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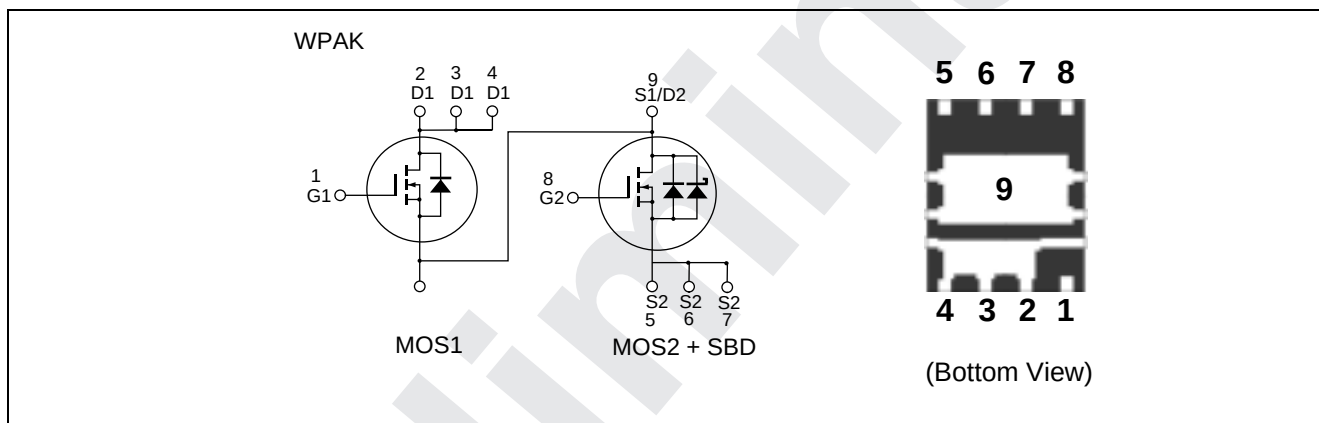
Silicon N Channel Power MOS FET with Schottky Barrier Diode
High Speed Power Switching

REJ03G1723-0101
Preliminary
Rev.1.01
Jul 10, 2008

Features

- Low on-resistance
- Capable of 4.5 V gate drive
- High density mounting
- Pb-free
- Halogen-free

Outline



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings		Unit
		MOS1	MOS2	
Drain to source voltage	V_{DSS}	30	30	V
Gate to source voltage	V_{GSS}	± 20	± 20	V
Drain current	I_D	15	45	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	60	180	A
Reverse drain current	I_{DR}	15	45	A
Avalanche current	I_{AP} ^{Note 2}	11	20	A
Avalanche energy	E_{AR} ^{Note 2}	12.1	40	mJ
Channel dissipation	P_{ch} ^{Note3}	10	30	W
Channel temperature	T_{ch}	150	150	°C
Storage temperature	T_{stg}	-55 to +150	-55 to +150	°C

Notes: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
 2. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$
 3. $T_c = 25^\circ C$

Electrical Characteristics

• MOS1

(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 leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.2	—	2.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	8.5	11.1	$\text{m}\Omega$	$I_D = 7.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	12	16.8	$\text{m}\Omega$	$I_D = 7.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	—	TBD	—	S	$I_D = 7.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	1010	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	190	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	75	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	R_g	—	1.2	—	Ω	
Total gate charge	Q_g	—	6.8	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	2.5	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	Q_{gd}	—	1.5	—	nC	$I_D = 15 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	TBD	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 7.5 \text{ A}$
Rise time	t_r	—	TBD	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	TBD	—	ns	$R_L = 1.33 \Omega$
Fall time	t_f	—	TBD	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	V_{DF}	—	0.84	1.10	V	$I_F = 15 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	20	—	ns	$I_F = 15 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 4. Pulse test

• MOS2

(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 leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	mA	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.2	—	2.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	2.5	3.3	$\text{m}\Omega$	$I_D = 22.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	3.7	5.2	$\text{m}\Omega$	$I_D = 22.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	—	TBD	—	S	$I_D = 22.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	3200	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	720	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	300	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	R_g	—	1.5	—	Ω	
Total gate charge	Q_g	—	20	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	8.6	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	Q_{gd}	—	6.5	—	nC	$I_D = 45 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	TBD	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 22.5 \text{ A}$
Rise time	t_r	—	TBD	—	ns	$V_{DD} \approx 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	TBD	—	ns	$R_L = 0.44 \Omega$
Fall time	t_f	—	TBD	—	ns	$R_g = 4.7 \Omega$
Schottky Barrier diode forward voltage	V_F	—	0.36	—	V	$I_F = 2 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	30	—	ns	$I_F = 45 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 4. Pulse test

Notes:

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Renesas Technology America, Inc.
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 (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

Renesas Technology Hong Kong Ltd.
7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2377-3473

Renesas Technology Taiwan Co., Ltd.
10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

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, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510