H5N5005PL

Silicon N Channel MOS FET
High Speed Power Switching

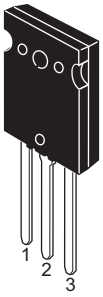
REJ03G0419-0400
Rev.4.00
May 13, 2009

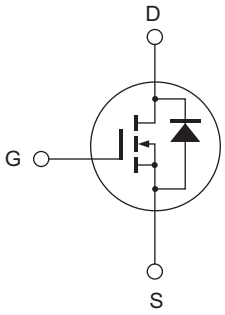
Features

- Low on-resistance: $R_{DS(on)}$ = 0.070 Ω typ.
- Low leakage current: I_{DSS} = 10 μA max (at V_{DS} = 500 V)
- High speed switching: t_f = 300 ns typ (at V_{GS} = 10 V, I_D = 30 A, R_L = 8.33 Ω)
- Low gate charge: Qg = 300 nC typ (at V_{DD} = 400 V, V_{GS} = 10 V, I_D = 60 A)
- Avalanche ratings
- Built-in fast recovery diode: t_{rr} = 220 ns typ

Outline

RENESAS Package code: PRSS0004ZF-A
(Package name: TO-3PL)





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

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to Source voltage	V_{DSS}	500	V
Gate to Source voltage	V_{GSS}	±30	V
Drain current	I_D	60	A
Drain peak current	$I_{D\ (pulse)}$ Note1	240	A
Body-Drain diode reverse Drain current	I_{DR}	60	A
Body-Drain diode reverse Drain peak current	$I_{DR\ (pulse)}$ Note1	240	A
Avalanche current	I_{AP} Note3	30	A
Channel dissipation	Pch Note2	270	W
Channel to case thermal impedance	θch-c	0.463	°C/W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. STch = 25°C, Tch ≤ 150°C

Electrical Characteristics

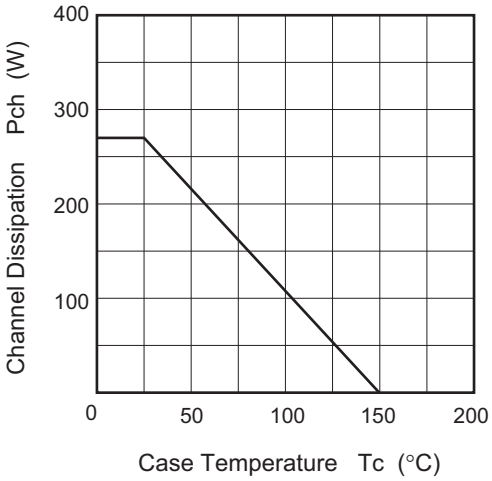
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to Source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	I_D = 10 mA, V_{GS} = 0
Zero Gate voltage Drain current	I_{DSS}	—	—	10	μA	V_{DS} = 500 V, V_{GS} = 0
Gate to Source leak current	I_{GSS}	—	—	±0.1	μA	V_{GS} = ±30 V, V_{DS} = 0
Gate to Source cutoff voltage	$V_{GS(off)}$	2.0	—	4.0	V	V_{DS} = 10 V, I_D = 1 mA
Forward transfer admittance	$\|y_{fs}\|$	25	42	—	S	I_D = 30 A, V_{DS} = 10 V [Note4]
Static Drain to Source on state resistance	$R_{DS(on)}$	—	0.070	0.085	Ω	I_D = 30 A, V_{GS}= 10 V [Note4]
Input capacitance	Ciss	—	10550	—	pF	V_{DS} = 25 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	1060	—	pF	
Reverse transfer capacitance	Crss	—	180	—	pF	
Turn-on delay time	$t_{d(on)}$	—	115	—	ns	I_D= 30 A V_{GS} = 10 V R_L = 8.33 Ω Rg = 10 Ω
Rise time	t_r	—	380	—	ns	
Turn-off delay time	$t_{d(off)}$	—	560	—	ns	
Fall time	t_f	—	300	—	ns	
Total Gate charge	Qg	—	300	—	nC	V_{DD} = 400 V V_{GS} = 10 V I_D = 60 A
Gate to Source charge	Qgs	—	40	—	nC	
Gate to Drain charge	Qgd	—	155	—	nC	
Body-Drain diode forward voltage	V_{DF}	—	1.0	1.5	V	I_F = 60 A, V_{GS} = 0 [Note4]
Body-Drain diode reverse recovery time	t_{rr}	—	220	—	ns	I_F = 60 A, V_{GS} = 0 di_F/dt = 100A/μs
Body-Drain diode reverse recovery charge	Q_{rr}	—	2.0	—	μC	

