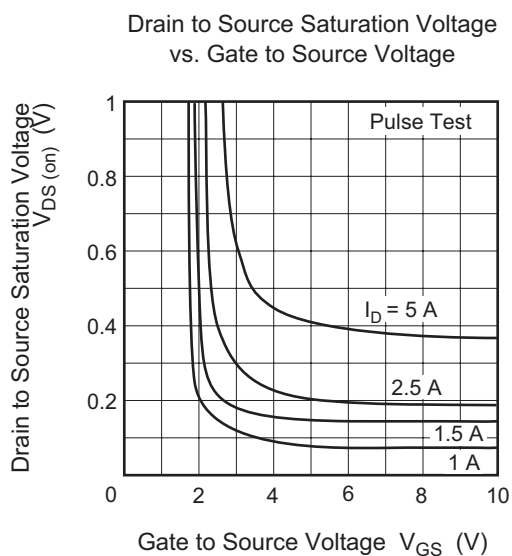
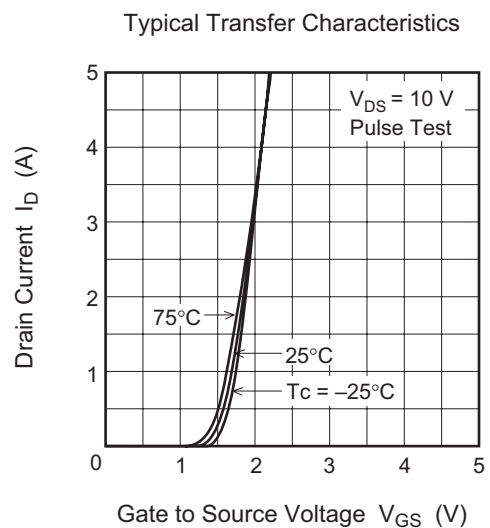
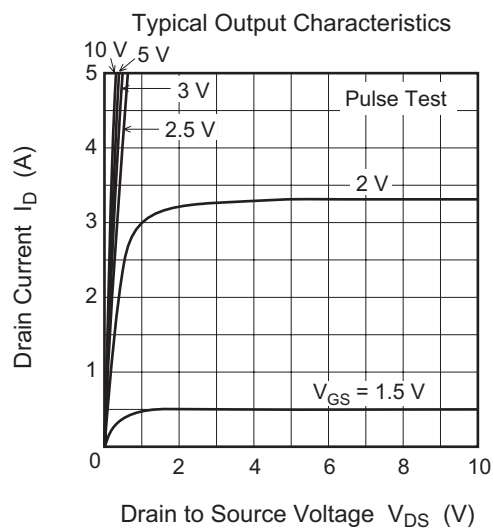
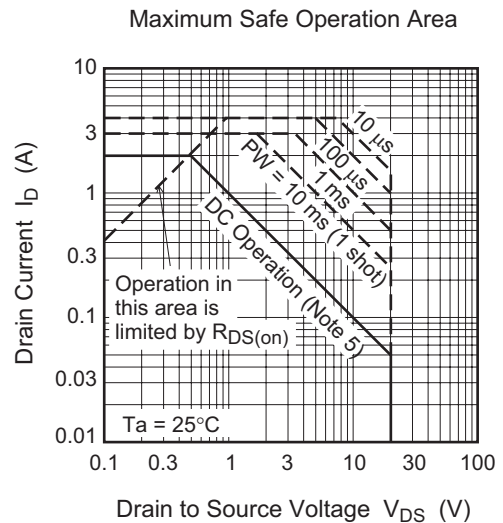
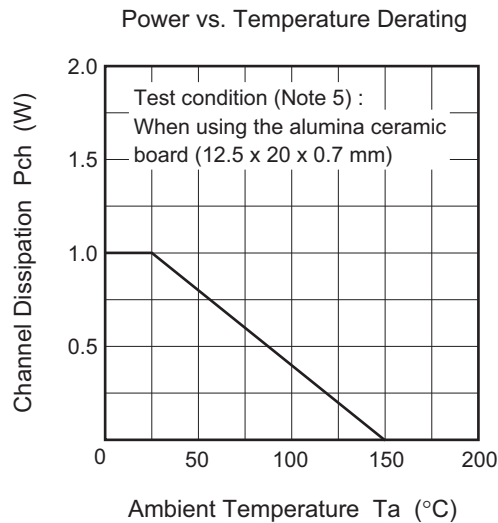
## Electrical Characteristics

