

HAT3029R

Silicon N/P Channel Power MOS FET Power Switching

REJ03G1597-0601

Rev.6.01

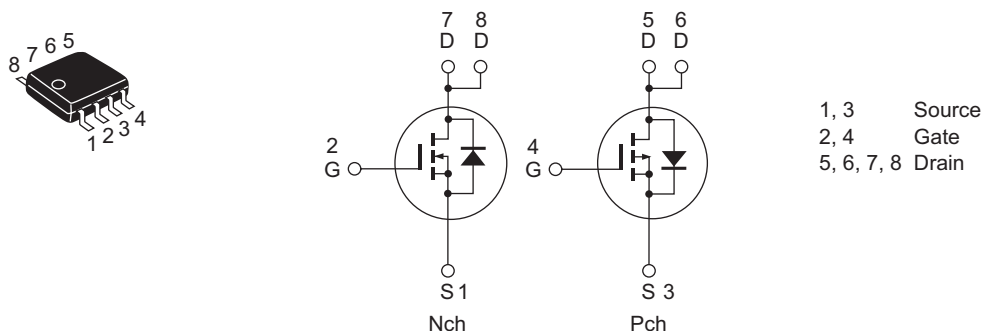
Nov.24.2016

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	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	$V_{DS} = 10 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	110	—	pF	
Reverse transfer capacitance	C_{rss}	—	41	—	pF	
Total gate charge	Q_g	—	3.1	—	nC	$V_{DD} = 10 \text{ V}$ $V_{GS} = 4.5 \text{ V}$ $I_D = 6 \text{ A}$
Gate to source charge	Q_{gs}	—	1.1	—	nC	
Gate to drain charge	Q_{gd}	—	1.1	—	nC	
Turn-on delay time	$t_{d(on)}$	—	5.4	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 3 \text{ A}$ $V_{DD} \cong 10 \text{ V}$ $R_L = 3.33 \Omega$ $R_g = 4.7 \Omega$
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	$I_F = 6 \text{ A}$, $V_{GS} = 0$ ^{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

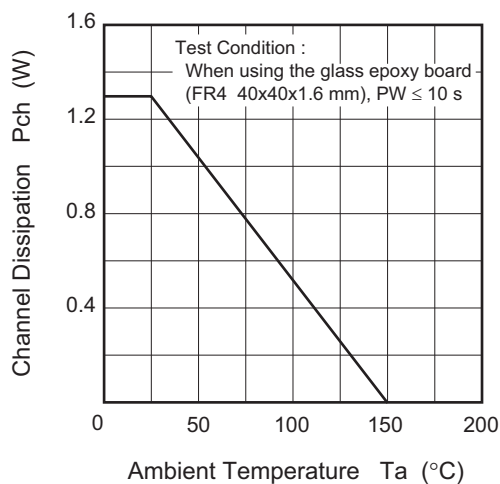
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-30	—	—	V	$I_D = -10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = -20, +10 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	-1	μA	$V_{DS} = -30 \text{ V}$, $V_{GS} = 0$
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	$V_{DS} = -10 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	215	—	pF	
Reverse transfer capacitance	C_{rss}	—	155	—	pF	
Total gate charge	Q_g	—	11.5	—	nC	$V_{DD} = -10 \text{ V}$ $V_{GS} = -4.5 \text{ V}$ $I_D = -6 \text{ A}$
Gate to source charge	Q_{gs}	—	3.2	—	nC	
Gate to drain charge	Q_{gd}	—	4.4	—	nC	
Turn-on delay time	$t_{d(on)}$	—	18	—	ns	$V_{GS} = -10 \text{ V}$, $I_D = -3 \text{ A}$ $V_{DD} \cong -10 \text{ V}$ $R_L = 3.33 \Omega$ $R_g = 4.7 \Omega$
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	$I_F = -6 \text{ A}$, $V_{GS} = 0$ ^{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

