HAT3029R

Silicon N/P Channel Power MOS FET
Power Switching

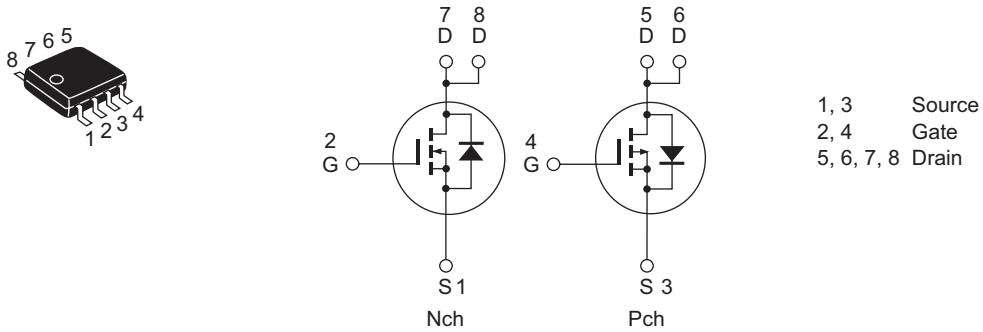
REJ03G1597-0600
Rev.6.00
Oct 16, 2007

Features

- Capable of 4.5 V gate drive
- Low drive current
- High density mounting

Outline

RENESAS Package code: PRSP0008DD-D
(Package name: SOP-8<FP-8DAV>)



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings		Unit
		Nch	Pch	
Drain to source voltage	V_{DSS}	30	–30	V
Gate to source voltage	V_{GSS}	±20	-20/+10	V
Drain current	I_D	6	–6	A
Drain peak current	$I_{D(pulse)}$ Note1	48	–48	A
Body-drain diode reverse drain current	I_{DR}	6	–6	A
Channel dissipation	Pch Note2	1.3		W
Channel dissipation	Pch Note3	2.0		W
Channel temperature	Tch	150		°C
Storage temperature	Tstg	–55 to +150		°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1 %
2. 1 Drive operation; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10s
3. 2 Drive operation; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10s

Electrical Characteristics

(Ta = 25°C)

• N Channel

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±0.1	µA	V_{GS} = ±20 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	µA	V_{DS} = 30 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	27	34	mΩ	I_D = 3 A, V_{GS} = 10 V Note4
	$R_{DS(on)}$	—	40	58	mΩ	I_D = 3 A, V_{GS} = 4.5 V Note4
Forward transfer admittance	$\|y_{fs}\|$	6	10	—	S	I_D = 3 A, V_{DS} = 10 V Note4
Input capacitance	Ciss	—	410	—	pF	V_{DS} = 10 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	110	—	pF	
Reverse transfer capacitance	Crss	—	41	—	pF	
Total gate charge	Qg	—	3.1	—	nC	V_{DD} = 10 V V_{GS} = 4.5 V I_D = 6 A
Gate to source charge	Qgs	—	1.1	—	nC	
Gate to drain charge	Qgd	—	1.1	—	nC	
Turn-on delay time	$t_{d(on)}$	—	5.4	—	ns	V_{GS} = 10 V, I_D = 3 A V_{DD} ≅ 10 V R_L = 3.33 Ω Rg = 4.7 Ω
Rise time	t_r	—	10	—	ns	
Turn-off delay time	$t_{d(off)}$	—	36	—	ns	
Fall time	t_f	—	3.0	—	ns	
Body–drain diode forward voltage	V_{DF}	—	0.84	1.10	V	IF = 6 A, V_{GS} = 0 Note4
Body–drain diode reverse recovery time	t_{rr}	—	20	—	ns	IF = 6 A, V_{GS} = 0 di_F/dt = 100 A/µs

