

## 2SK3136

Silicon N Channel MOS FET  
High Speed Power Switching

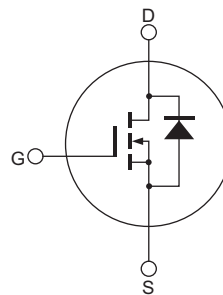
REJ03G1068-0400  
(Previous: ADE-208-696B)  
Rev.4.00  
Sep 20, 2005

### Features

- Low on-resistance  
 $R_{DS(on)} = 4.5 \text{ m}\Omega$  typ.
- Low drive current
- 4 V gate drive device can be driven from 5 V source

### Outline

RENESAS Package code: PRSS0004AC-A  
(Package name: TO-220AB)



1. Gate
2. Drain  
(Flange)
3. Source

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	40	V
Gate to source voltage	$V_{GSS}$	$\pm 20$	V
Drain current	$I_D$	75	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	300	A
Body-drain diode reverse drain current	$I_{DR}$	75	A
Avalanche current	$I_{AP}$ <sup>Note 3</sup>	50	A
Avalanche energy	$E_{AR}$ <sup>Note 3</sup>	333	mJ
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	100	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  $T_c = 25^\circ C$   
 3. Value at  $T_{ch} = 25^\circ C$ ,  $R_g \geq 50 \Omega$

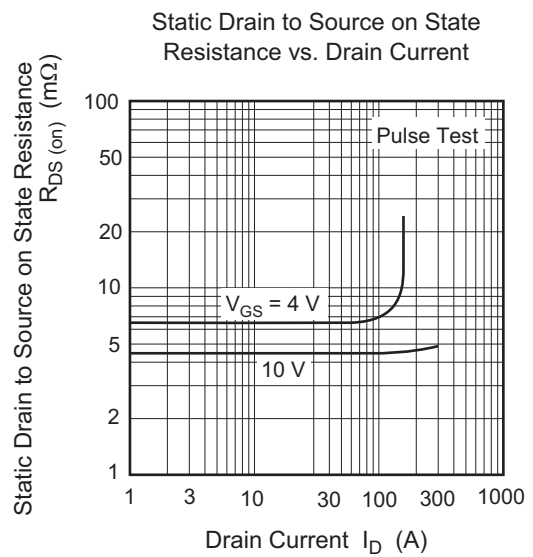
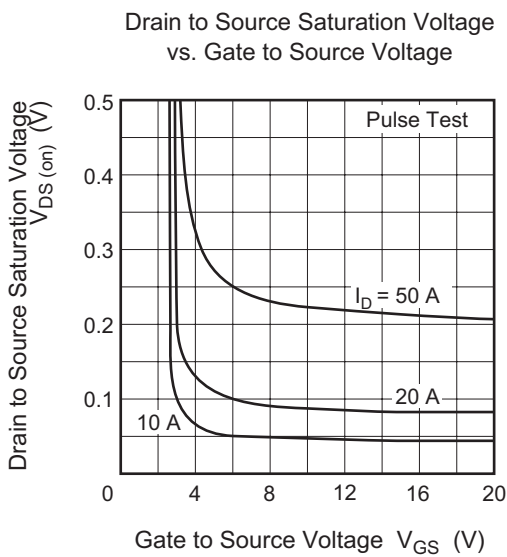
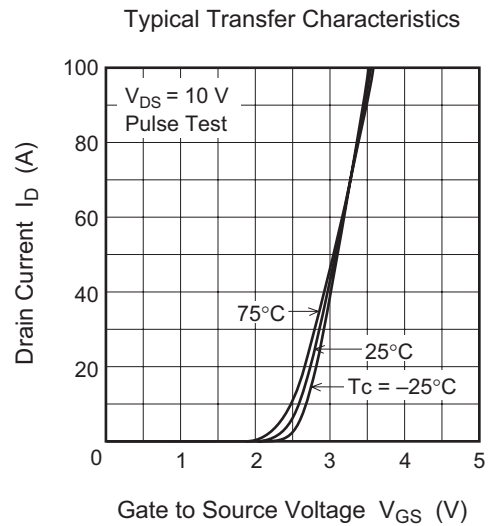
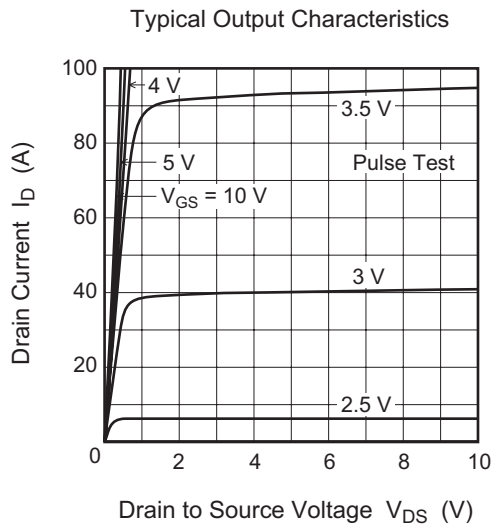
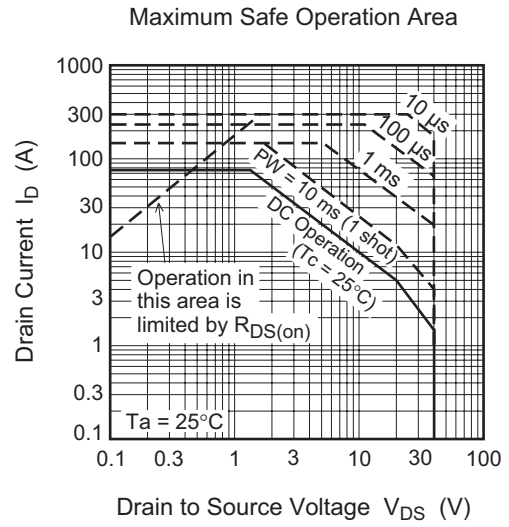
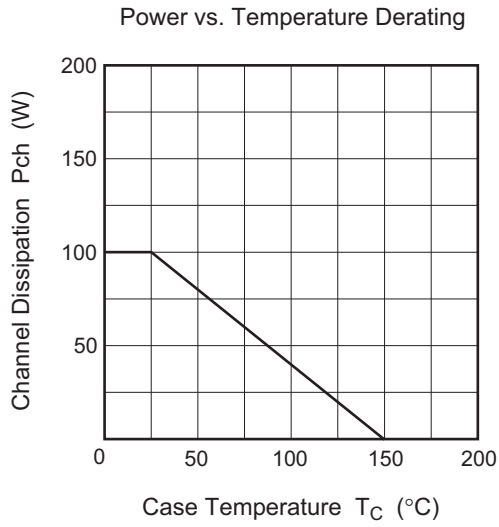
## Electrical Characteristics