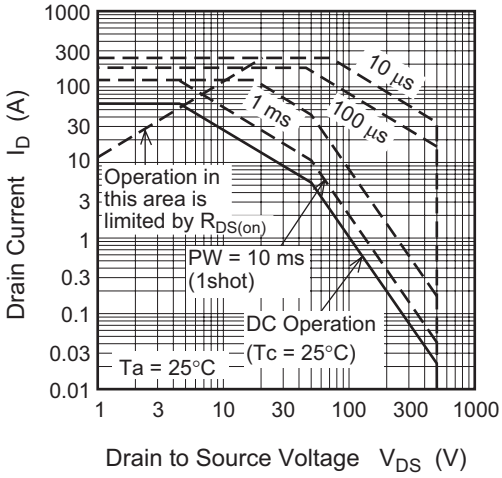
Note: 4. Pulse test

Main Characteristics

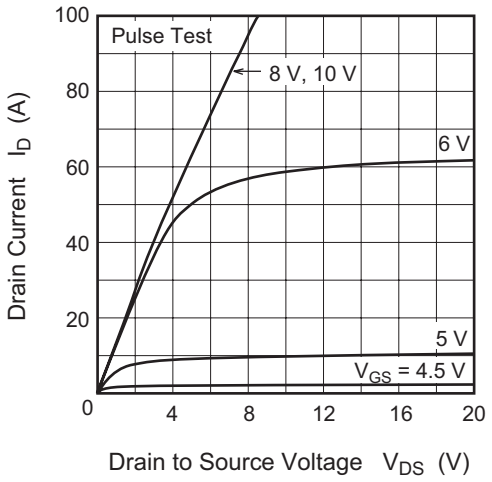
Power vs. Temperature Derating



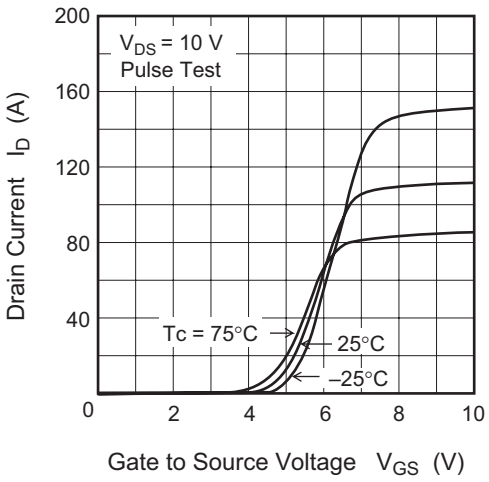
Maximum Safe Operation Area



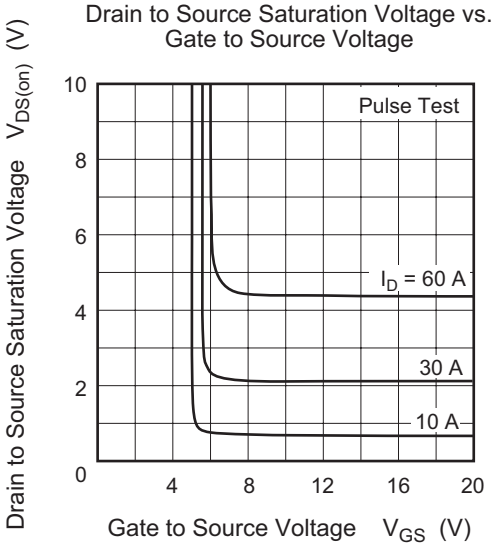
Typical Output Characteristics



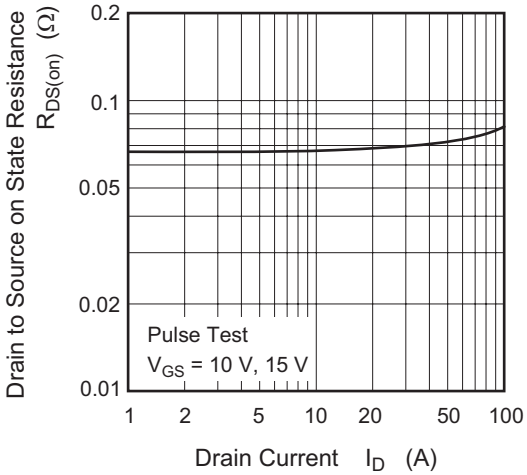
Typical Transfer Characteristics