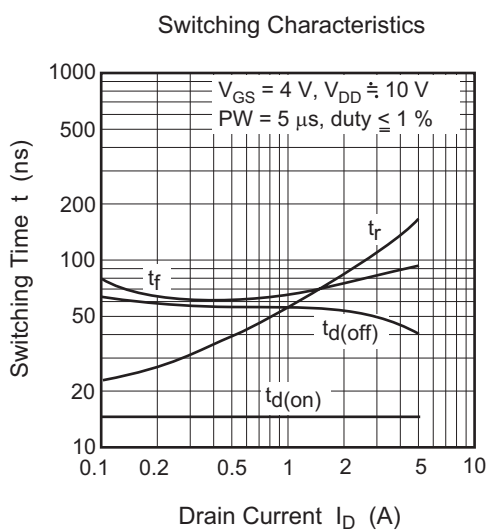
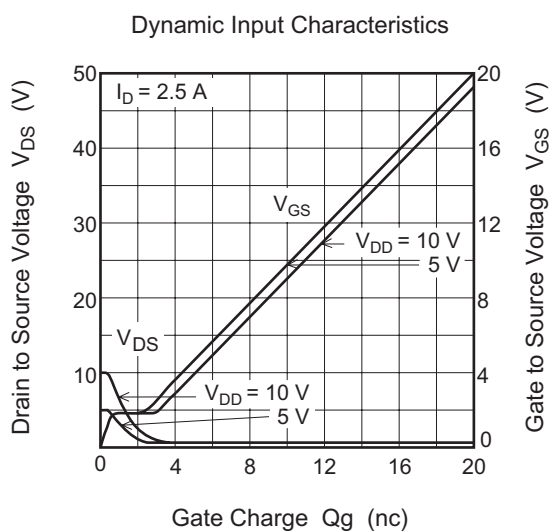
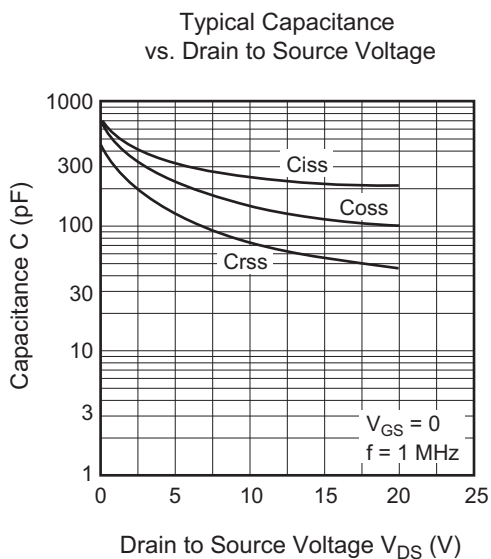
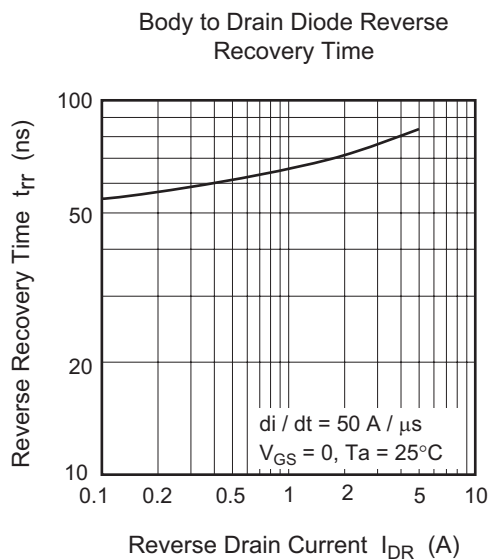
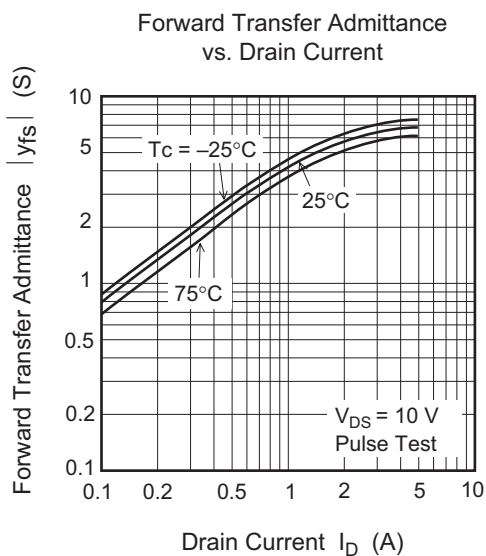
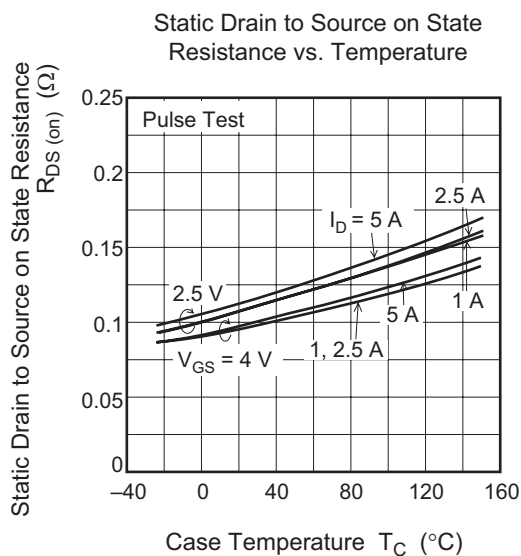
(Ta = 25°C)

