

HAT3029R

Silicon N/P Channel Power MOS FET Power Switching

REJ03G1597-0600

Rev.6.00

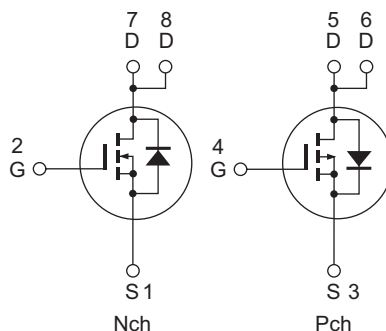
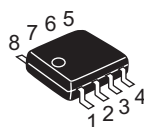
Oct 16, 2007

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>)



1, 3 Source
2, 4 Gate
5, 6, 7, 8 Drain

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	P_{ch} ^{Note2}	1.3		W
Channel dissipation	P_{ch} ^{Note3}	2.0		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. 1 Drive operation; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), $PW \leq 10s$

3. 2 Drive operation; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), $PW \leq 10s$

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	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
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	$V_{GS(off)}$	1.0	—	2.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	27	34	$\text{m}\Omega$	$I_D = 3 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	40	58	$\text{m}\Omega$	$I_D = 3 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	6	10	—	S	$I_D = 3 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	410	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	110	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	41	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	3.1	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	1.1	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	Q_{gd}	—	1.1	—	nC	$I_D = 6 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	5.4	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 3 \text{ A}$
Rise time	t_r	—	10	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	36	—	ns	$R_L = 3.33 \Omega$
Fall time	t_f	—	3.0	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	V_{DF}	—	0.84	1.10	V	$I_F = 6 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	20	—	ns	$I_F = 6 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 4. Pulse test

• P Channel

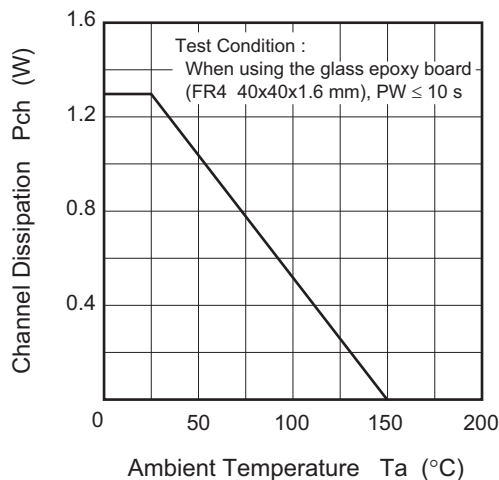
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-30	—	—	V	$I_D = -10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = -20, +10 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	-1	μA	$V_{DS} = -30 \text{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