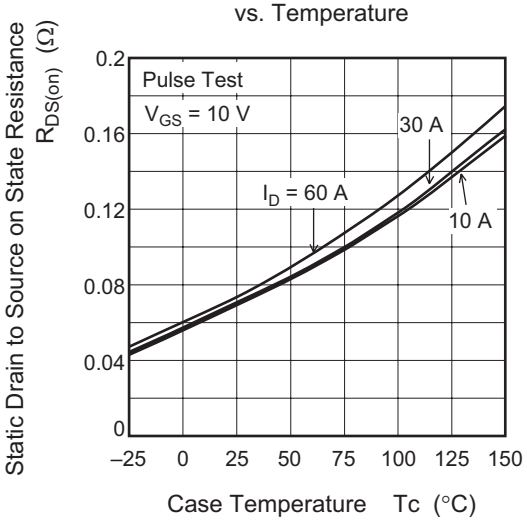
Drain to Source Saturation Voltage vs. Gate to Source Voltage



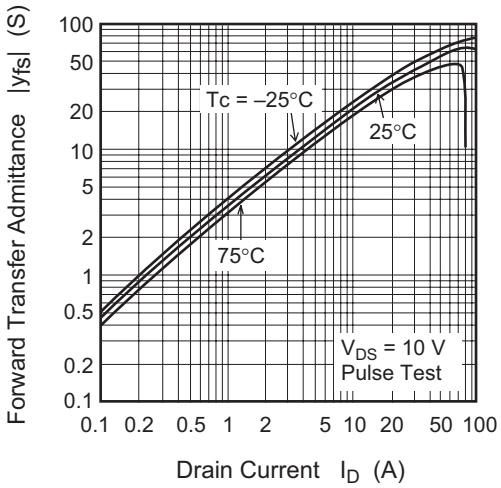
Static Drain to Source on State Resistance vs. Drain Current



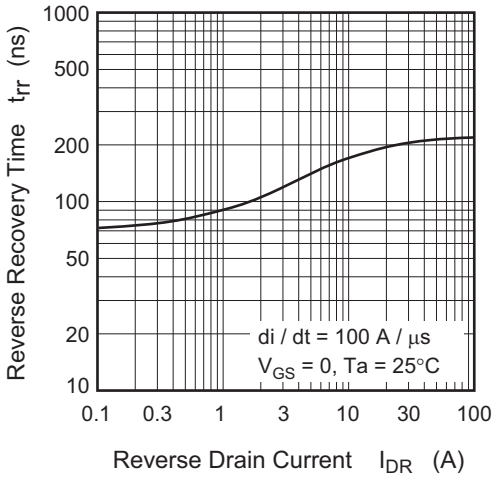
Static Drain to Source on State Resistance vs. Temperature



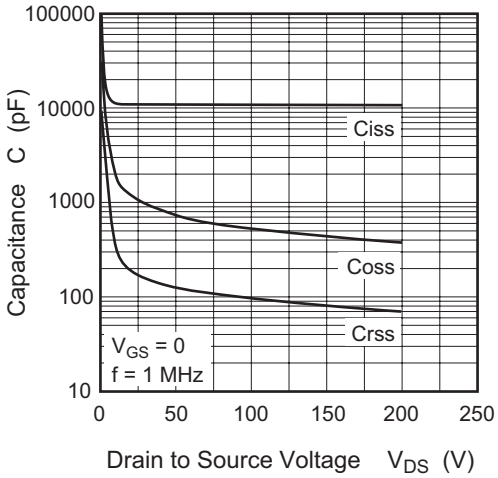
Forward Transfer Admittance vs. Drain Current