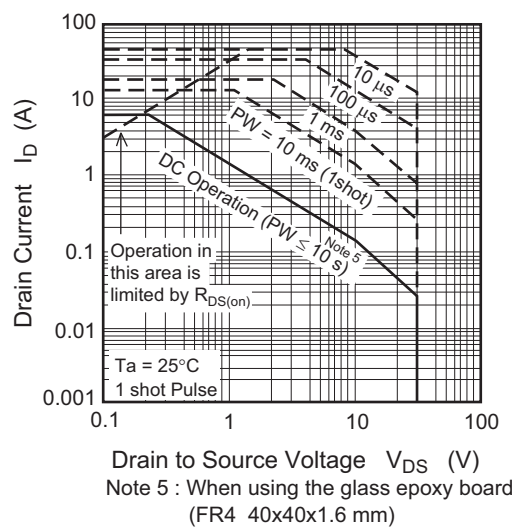
Main Characteristics

• N Channel

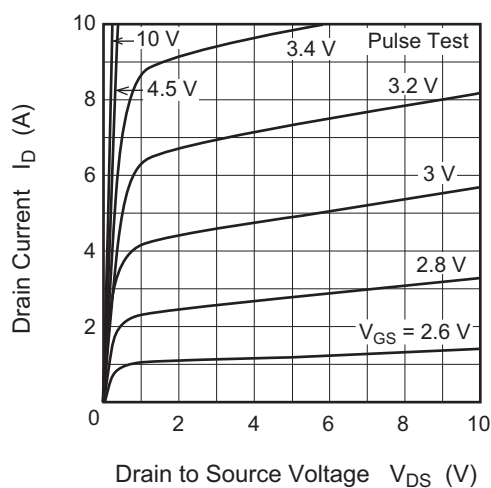
Power vs. Temperature Derating



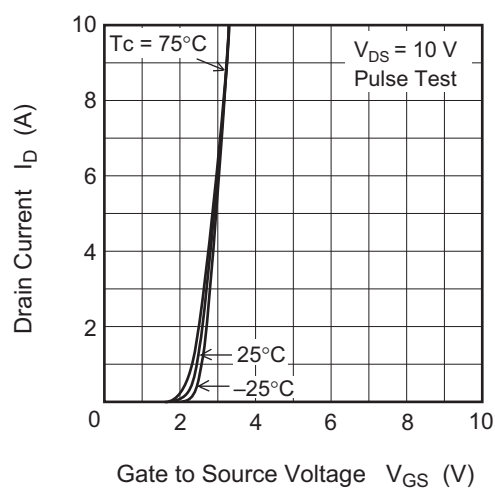
Maximum Safe Operation Area



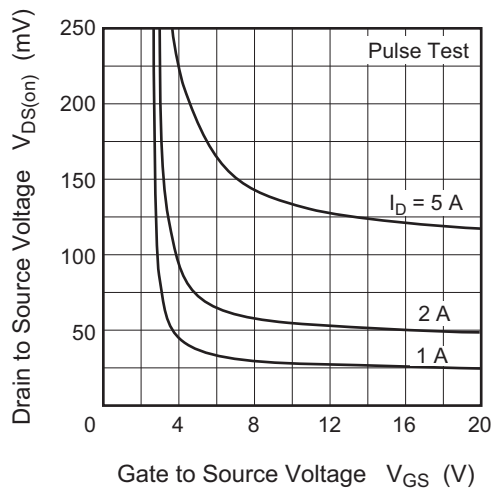
Typical Output Characteristics