Notes: 4. Pulse test

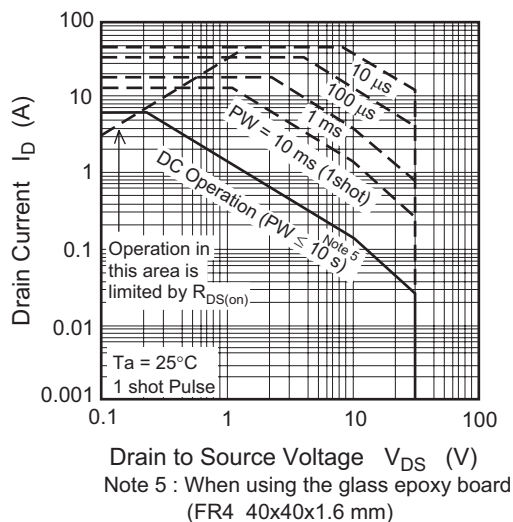
Main Characteristics

• N Channel

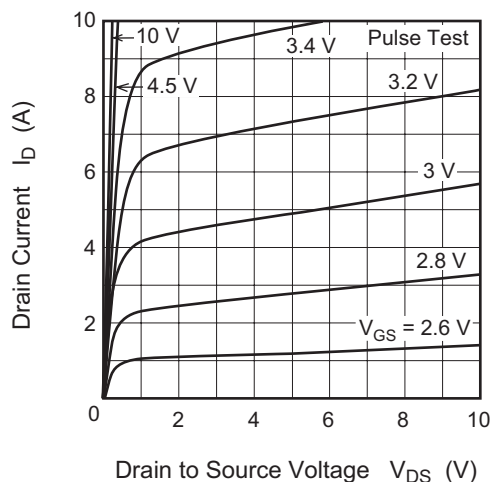
Power vs. Temperature Derating



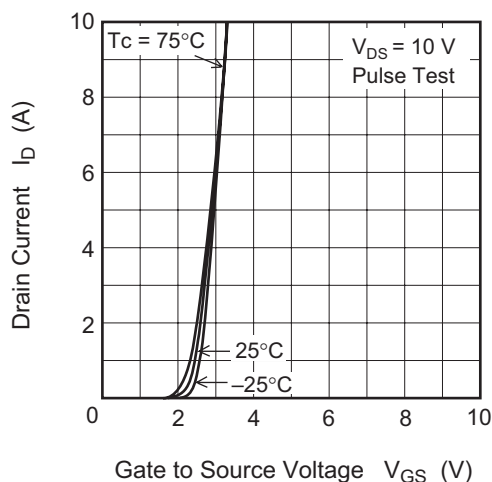
Maximum Safe Operation Area



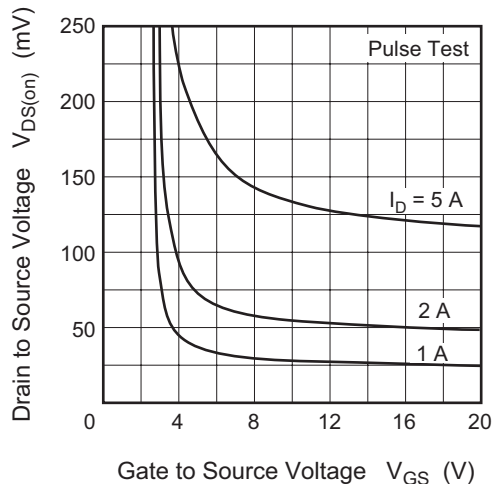
Typical Output Characteristics



