

2SK2931

Silicon N Channel MOS FET High Speed Power Switching

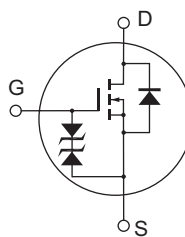
REJ03G1045-0500
(Previous: ADE-208-554C)
Rev.5.00
Sep 07, 2005

Features

- Low on-resistance
 $R_{DS} = 0.010 \Omega$ typ.
- High speed switching
- 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}	60	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	45	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	180	A
Body-drain diode reverse drain current	I_{DR}	45	A
Avalanche current	I_{AP} ^{Note3}	45	A
Avalanche energy	E_{AR} ^{Note3}	173	mJ
Channel dissipation	P_{ch} ^{Note2}	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 $T_c = 25^\circ C$
 3. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50\ \Omega$

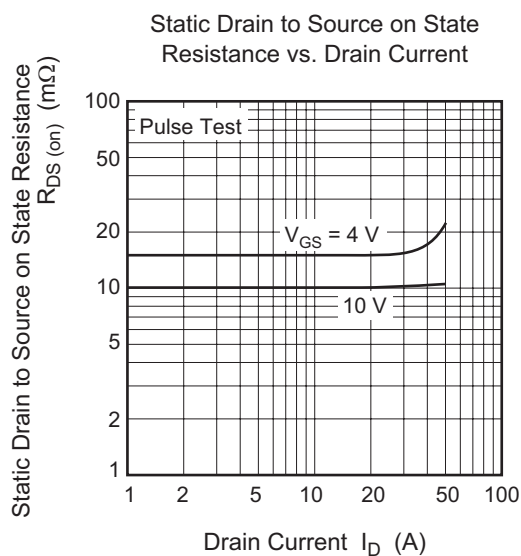
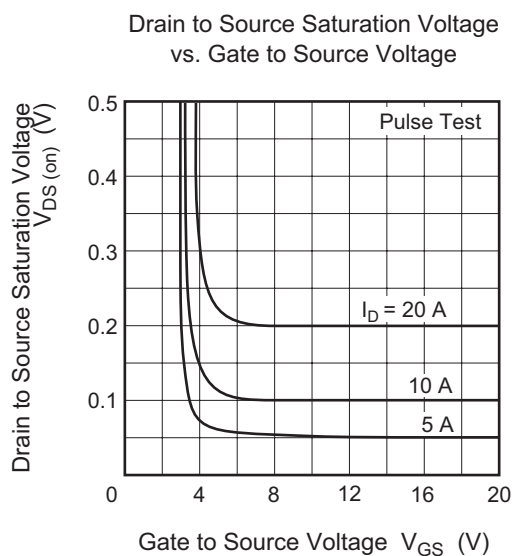
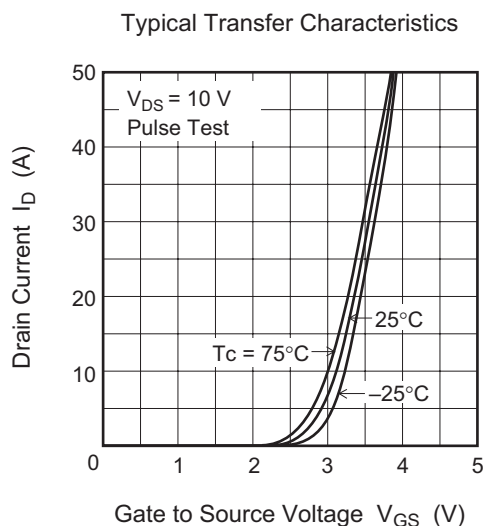
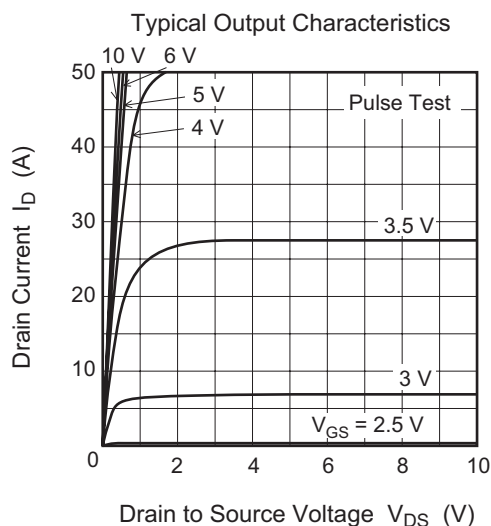
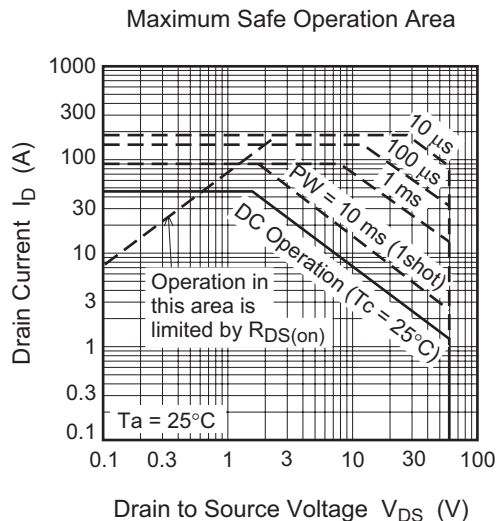
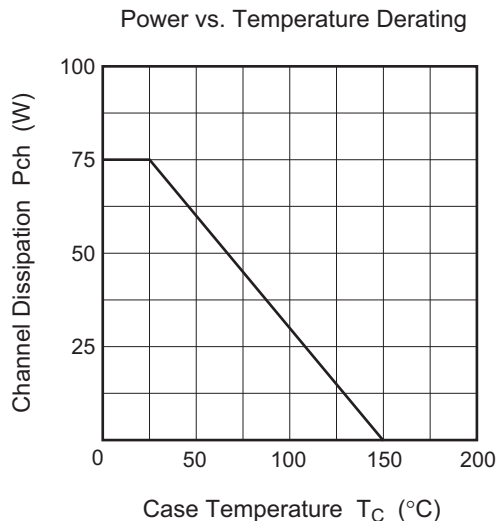
Electrical Characteristics