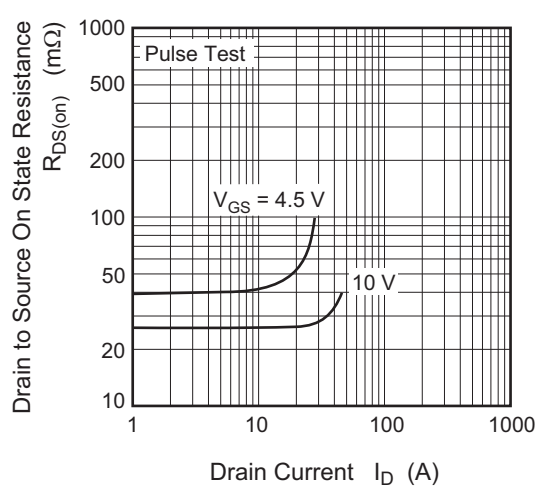
Typical Transfer Characteristics

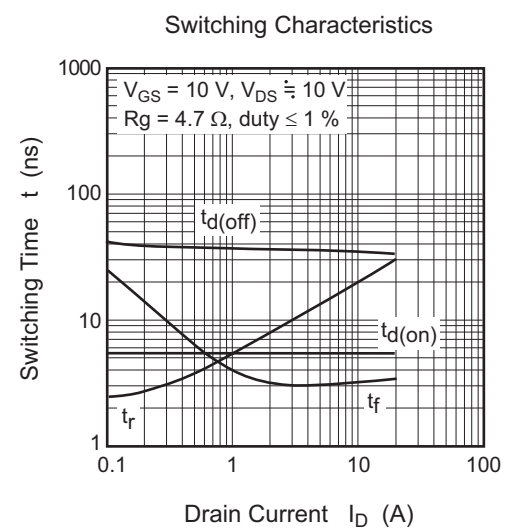
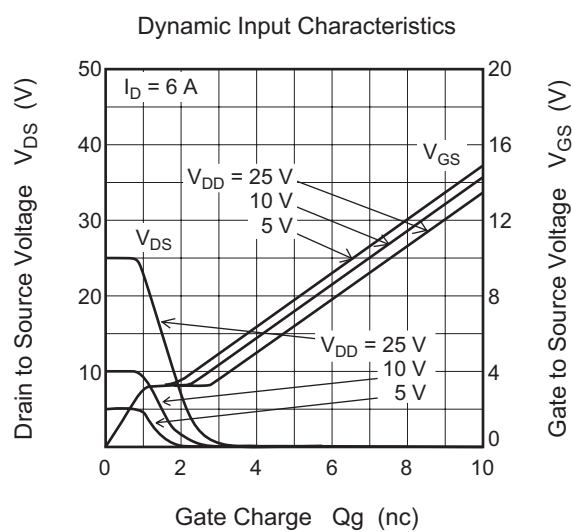
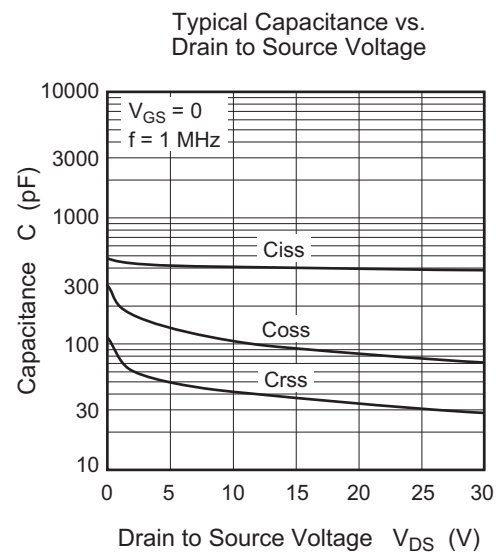
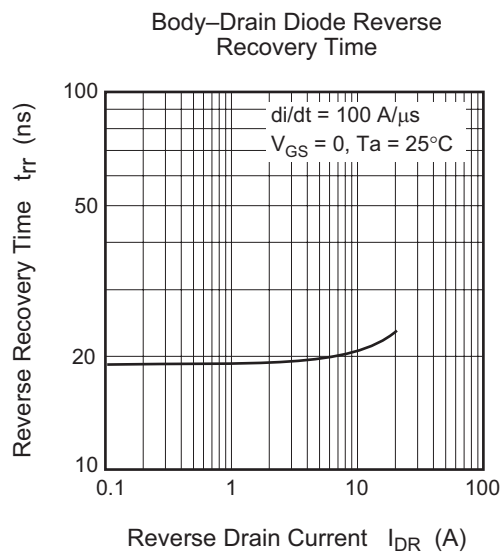
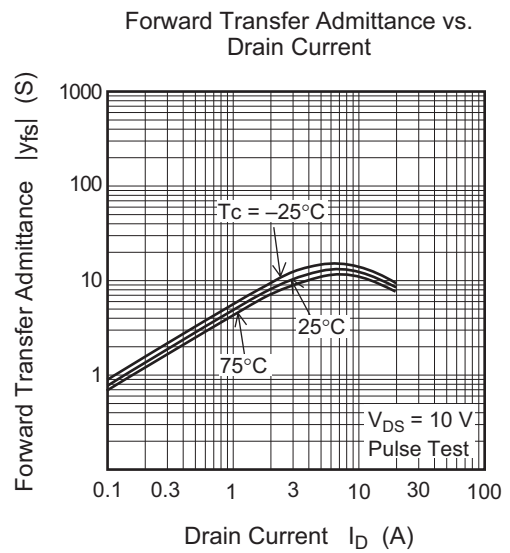
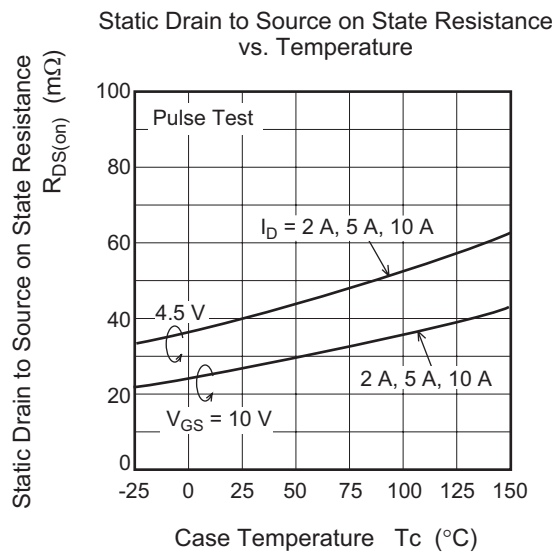