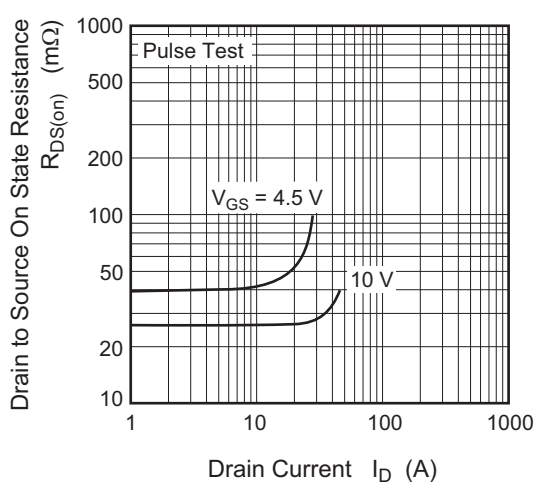
Typical Transfer Characteristics

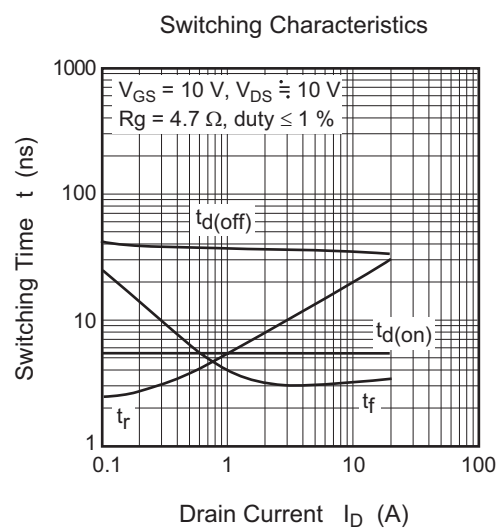
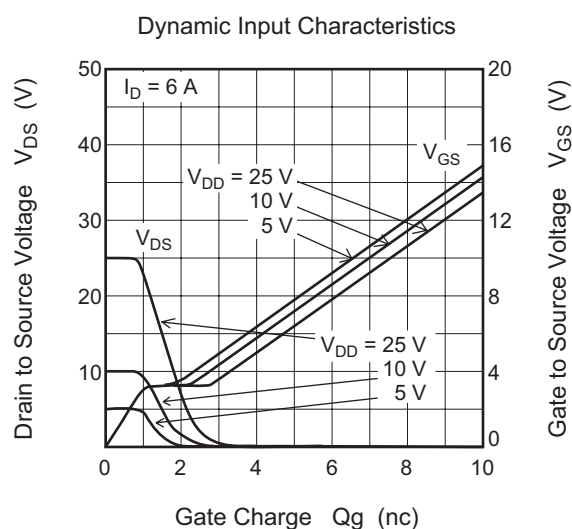
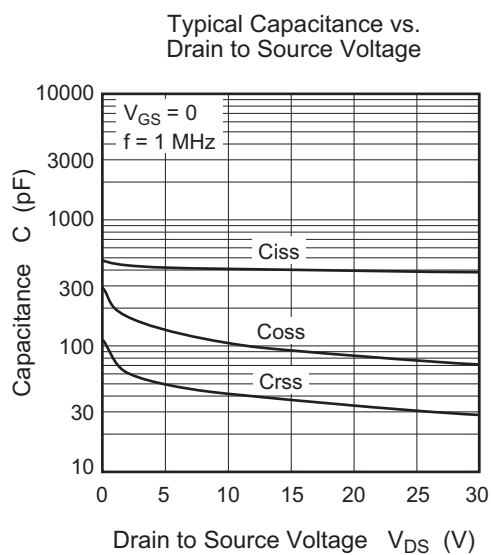
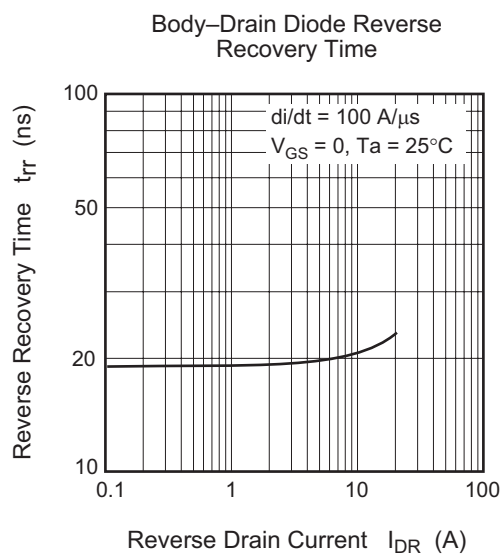
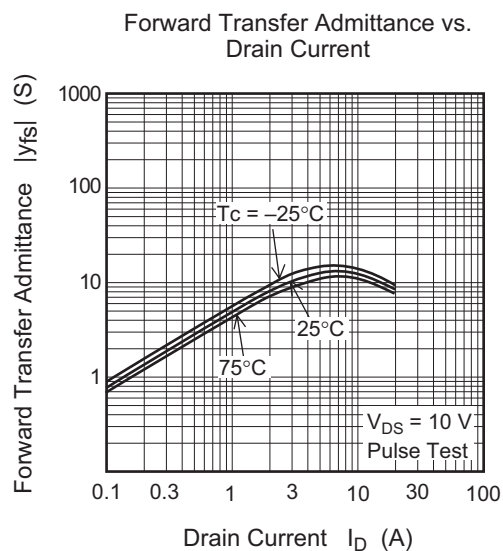
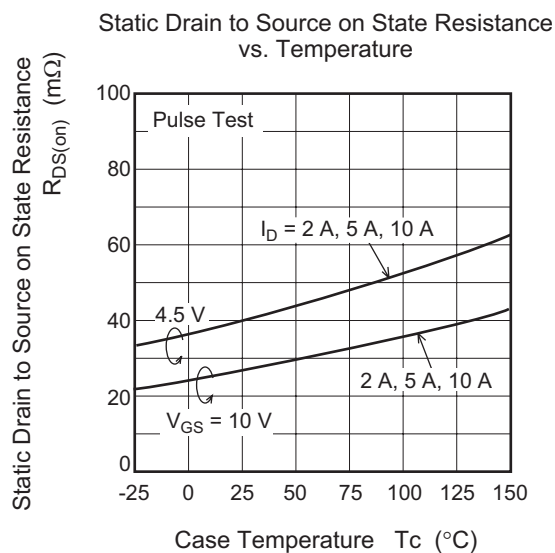