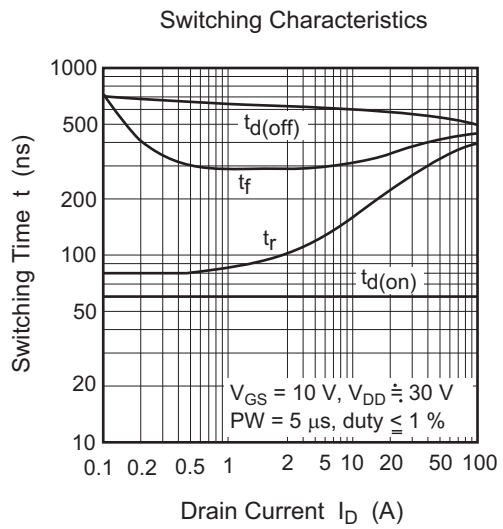
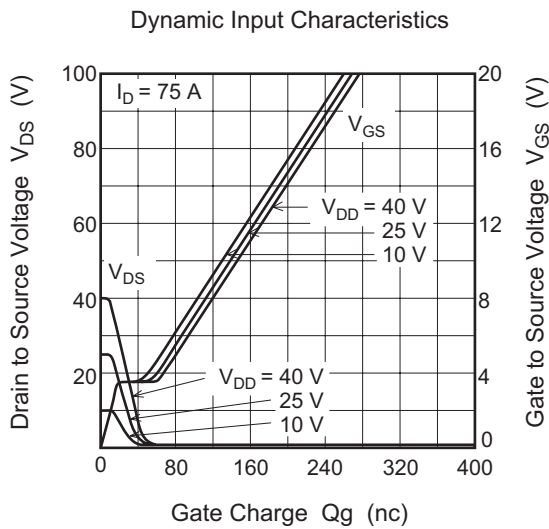
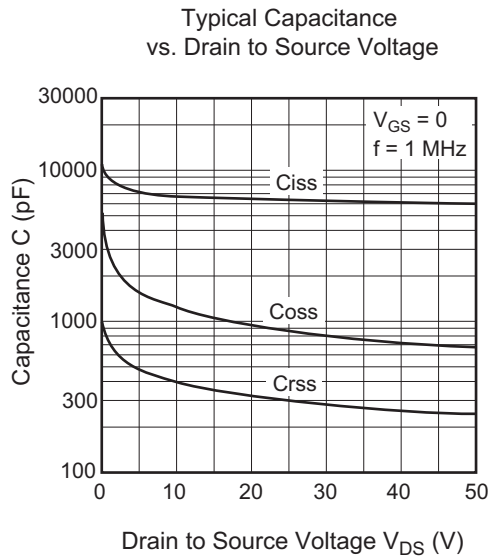
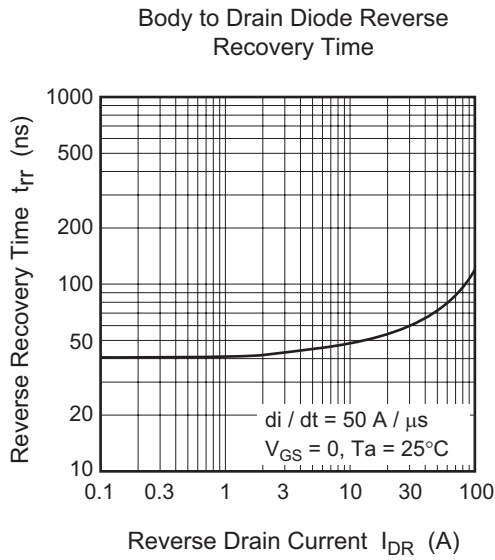
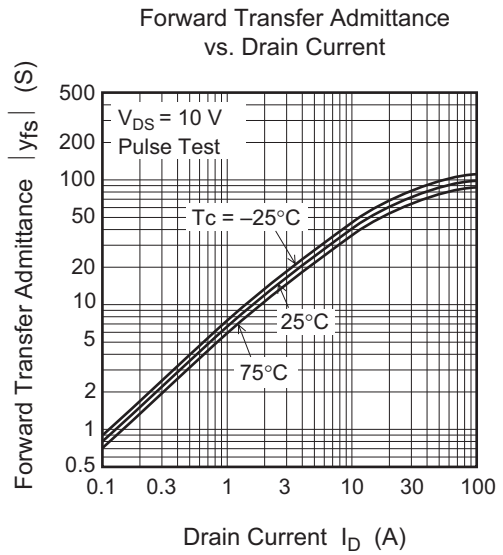
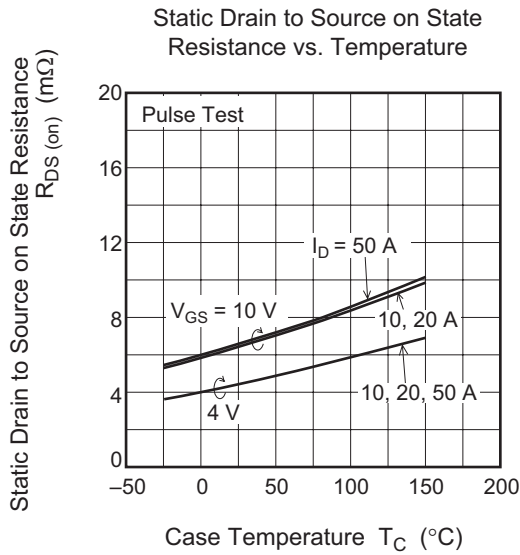
(Ta = 25°C)