Notes: 4. Pulse test

• P Channel

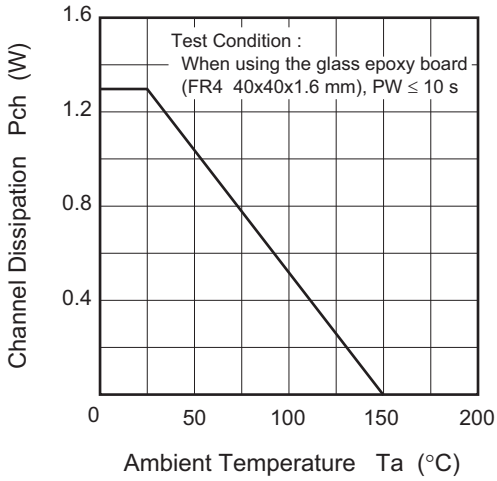
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	–30	—	—	V	I_D = –10 mA, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±0.1	µA	V_{GS} = -20,+10 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	–1	µA	V_{DS} = –30 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	–1.0	—	–2.5	V	V_{DS} = –10 V, I_D = –1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	25	32	mΩ	I_D = –3 A, V_{GS} = –10 V Note4
	$R_{DS(on)}$	—	36	53	mΩ	I_D = –3 A, V_{GS} = – 4.5 V Note4
Forward transfer admittance	$\|y_{fs}\|$	6	10	—	S	I_D = –3 A, V_{DS} = –10 V Note4
Input capacitance	Ciss	—	1330	—	pF	V_{DS} = –10 V V_{GS} = 0 f = 1MHz
Output capacitance	Coss	—	215	—	pF	
Reverse transfer capacitance	Crss	—	155	—	pF	
Total gate charge	Qg	—	11.5	—	nC	V_{DD} = –10 V V_{GS} = –4.5 V I_D = -6 A
Gate to source charge	Qgs	—	3.2	—	nC	
Gate to drain charge	Qgd	—	4.4	—	nC	
Turn-on delay time	$t_{d(on)}$	—	18	—	ns	V_{GS} = –10 V, I_D = –3 A V_{DD} ≅ –10 V R_L = 3.33 Ω R_g = 4.7 Ω
Rise time	t_r	—	19	—	ns	
Turn-off delay time	$t_{d(off)}$	—	47	—	ns	
Fall time	t_f	—	8	—	ns	
Body–drain diode forward voltage	V_{DF}	—	–0.84	–1.10	V	IF = –6 A, V_{GS} = 0 Note4
Body–drain diode reverse recovery time	t_{rr}	—	20	—	ns	IF = –6 A, V_{GS} = 0 di_F/dt =100A/µs

Notes: 4. Pulse test

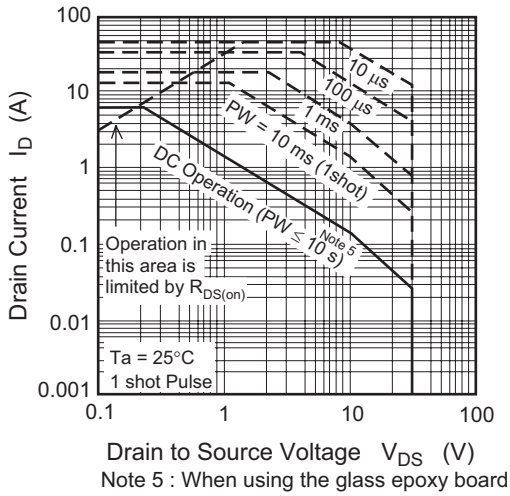
Main Characteristics

• **N Channel**

Power vs. Temperature Derating

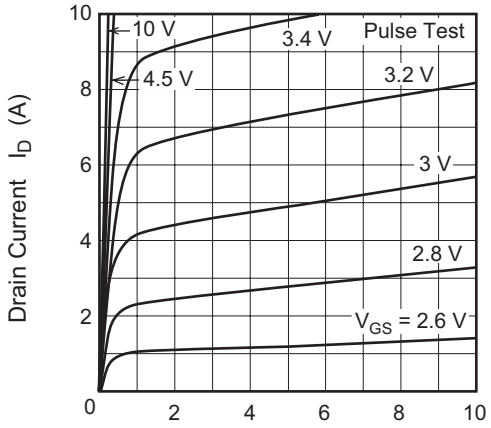


Maximum Safe Operation Area

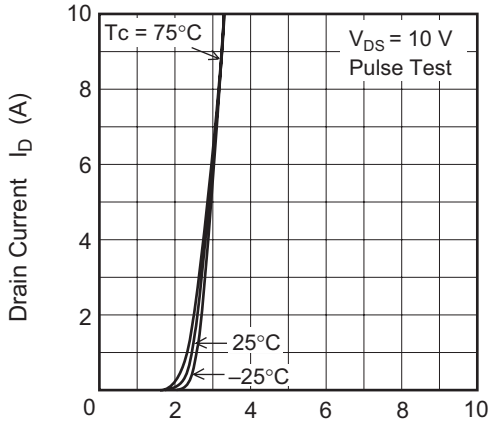


Note 5 : When using the glass epoxy board (FR4 40x40x1.6 mm)