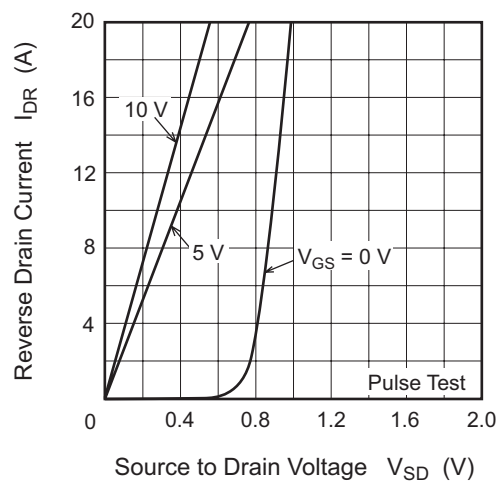
Drain to Source Saturation Voltage vs. Gate to Source Voltage



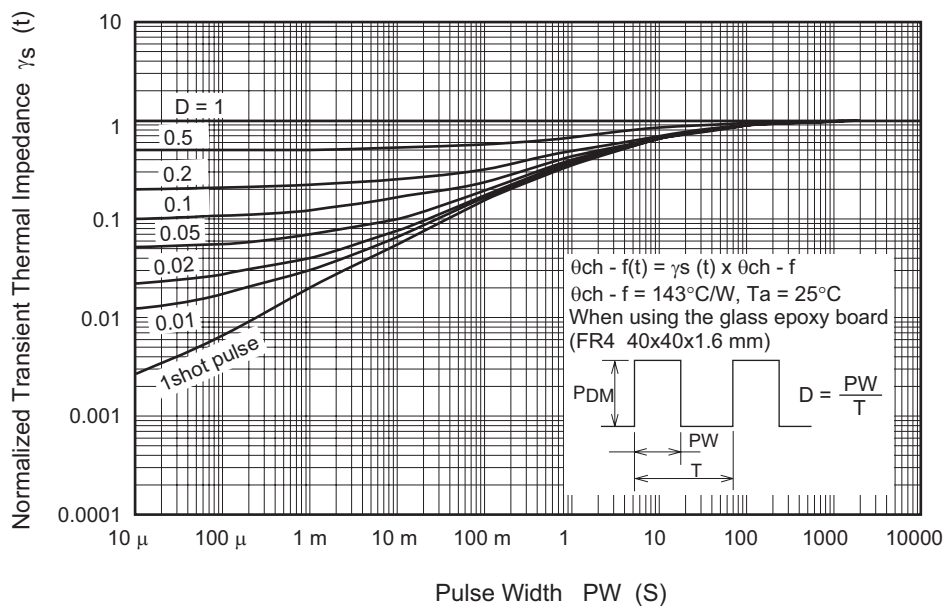
Static Drain to Source on State Resistance vs. Drain Current



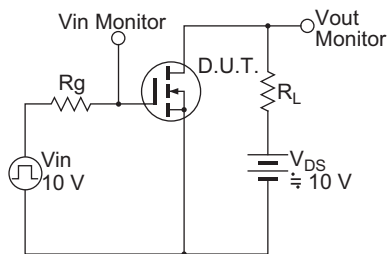


Reverse Drain Current vs.
Source to Drain Voltage

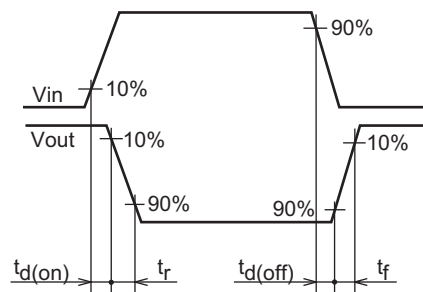
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