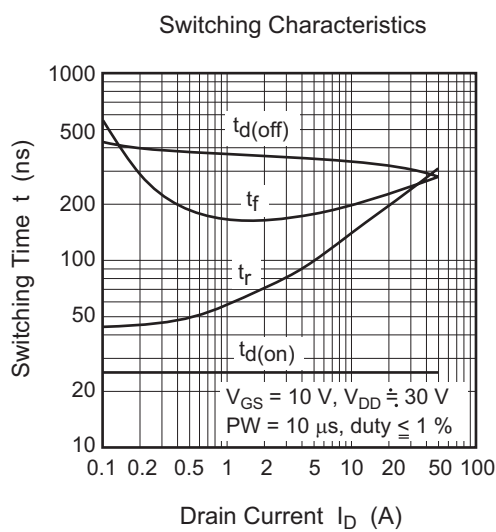
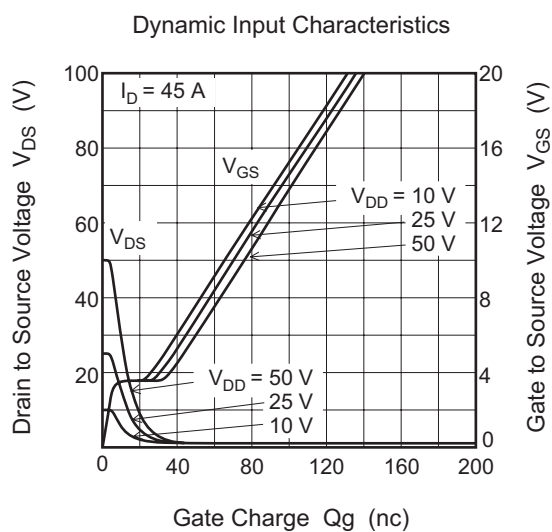
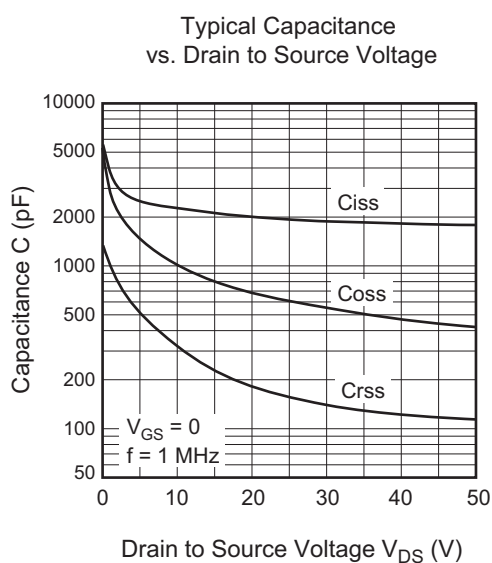
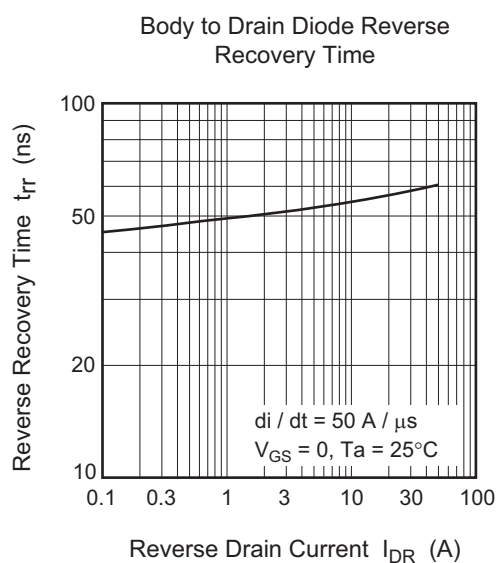
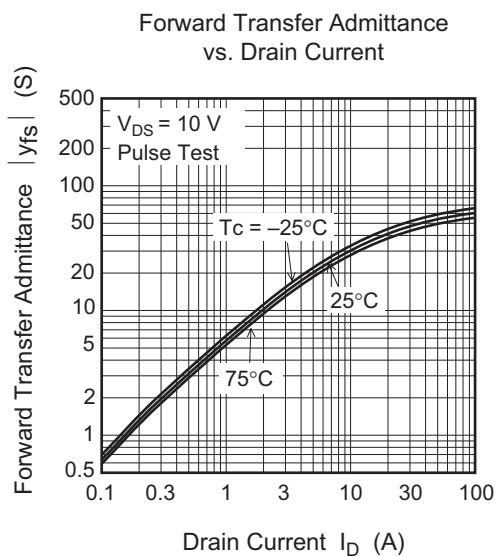
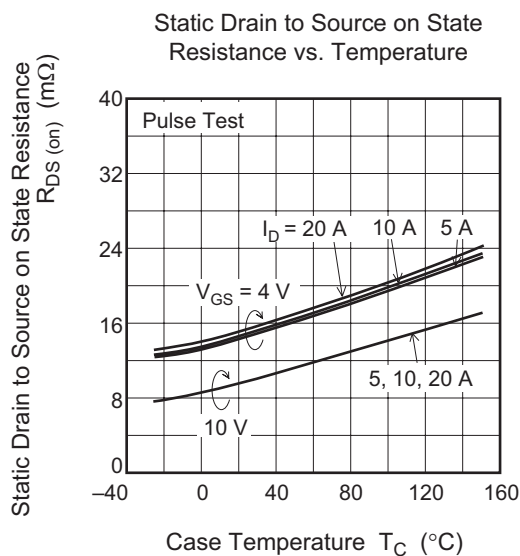
(Ta = 25°C)