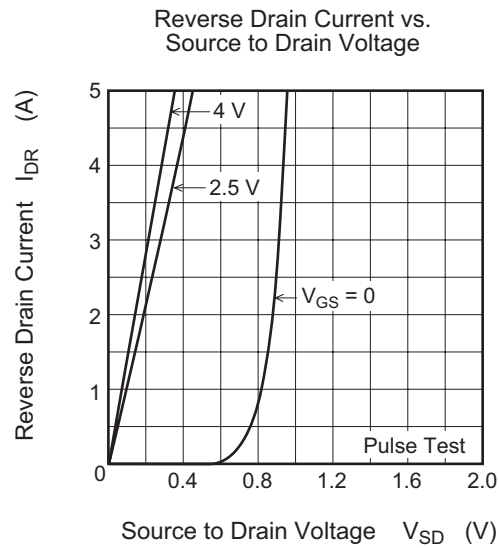
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	20	—	—	V	$I_D = 10\text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 10$	—	—	V	$I_G = \pm 100\text{ }\mu\text{A}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu\text{A}$	$V_{DS} = 20\text{ V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8\text{ V}$ , $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.5	—	1.5	V	$I_D = 1\text{ mA}$ , $V_{DS} = 10\text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.09	0.12	$\Omega$	$I_D = 1.5\text{ A}$ , $V_{GS} = 4\text{ V}$ <sup>Note3</sup>
Static drain to source on state resistance	$R_{DS(on)}$	—	0.12	0.20	$\Omega$	$I_D = 1.5\text{ A}$ , $V_{GS} = 2.5\text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	3.0	5.0	—	S	$I_D = 1.5\text{ A}$ , $V_{DS} = 10\text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	260	—	pF	$V_{DS} = 10\text{ V}$ , $V_{GS} = 0$ , $f = 1\text{ MHz}$
Output capacitance	$C_{oss}$	—	150	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	75	—	pF	
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$V_{GS} = 4\text{ V}$ , $I_D = 1.5\text{ A}$ , $R_L = 6.67\text{ }\Omega$
Rise time	$t_r$	—	70	—	ns	
Turn-off delay time	$t_{d(off)}$	—	55	—	ns	
Fall time	$t_f$	—	70	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.9	—	V	$I_F = 2.5\text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	75	—	ns	$I_F = 2.5\text{ A}$ , $V_{GS} = 0$ $di_F/dt = 50\text{ A}/\mu s$

Note: 3. Pulse test

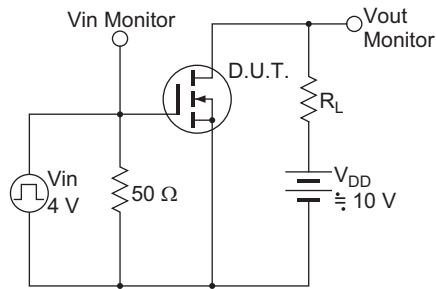
## Main Characteristics



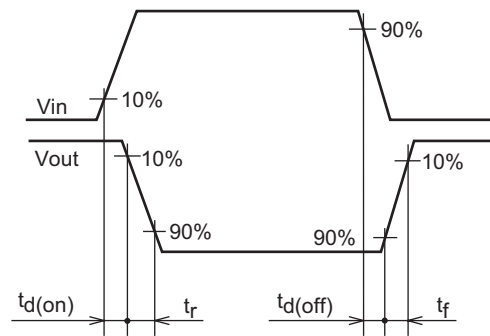




Switching Time Test Circuit



Waveform



## Package Dimensions

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]	Unit: mm
SC-62	PLZZ0004CA-A	UPAK / UPAKV	0.050g	

The drawing shows three views of the package:

- Top View:** Overall width is  $4.5 \pm 0.1$  mm. The central circular feature has a diameter of  $\phi 1$  mm. The distance from the center to the nearest edge is  $1.8$  Max mm. The distance between the two side features is  $3.0$  mm. The distance from the center to the side features is  $1.5$  mm. The distance from the center to the bottom edge is  $2.5 \pm 0.1$  mm. The distance from the center to the top edge is  $0.4$  mm. The distance from the center to the bottom edge is  $4.25$  Max mm. The distance from the center to the bottom edge is  $0.8$  Min mm. The distance from the center to the bottom edge is  $0.53$  Max mm. The distance from the center to the bottom edge is  $0.48$  Max mm.
- Side View:** The height of the package is  $1.5 \pm 0.1$  mm. The distance from the top edge to the bottom edge is  $0.44$  Max mm. The distance from the top edge to the bottom edge is  $0.44$  Max mm.
- End View:** The width of the package is  $1.5$  mm. The distance from the top edge to the bottom edge is  $2.5$  mm. The distance from the top edge to the bottom edge is  $0.4$  mm. The distance from the top edge to the bottom edge is  $0.2$  mm.

## Ordering Information

Part Name	Quantity	Shipping Container
2SK2978ZYTL-E	1000 pcs	Taping
2SK2978ZYTR-E	1000 pcs	Taping

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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