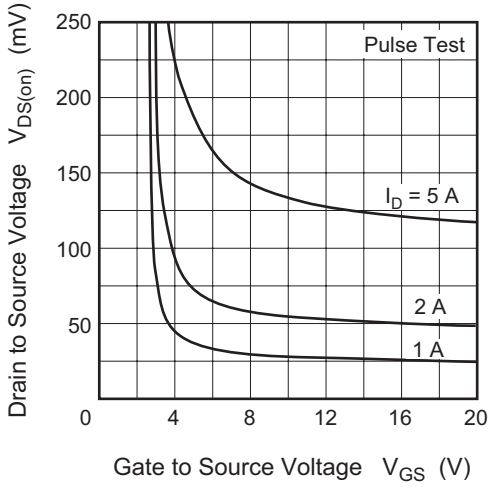
Typical Output Characteristics



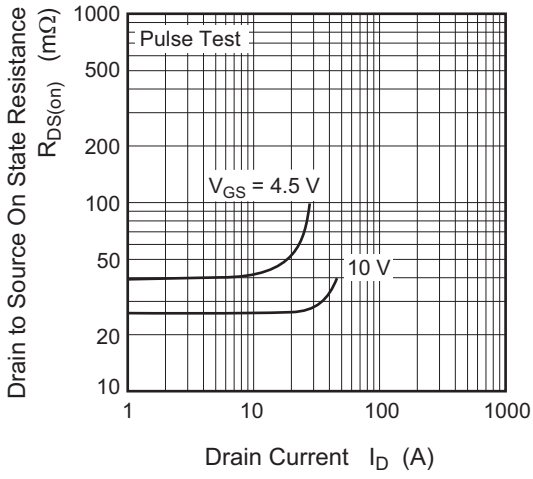
Typical Transfer Characteristics



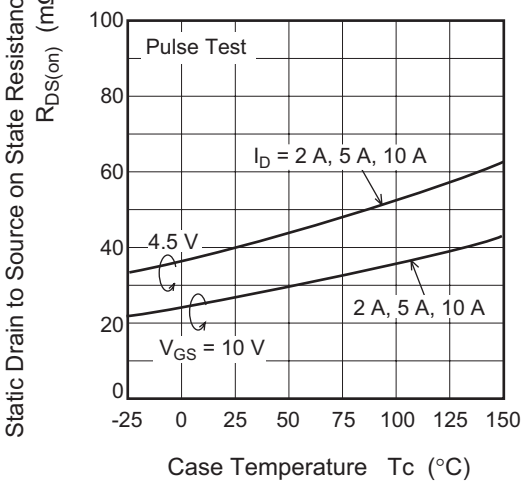
Drain to Source Saturation Voltage vs. Gate to Source Voltage



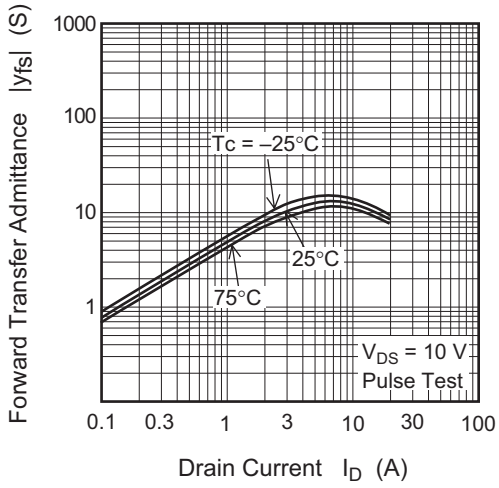
Static Drain to Source on State Resistance vs. Drain Current



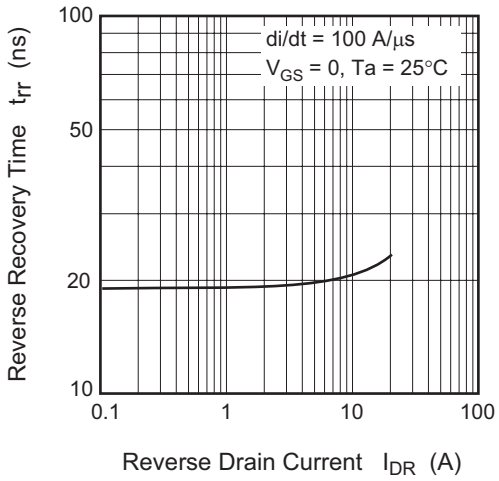
Static Drain to Source on State Resistance vs. Temperature