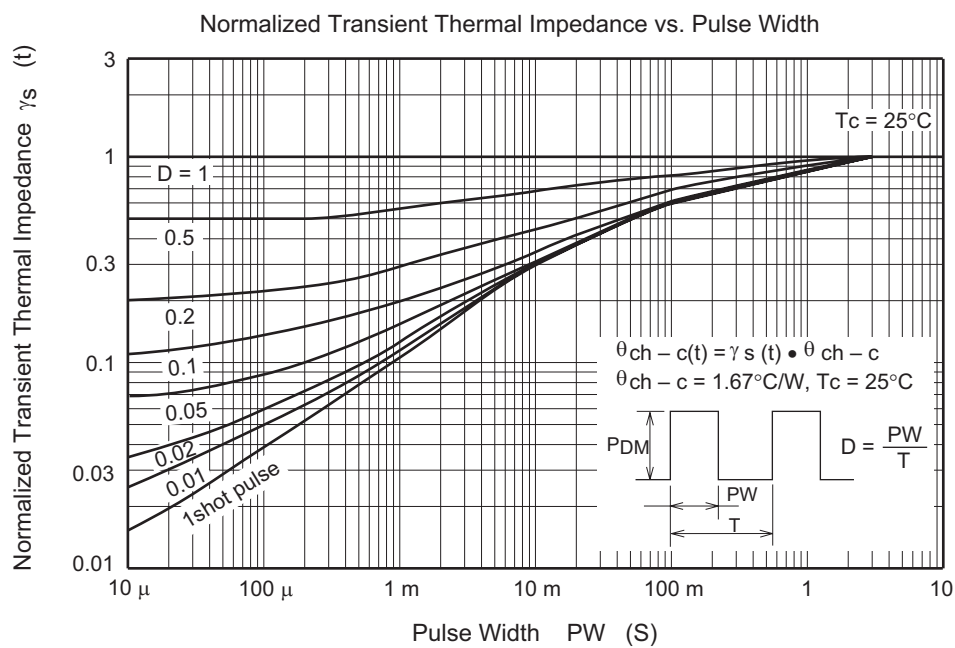
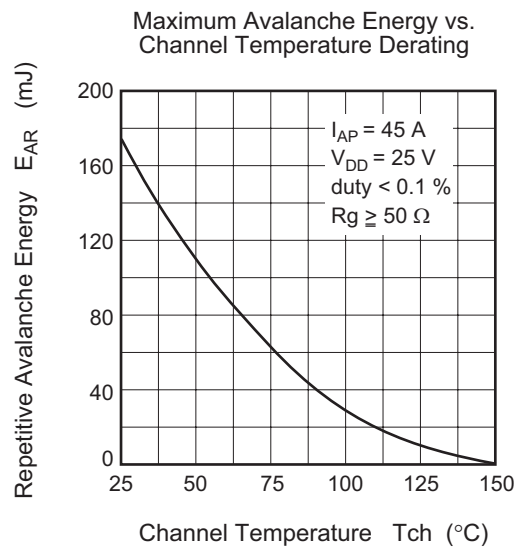
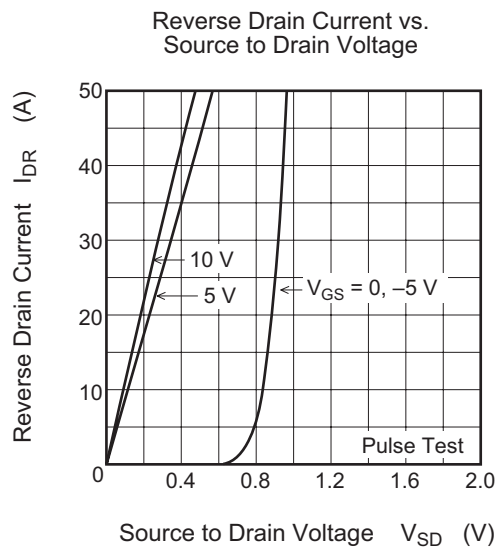
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 10\text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100\ \mu A$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 60\text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	$I_D = 1\text{ mA}$, $V_{DS} = 10\text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.010	0.013	Ω	$I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	0.015	0.025	Ω	$I_D = 20\text{ A}$, $V_{GS} = 4\text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	24	40	—	S	$I_D = 20\text{ A}$, $V_{DS} = 10\text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	2200	—	pF	$V_{DS} = 10\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$
Output capacitance	C_{oss}	—	1050	—	pF	
Reverse transfer capacitance	C_{rss}	—	320	—	pF	
Turn-on delay time	$t_{d(on)}$	—	25	—	ns	$I_D = 20\text{ A}$, $V_{GS} = 10\text{ V}$, $R_L = 1.5\ \Omega$
Rise time	t_r	—	200	—	ns	
Turn-off delay time	$t_{d(off)}$	—	320	—	ns	
Fall time	t_f	—	240	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.95	—	V	$I_F = 45\text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	60	—	ns	$I_F = 45\text{ A}$, $V_{GS} = 0$ $di_F/dt = 50\text{ A}/\mu s$

