

# 2SK3081

Silicon N Channel MOS FET  
High Speed Power Switching

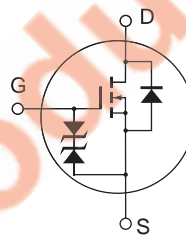
REJ03G1064-0400  
(Previous: ADE-208-636A)  
Rev.4.00  
Sep 07, 2005

## Features

- Low on-resistance  
 $R_{DS(on)} = 10 \text{ m}\Omega$  typ.
- 4 V gate drive devices.
- High speed switching

## 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	$V_{DSS}$	30	V
Gate to source voltage	$V_{GSS}$	±20	V
Drain current	$I_D$	45	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	180	A
Body-drain diode reverse drain current	$I_{DR}$	45	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	75	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

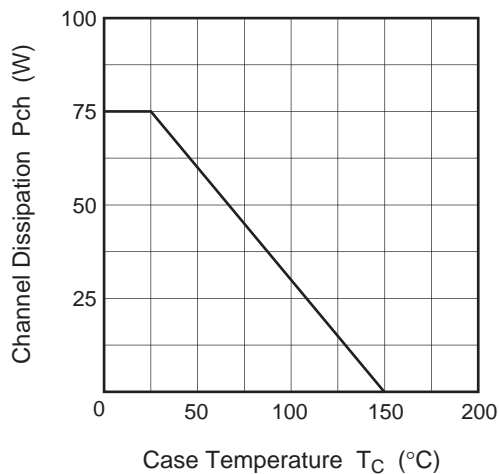
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10\text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100\text{ }\mu A$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu A$	$V_{DS} = 30\text{ V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±10	$\mu A$	$V_{GS} = \pm 16\text{ V}$ , $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	V	$I_D = 1\text{ mA}$ , $V_{DS} = 10\text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	10	14	$m\Omega$	$I_D = 20\text{ A}$ , $V_{GS} = 10\text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	15	25	$m\Omega$	$I_D = 20\text{ A}$ , $V_{GS} = 4\text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	20	30	—	S	$I_D = 20\text{ A}$ , $V_{DS} = 10\text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	1570	—	pF	$V_{DS} = 10\text{ V}$ , $V_{GS} = 0$ , $f = 1\text{ MHz}$
Output capacitance	$C_{oss}$	—	1100	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	410	—	pF	
Turn-on delay time	$t_{d(on)}$	—	32	—	ns	$V_{GS} = 10\text{ V}$ , $I_D = 20\text{ A}$ , $R_L = 0.5\text{ }\Omega$
Rise time	$t_r$	—	300	—	ns	
Turn-off delay time	$t_{d(off)}$	—	180	—	ns	
Fall time	$t_f$	—	200	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	1.0	—	V	$I_F = 45\text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	75	—	ns	$I_F = 45\text{ A}$ , $V_{GS} = 0$ $di_F/dt = 50\text{ A}/\mu s$