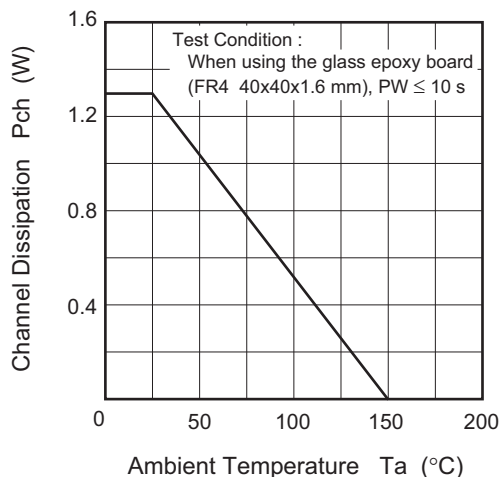


Switching Time Waveform

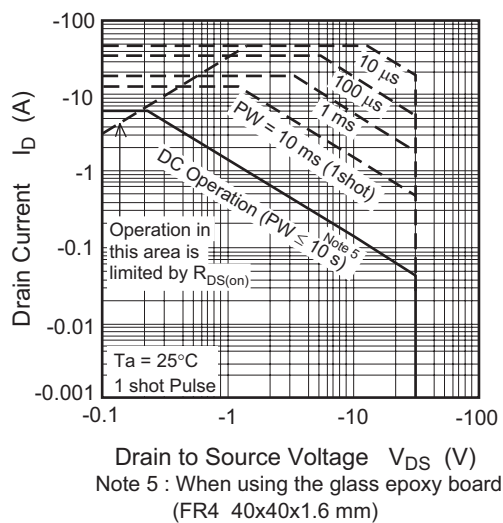


• P Channel

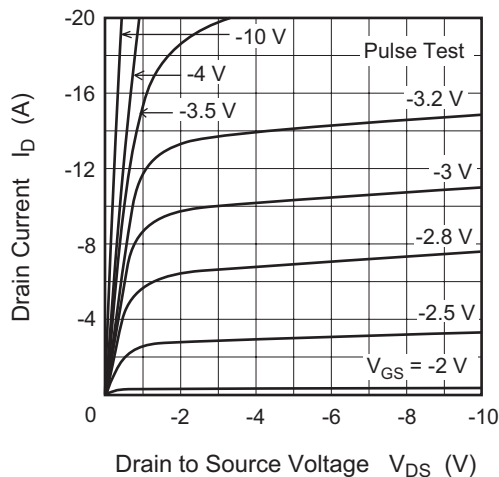
Power vs. Temperature Derating



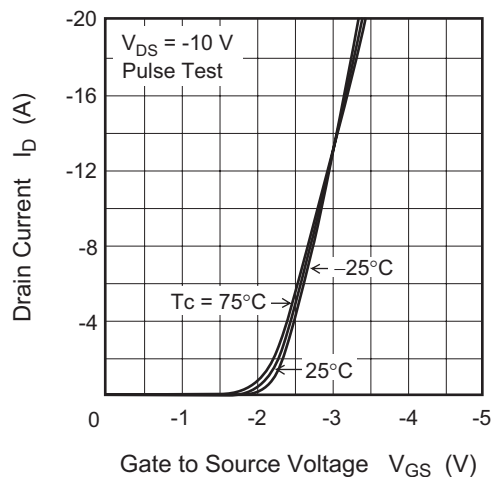
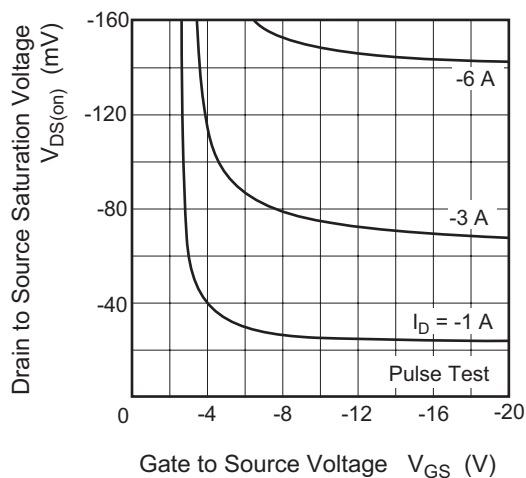
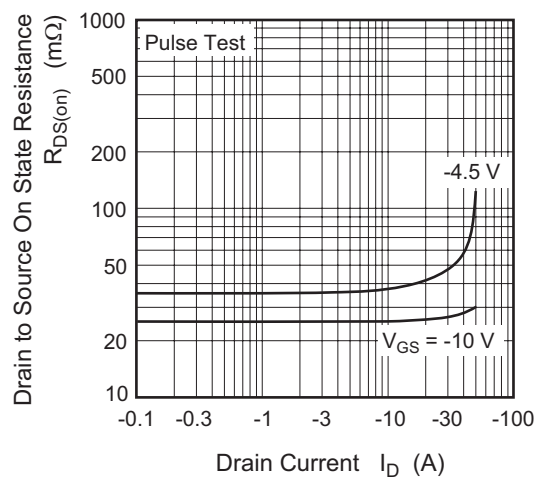
Maximum Safe Operation Area