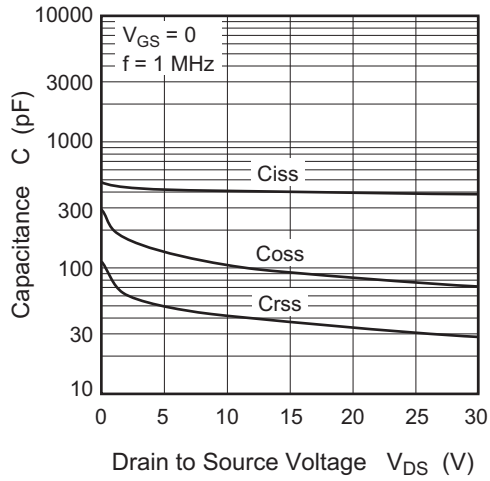
Forward Transfer Admittance vs. Drain Current



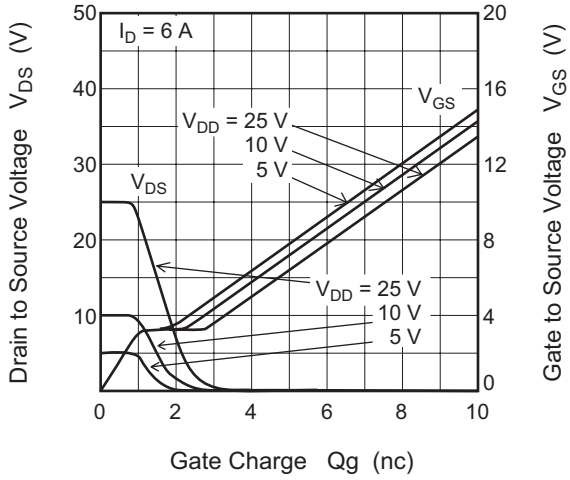
Body–Drain Diode Reverse Recovery Time



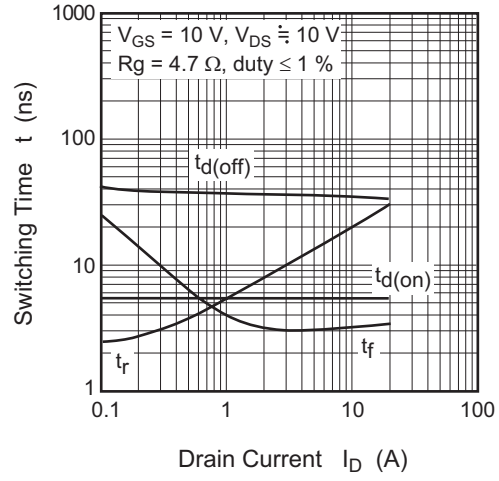
Typical Capacitance vs. Drain to Source Voltage