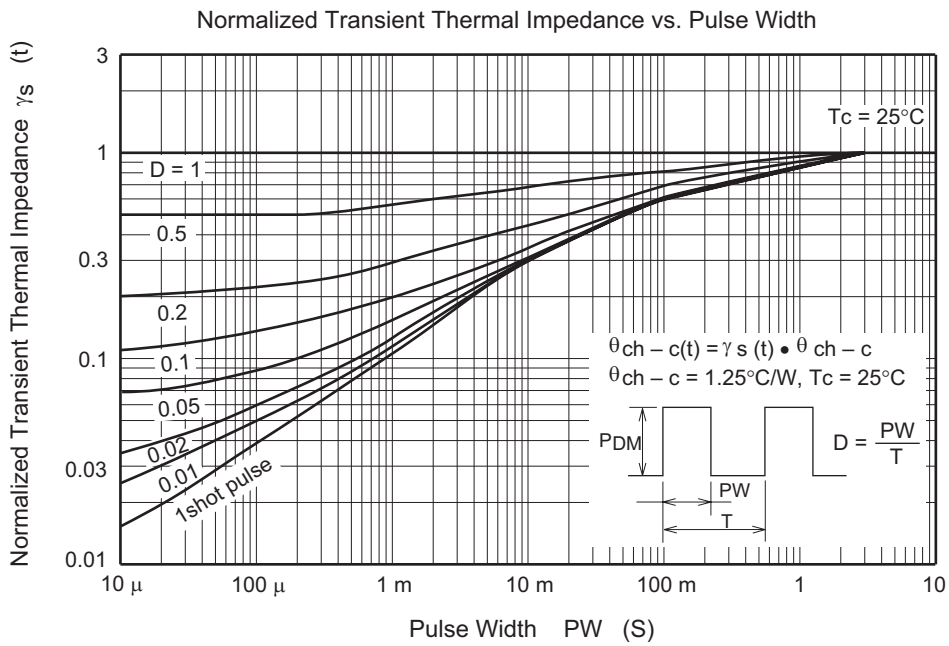
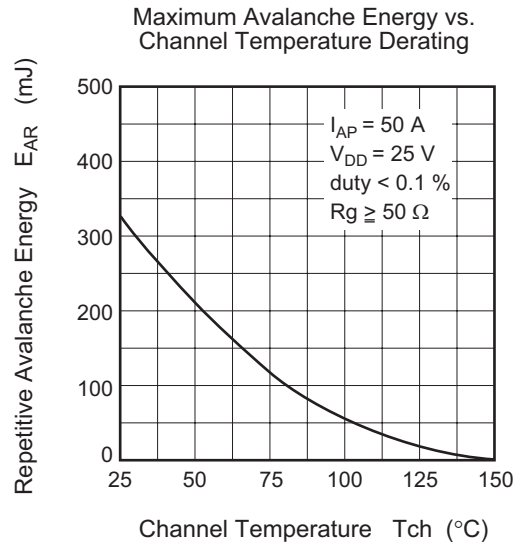
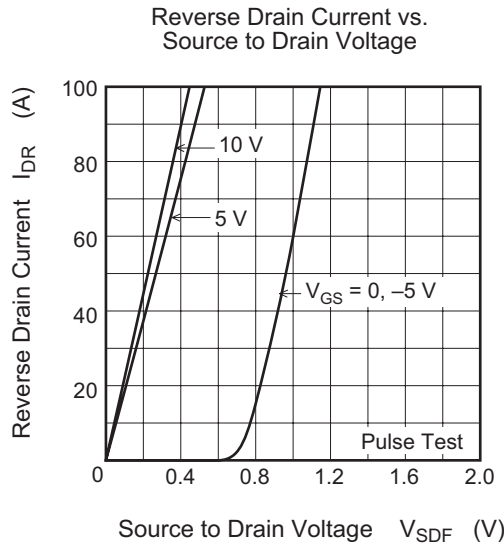
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	40	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu A$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu A$	$V_{DS} = 40 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 4</sup>
Static drain to source on state resistance	$R_{DS(on)}$	—	4.5	5.8	$m\Omega$	$I_D = 40 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 4</sup>
		—	6.5	10	$m\Omega$	$I_D = 40 \text{ A}$ , $V_{GS} = 4 \text{ V}$ <sup>Note 4</sup>
Forward transfer admittance	$ y_{fs} $	50	80	—	S	$I_D = 40 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 4</sup>
Input capacitance	$C_{iss}$	—	6800	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	1300	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	380	—	pF	
Total gate charge	$Q_g$	—	130	—	nc	$V_{DD} = 25 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 75 \text{ A}$
Gate to source charge	$Q_{gs}$	—	25	—	nc	
Gate to drain charge	$Q_{gd}$	—	30	—	nc	
Turn-on delay time	$t_{d(on)}$	—	60	—	ns	$V_{GS} = 10 \text{ V}$ , $I_D = 40 \text{ A}$ , $R_L = 0.75 \Omega$
Rise time	$t_r$	—	300	—	ns	
Turn-off delay time	$t_{d(off)}$	—	550	—	ns	
Fall time	$t_f$	—	400	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	1.05	—	V	$I_F = 75 \text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	90	—	ns	$I_F = 75 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 50 \text{ A}/\mu s$