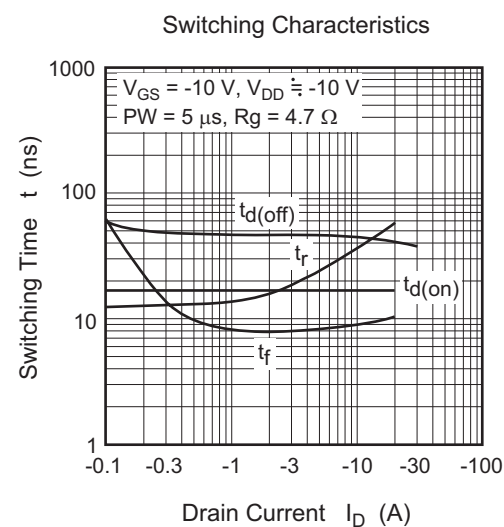
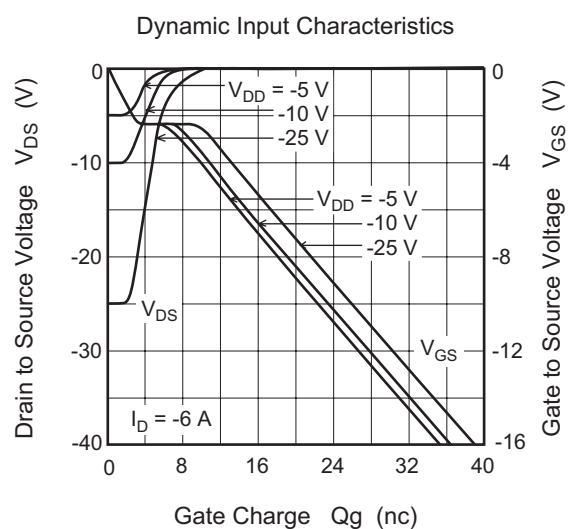
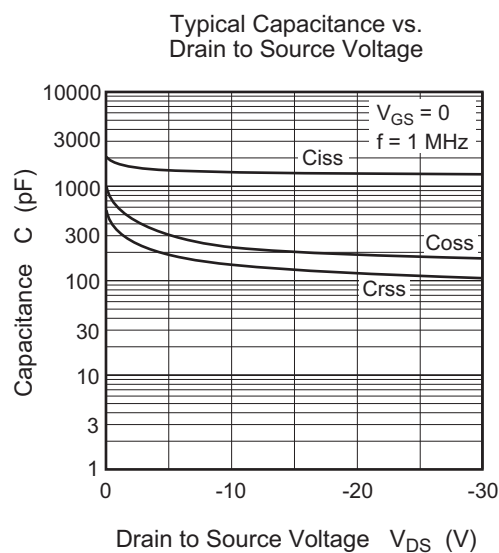
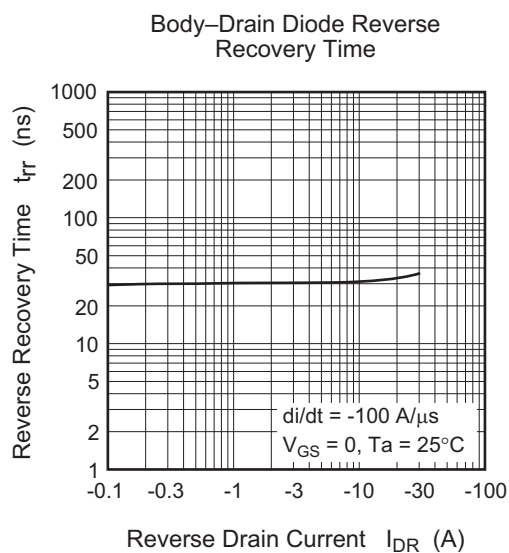
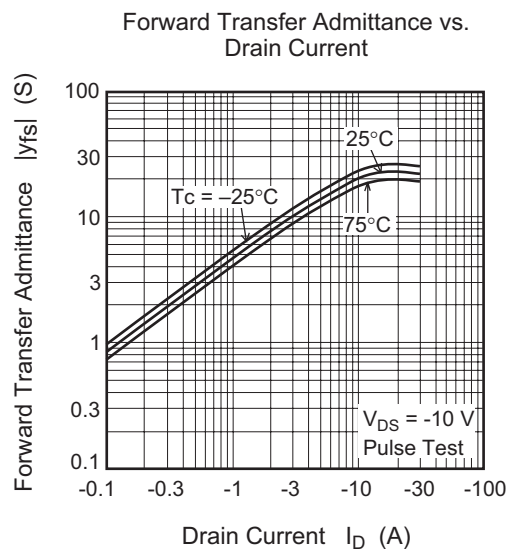
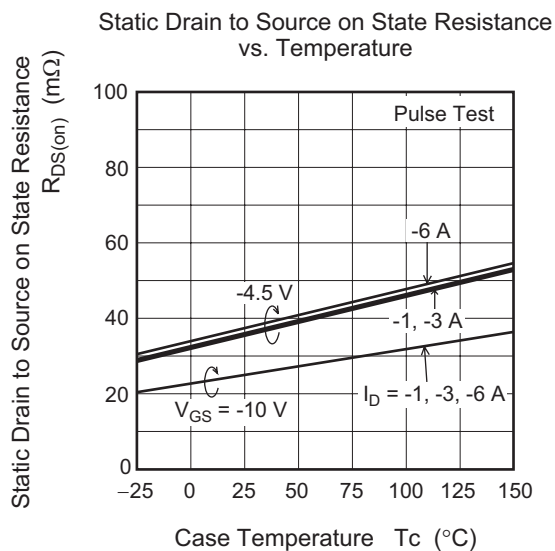