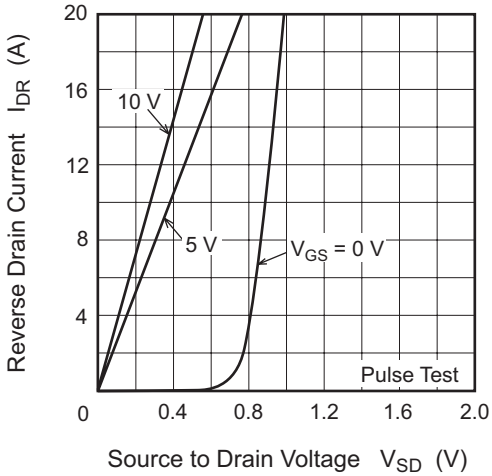
Dynamic Input Characteristics



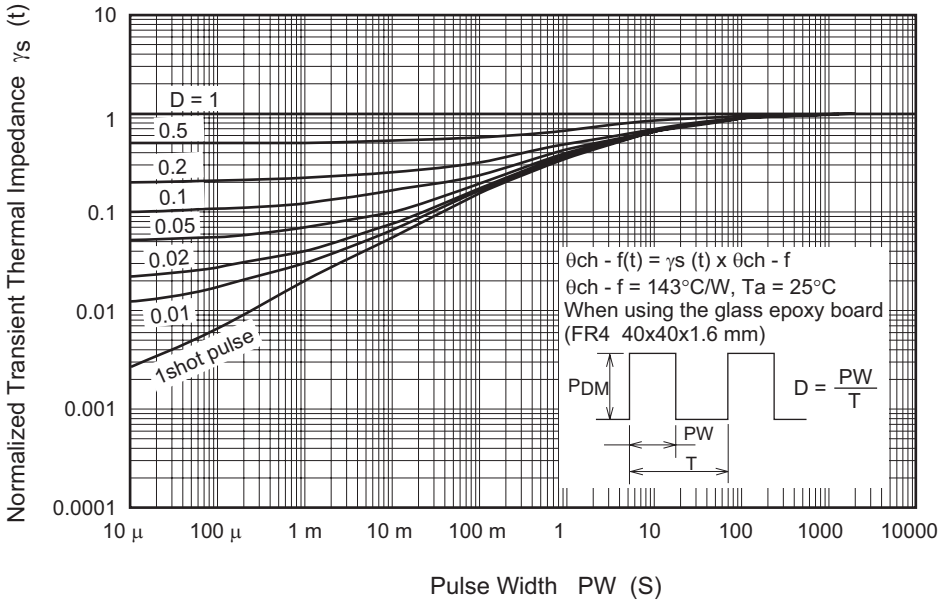
Switching Characteristics



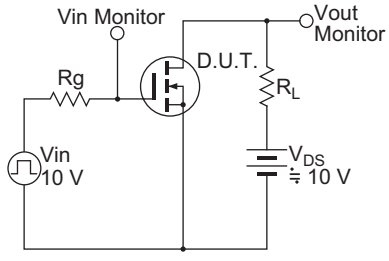
Reverse Drain Current vs.
Source to Drain Voltage



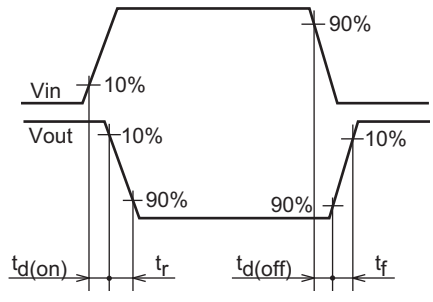
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

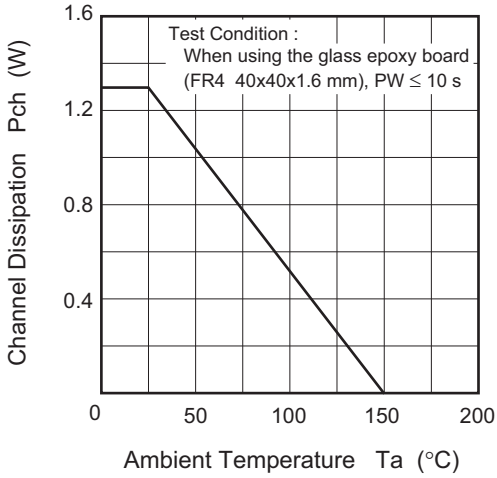


Switching Time Waveform

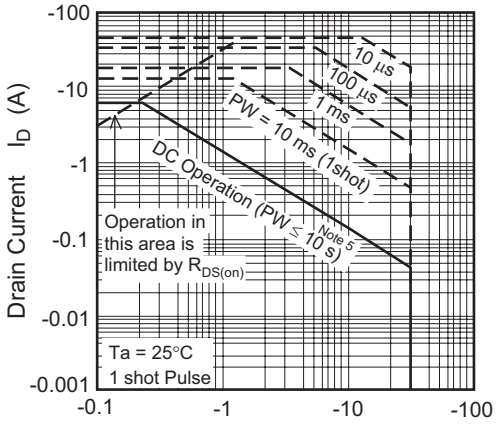


• P Channel

Power vs. Temperature Derating

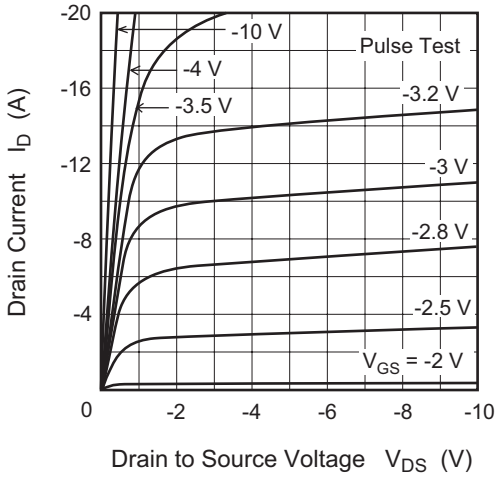


Maximum Safe Operation Area

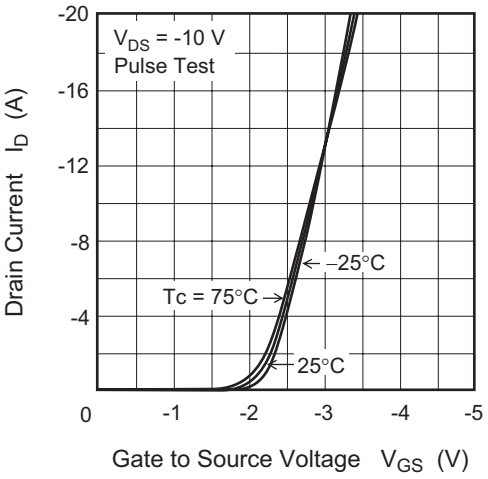


Note 5 : When using the glass epoxy board
(FR4 40x40x1.6 mm)