Note: 4. Pulse test

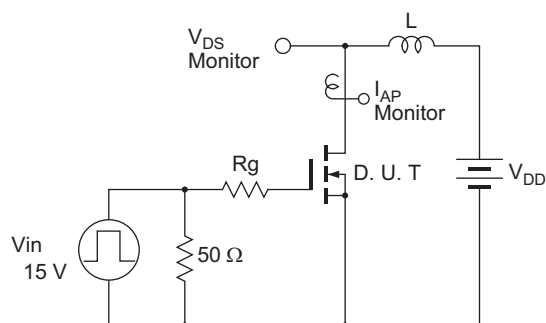
Main Characteristics



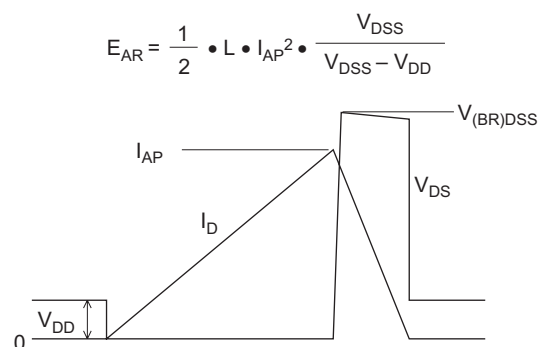


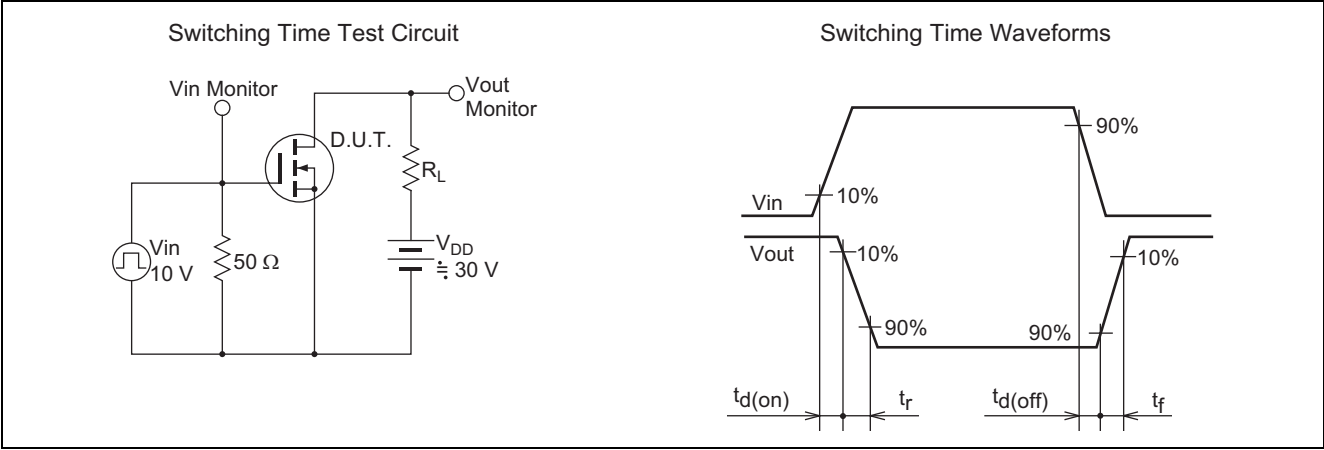


Avalanche Test Circuit



Avalanche Waveform





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450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology Hong Kong Ltd.

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2730-6071

Renesas Technology Taiwan Co., Ltd.

10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology (Shanghai) Co., Ltd.

Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

Renesas Technology Singapore Pte. Ltd.

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> 2-796-3115, Fax: <82> 2-796-2145

Renesas Technology Malaysia Sdn. Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510