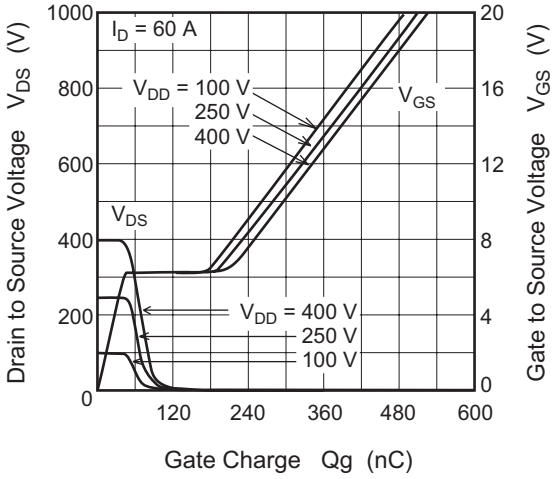
Body-Drain Diode Reverse Recovery Time



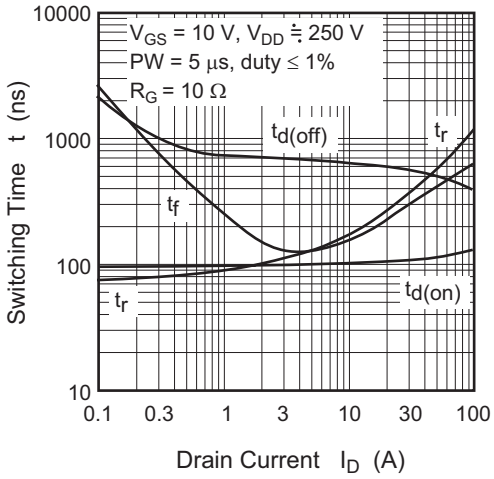
Typical Capacitance vs. Drain to Source Voltage