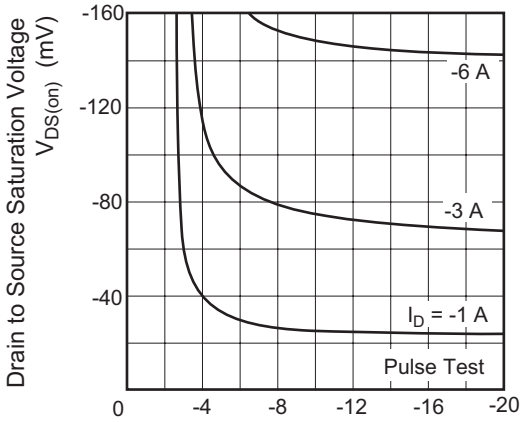
Typical Output Characteristics



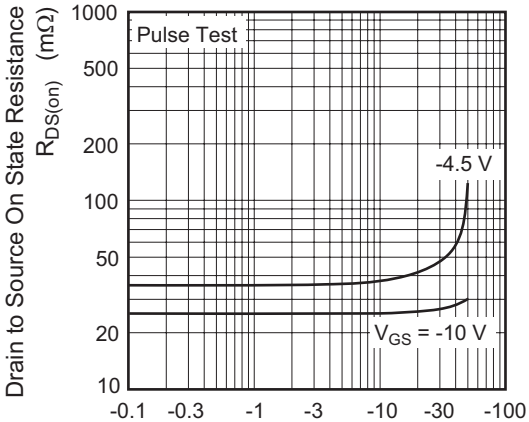
Typical Transfer Characteristics



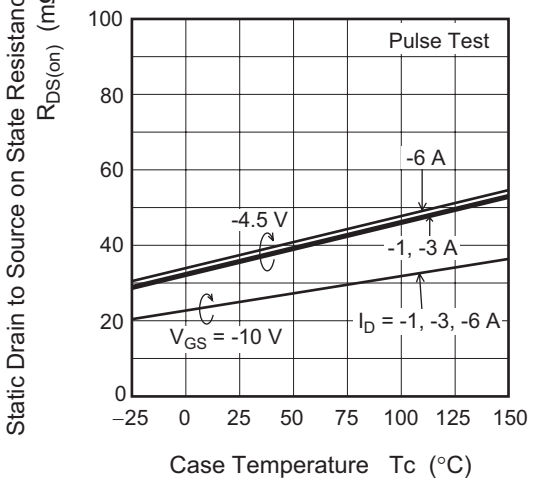
Drain to Source Saturation Voltage vs.
Gate to Source Voltage



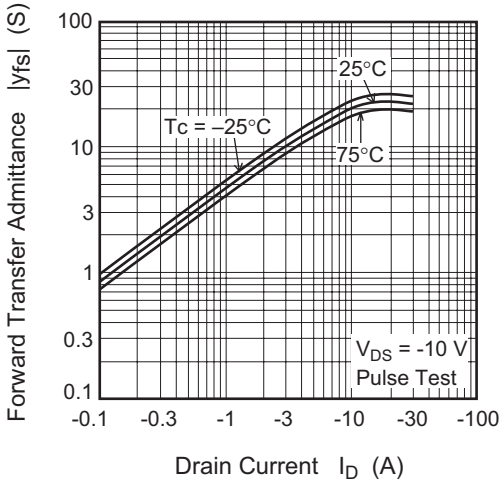
Static Drain to Source on State Resistance
vs. Drain Current



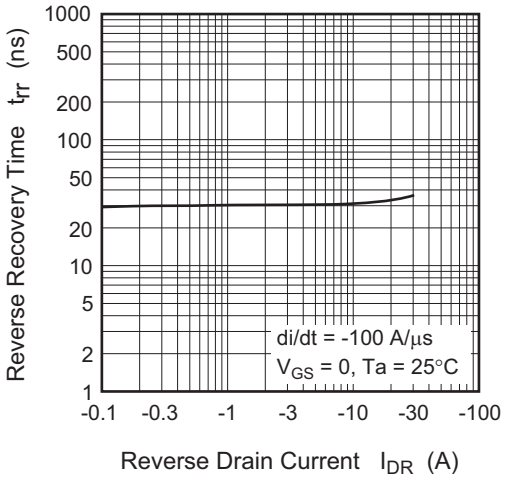
Static Drain to Source on State Resistance vs. Temperature