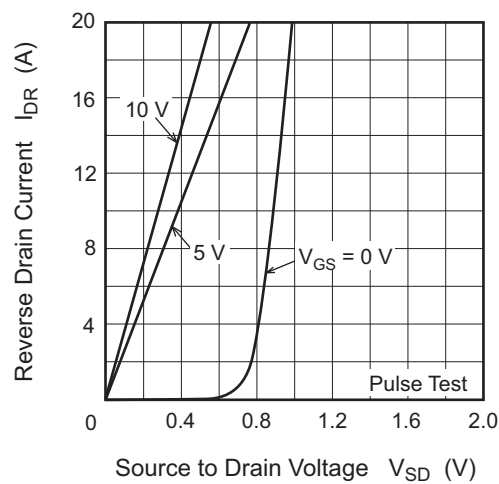
Drain to Source Saturation Voltage vs. Gate to Source Voltage



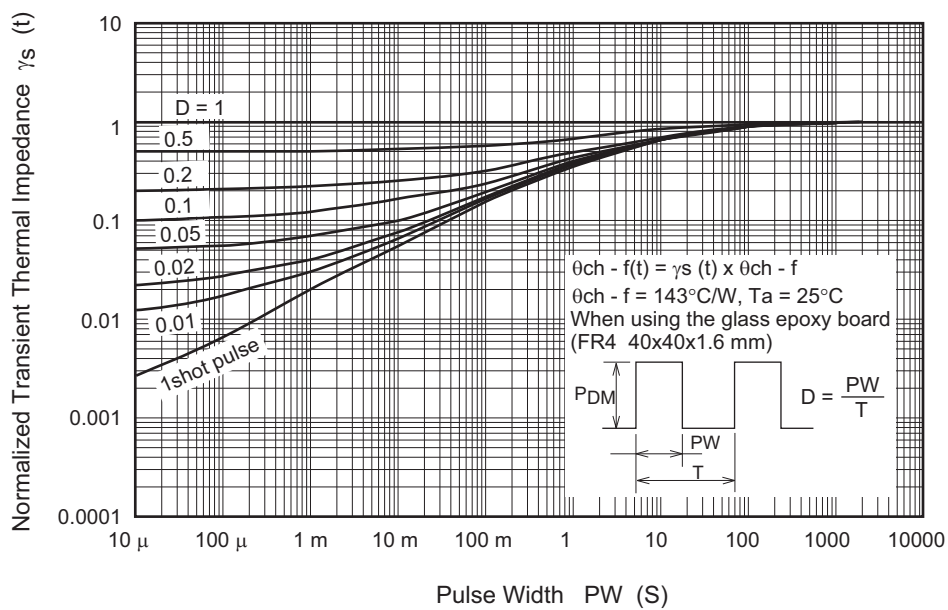
Static Drain to Source on State Resistance vs. Drain Current



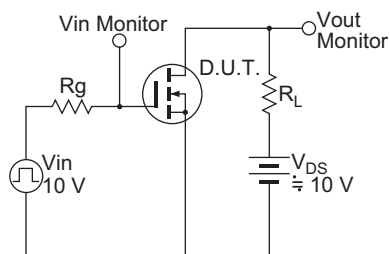


Reverse Drain Current vs.
Source to Drain Voltage

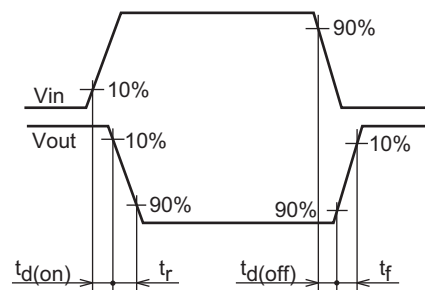
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