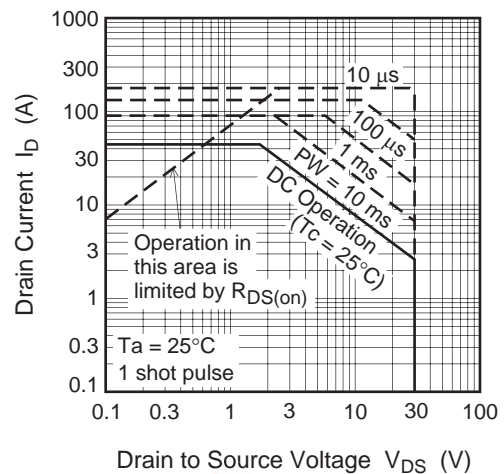
Note: 3. Pulse test

## Main Characteristics

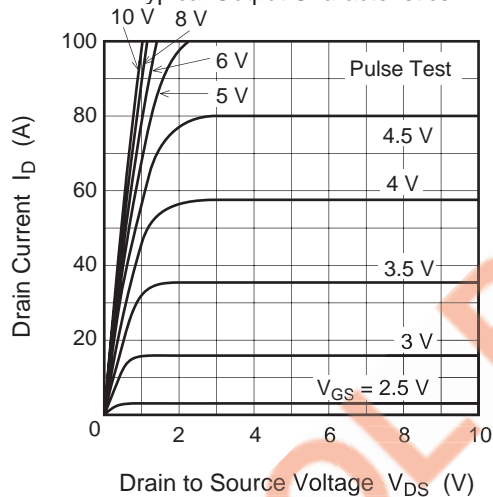
Power vs. Temperature Derating



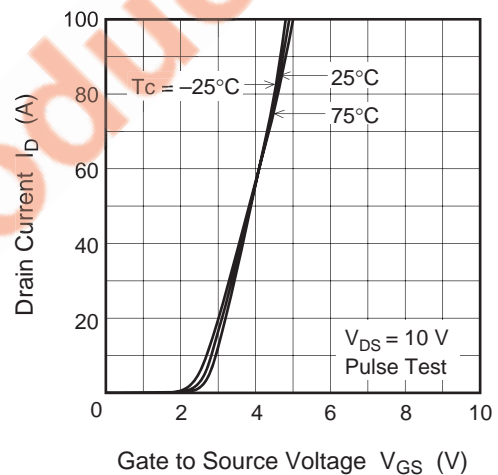
Maximum Safe Operation Area



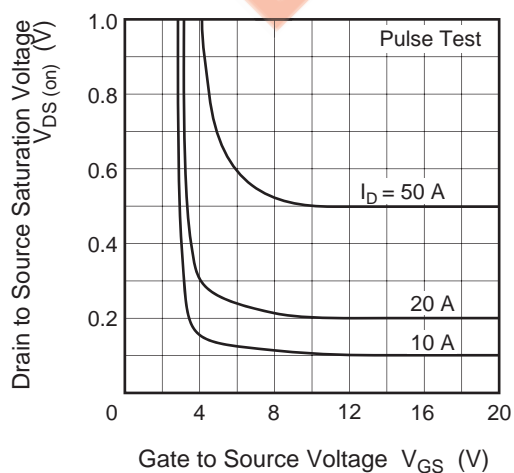
Typical Output Characteristics