Note: 4. Pulse test

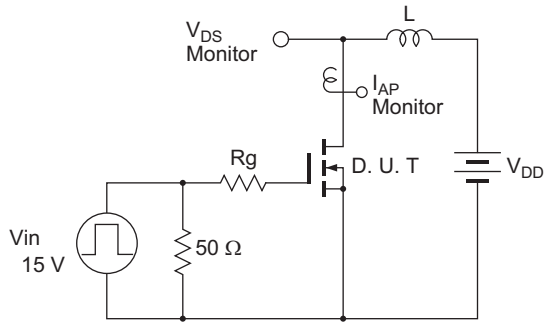
Main Characteristics



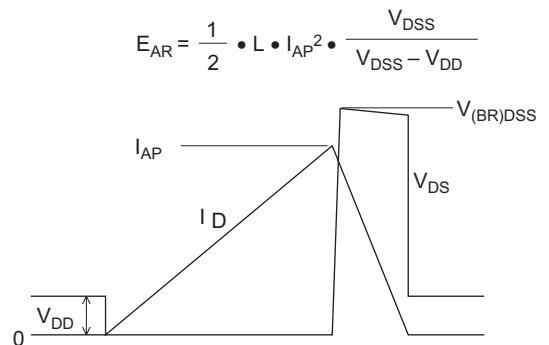


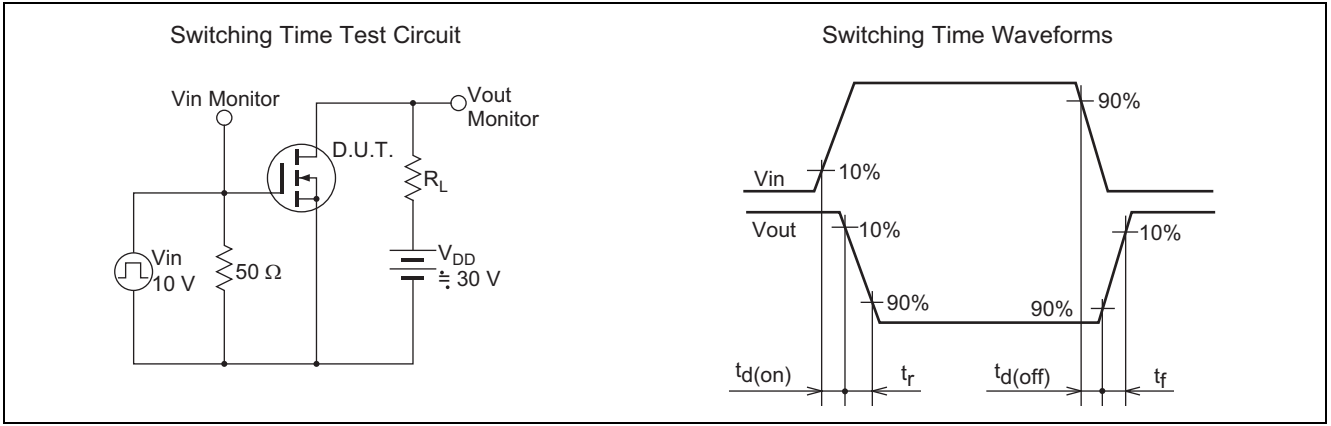


Avalanche Test Circuit



Avalanche Waveform







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