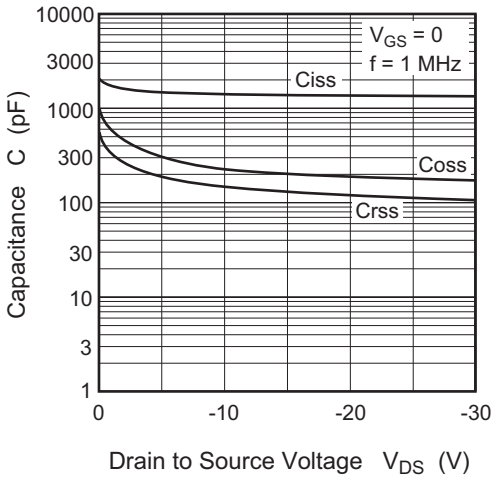
Forward Transfer Admittance vs. Drain Current



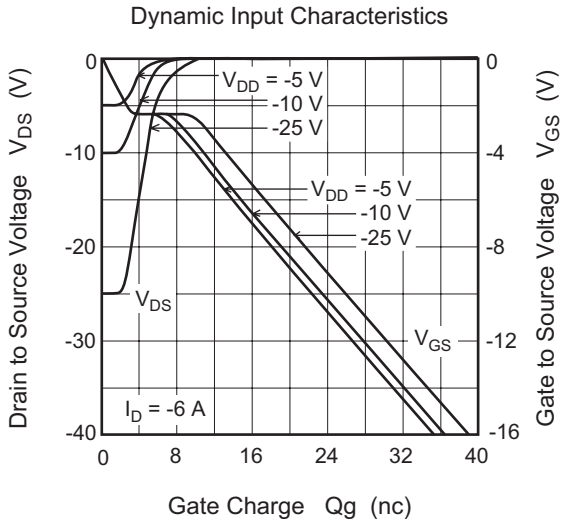
Body–Drain Diode Reverse Recovery Time



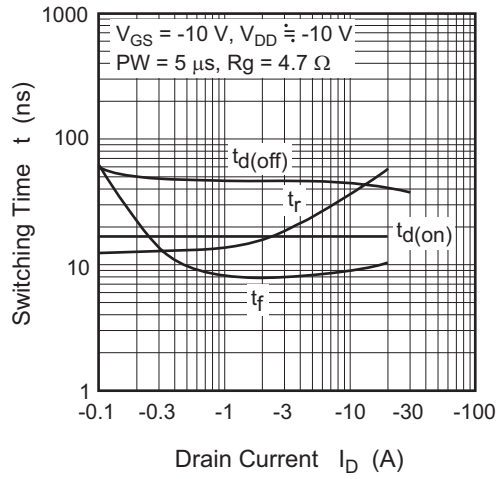
Typical Capacitance vs. Drain to Source Voltage