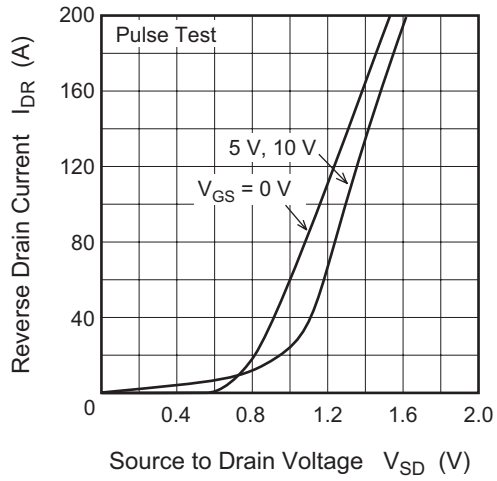
Dynamic Input Characteristics



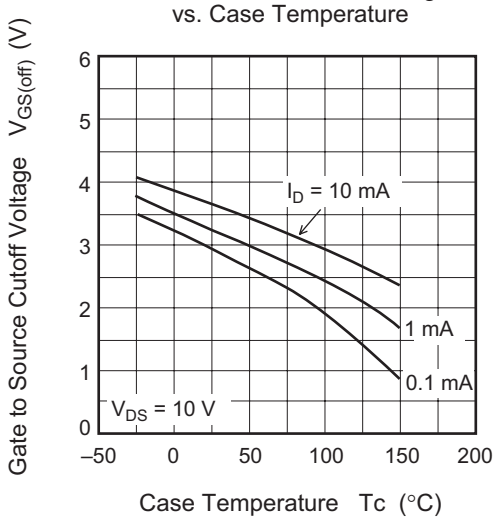
Switching Characteristics



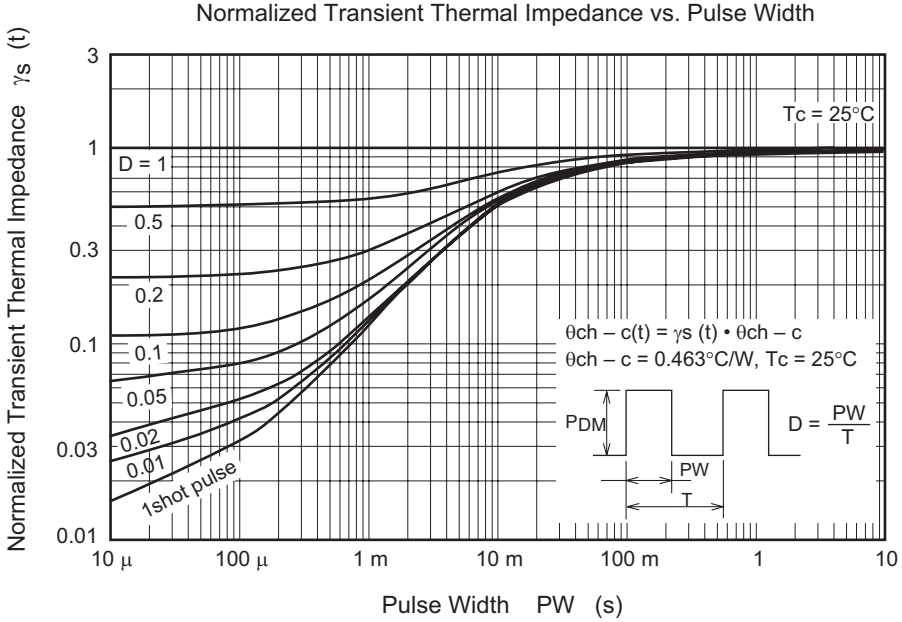
Reverse Drain Current vs. Source to Drain Voltage



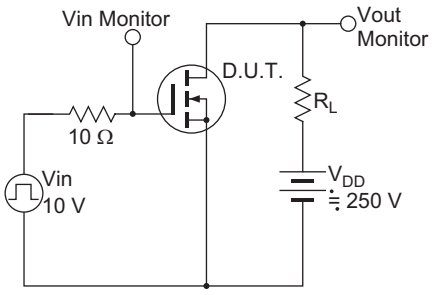
Gate to Source Cutoff Voltage vs. Case Temperature



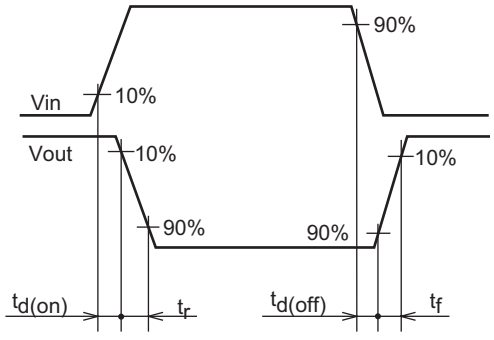
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



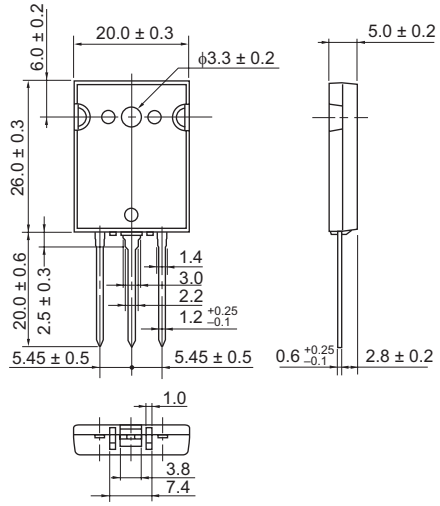
Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-3PL	—	PRSS0004ZF-A	TO-3PL / TO-3PLV	9.9g

Unit: mm



Ordering Information

Part Name	Quantity	Shipping Container
H5N5005PL-E	250 pcs	Box (Tube)

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

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http://www.renesas.com

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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, AZIACenter, 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

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