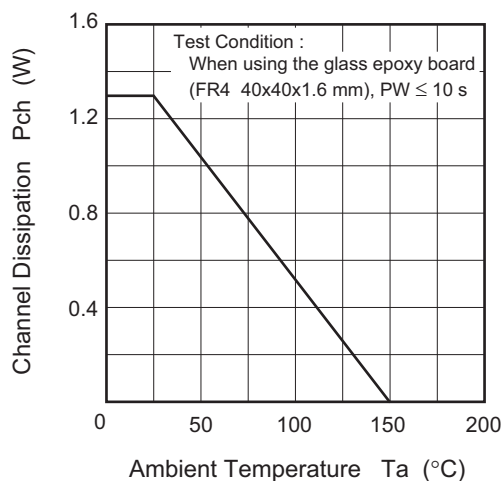


Switching Time Waveform

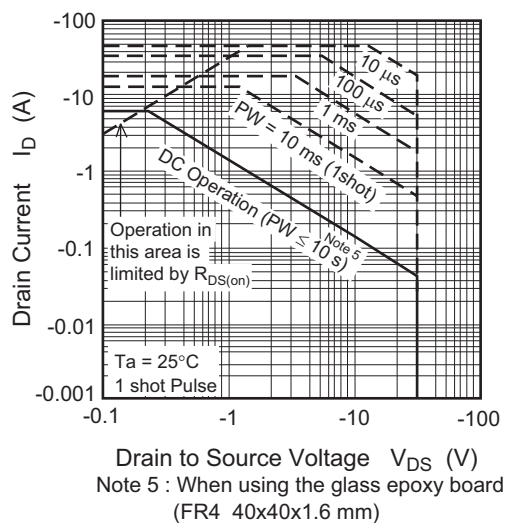


• P Channel

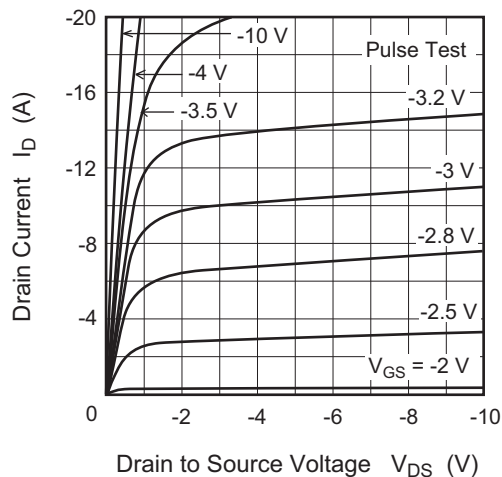
Power vs. Temperature Derating



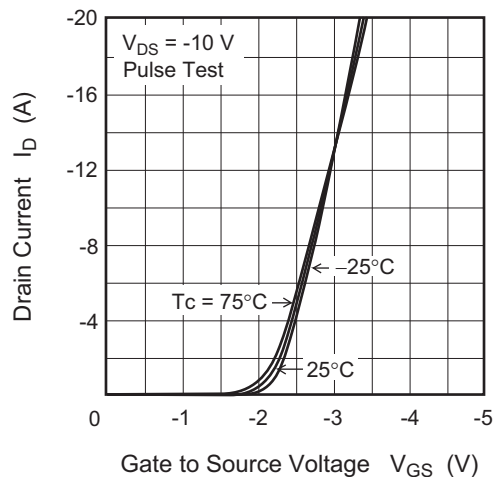
Maximum Safe Operation Area



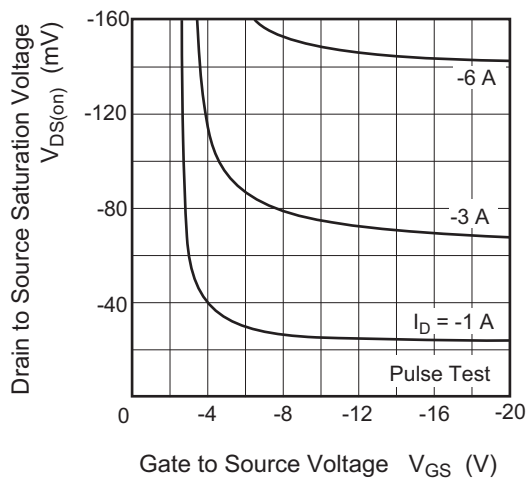