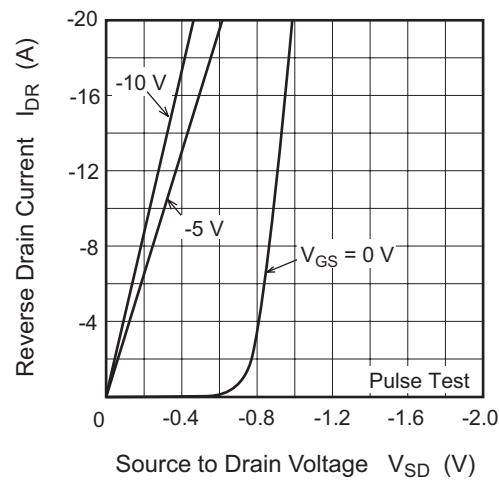
Typical Output Characteristics



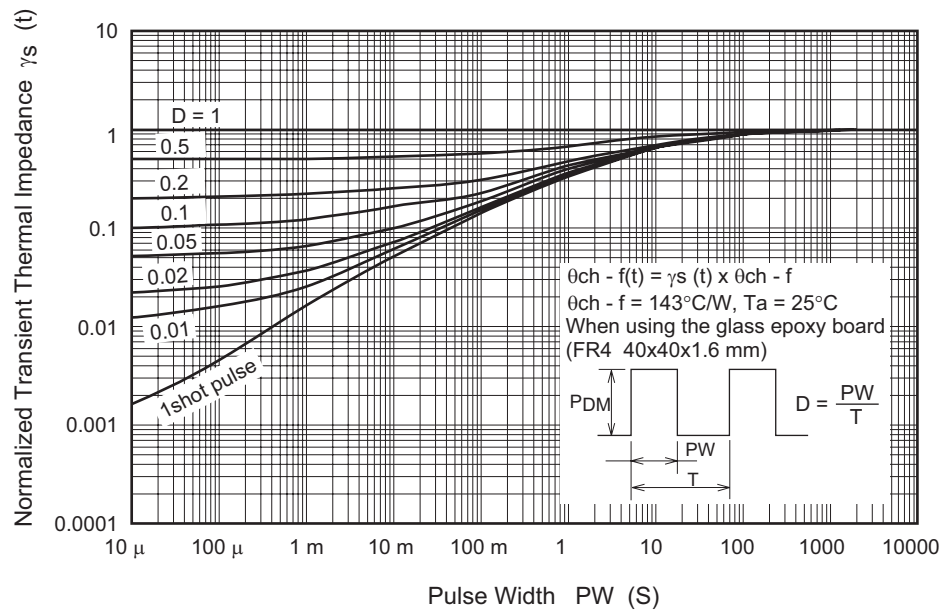
Typical Transfer Characteristics

Drain to Source Saturation Voltage vs.
Gate to Source VoltageStatic Drain to Source on State Resistance
vs. Drain Current