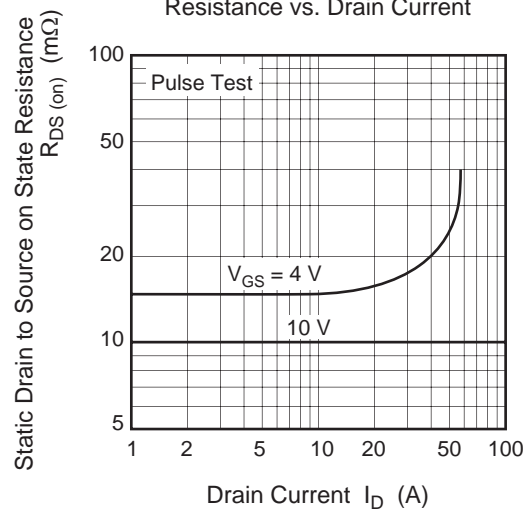
Typical Transfer Characteristics

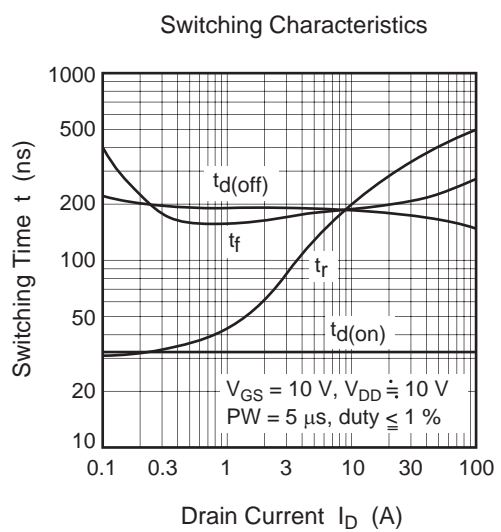
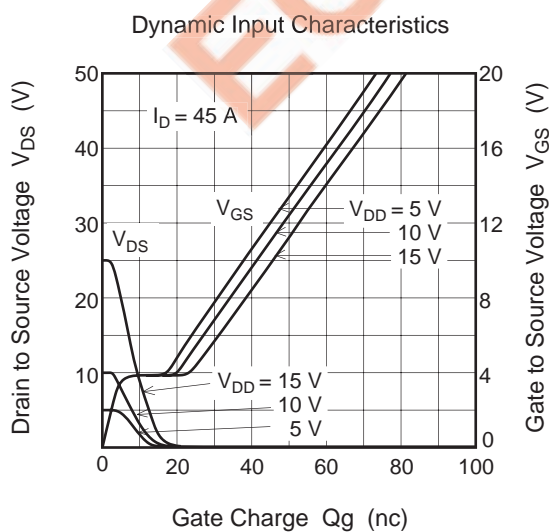
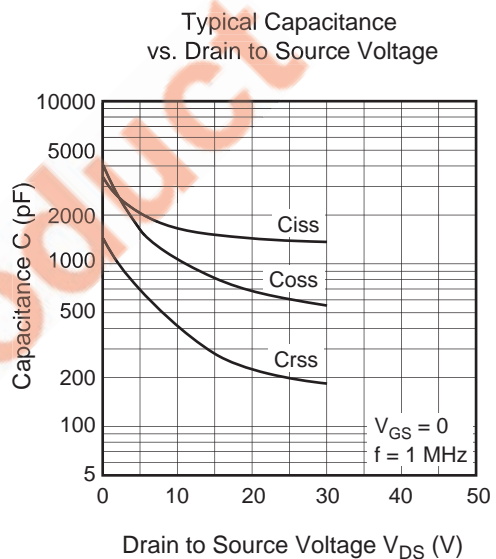
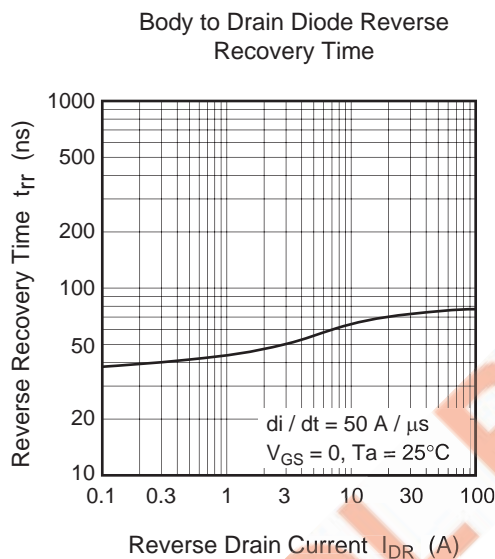
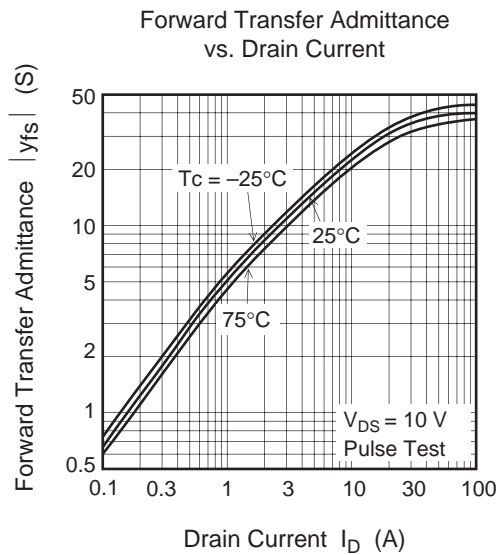
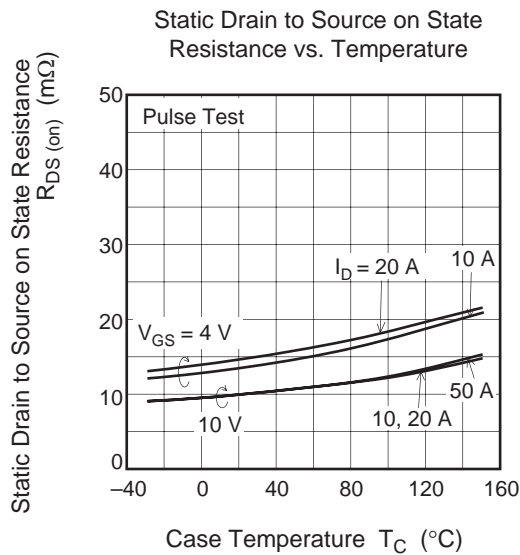