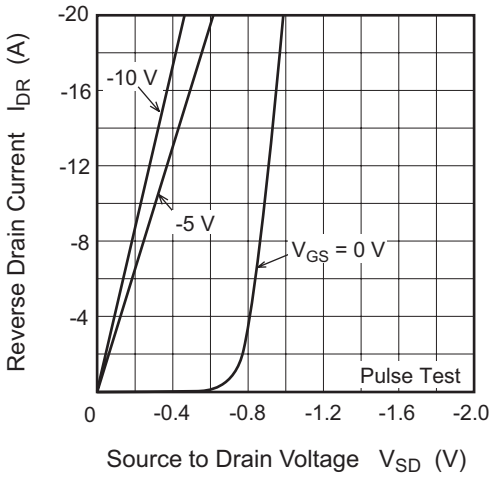
Dynamic Input Characteristics



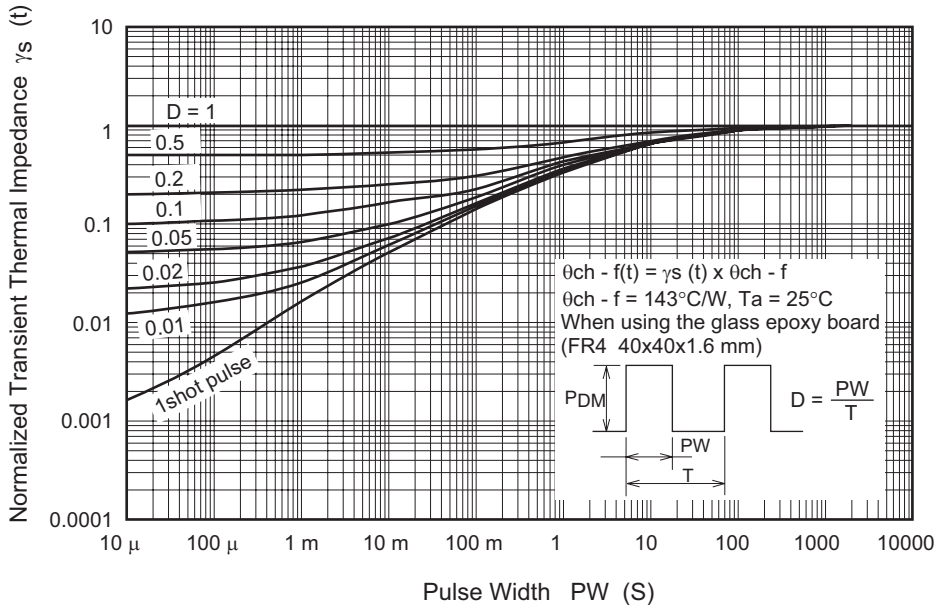
Switching Characteristics



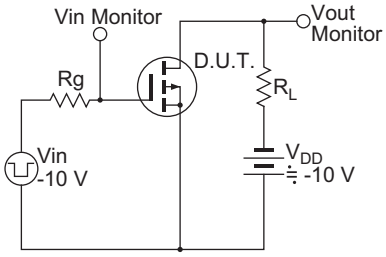
Reverse Drain Current vs.
Source to Drain Voltage



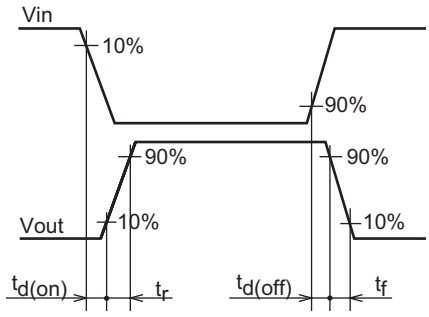
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

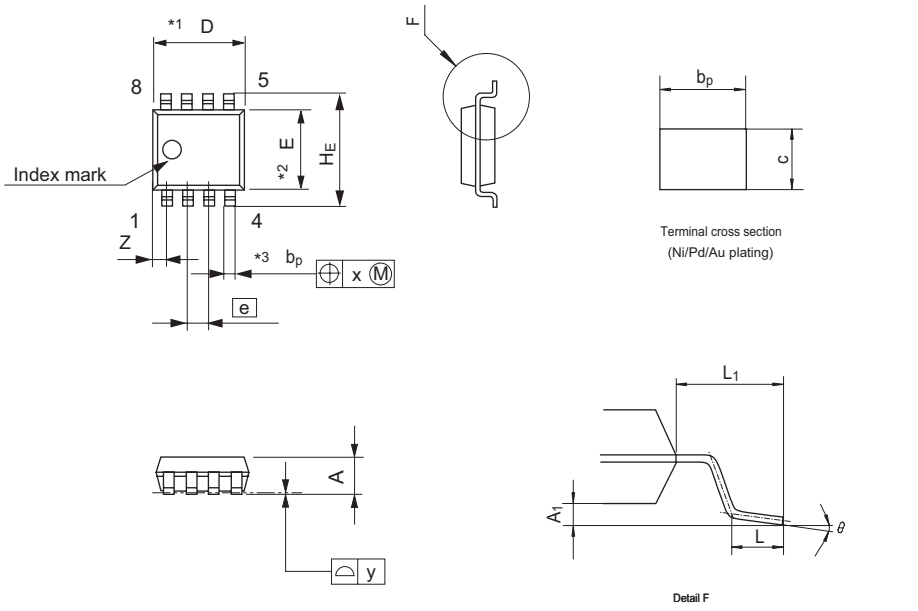


Switching Time Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
SOP-8	P-SOP8-3.95 × 4.9-1.27	PRSP0008DD-D	FP-8DAV	0.085g



NOTE)
1. DIMENSIONS "*1(Nom)" AND "*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION "*3" DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	4.90	5.3
E	—	3.95	—
A_2	—	—	—
A_1	0.10	0.14	0.25
A	—	—	1.75
b_p	0.34	0.40	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	5.80	6.10	6.20
e	—	1.27	—
x	—	—	0.25
y	—	—	0.1
Z	—	—	0.75
L	0.40	0.60	1.27
L_1	—	1.08	—

Ordering Information

Part Name	Quantity	Shipping Container
HAT3029R-EL-E	2500 pcs	Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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

RENESAS SALES OFFICES

http://www.renesas.com

Refer to "**http://www.renesas.com/en/network**" for the latest and detailed information.

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) 6887-7898

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 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

Colophon .7.0