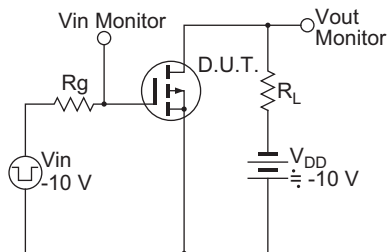


Reverse Drain Current vs.
Source to Drain Voltage

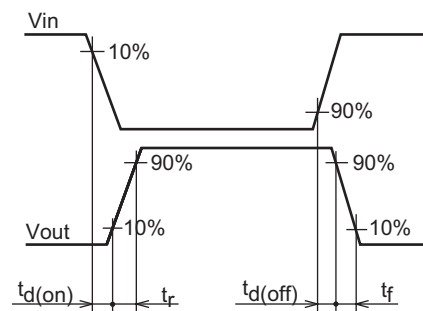
Normalized Transient Thermal Impedance vs. Pulse Width



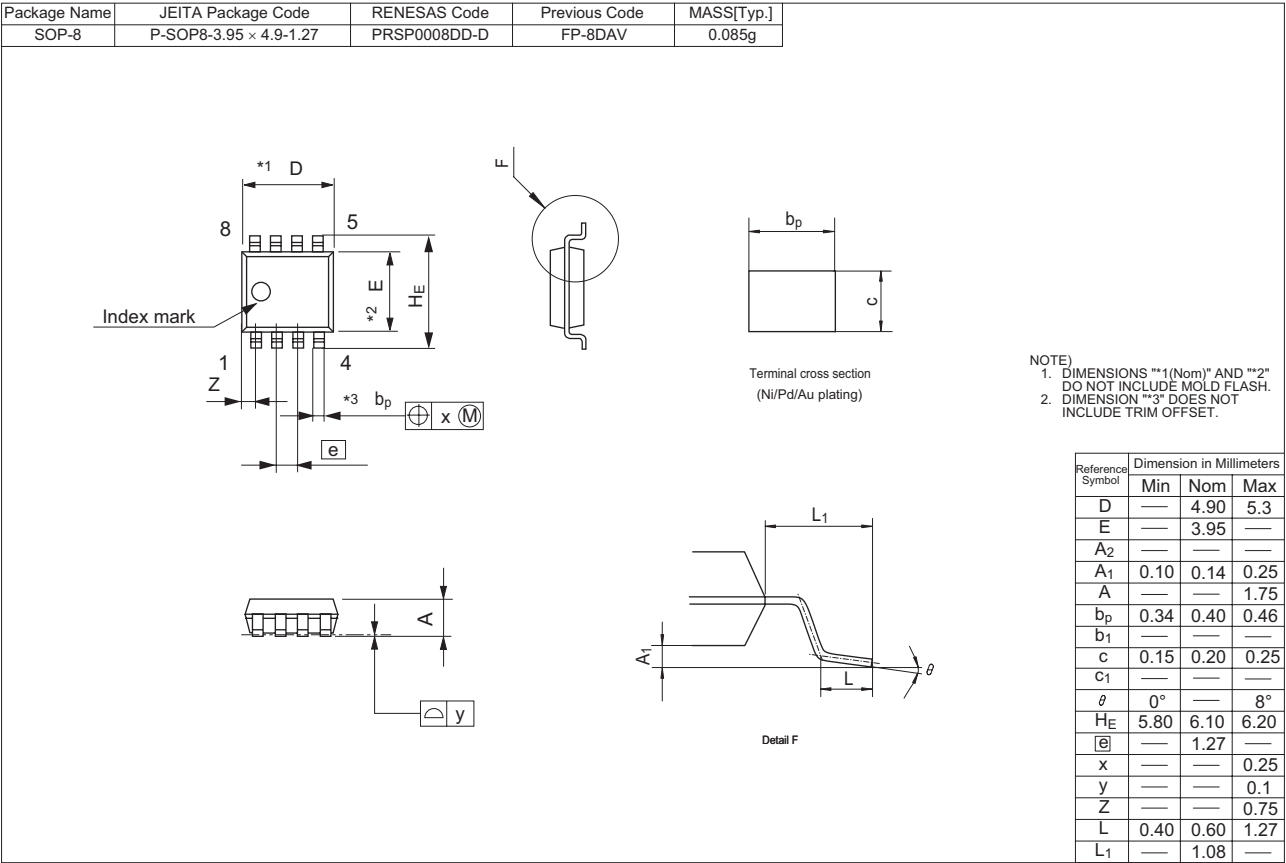
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



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.

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