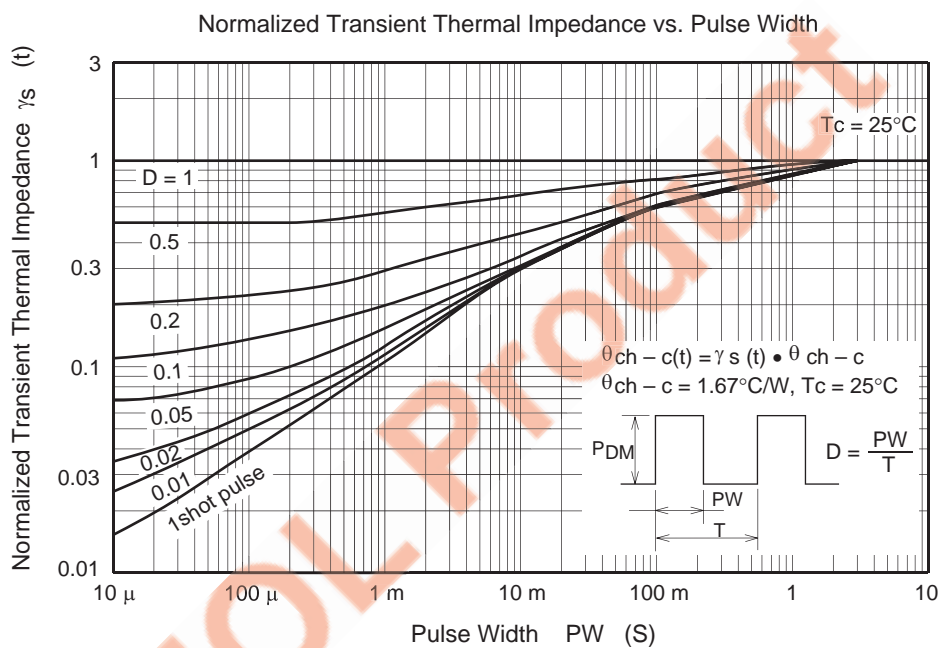
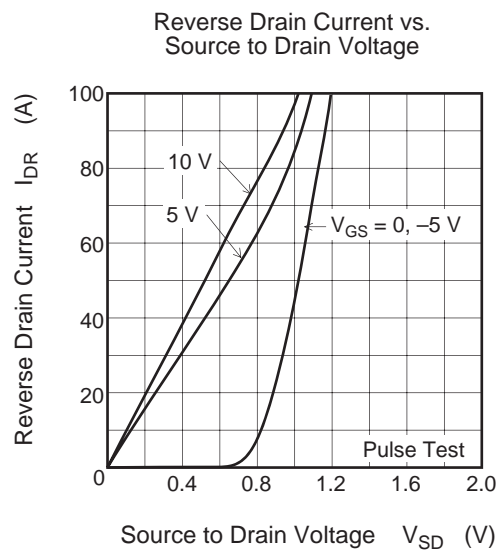
Drain to Source Saturation Voltage vs. Gate to Source Voltage



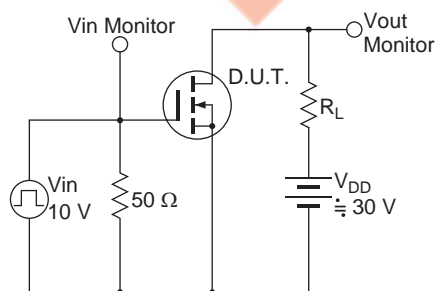
Static Drain to Source on State Resistance vs. Drain Current



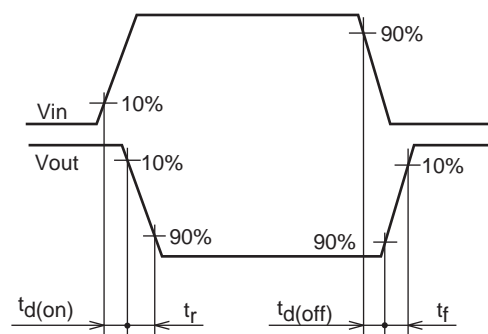




Switching Time Test Circuit



Waveform





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