Typical Output Characteristics



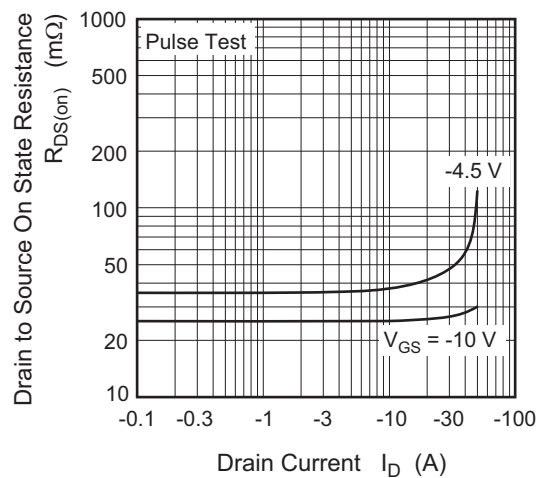
Typical Transfer Characteristics

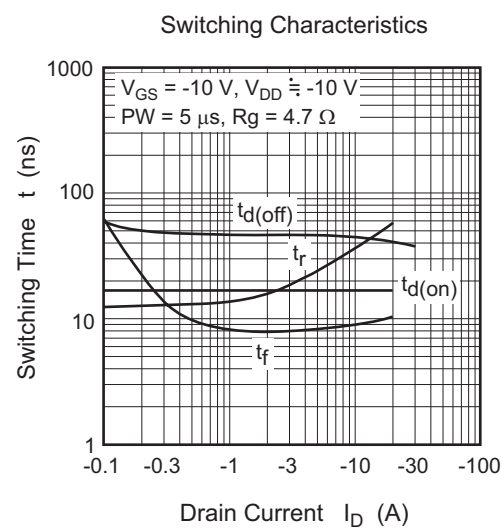
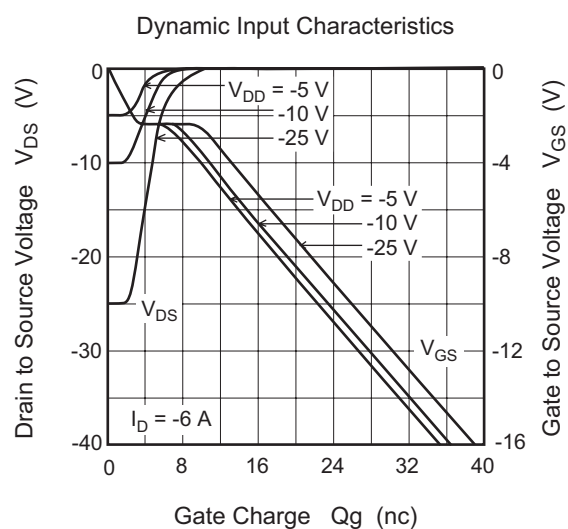
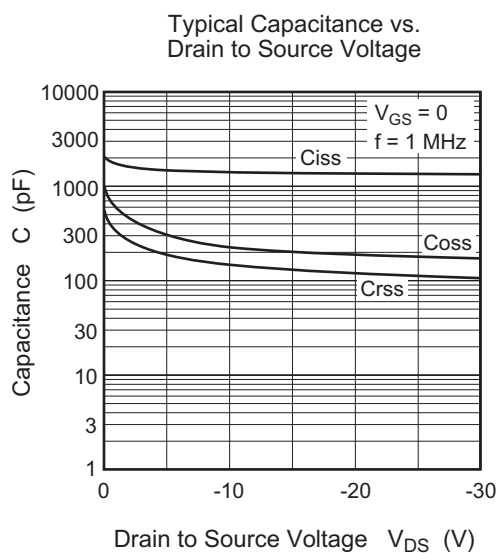
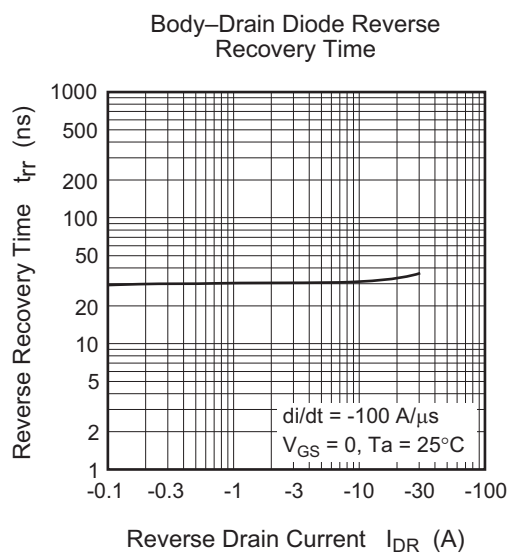
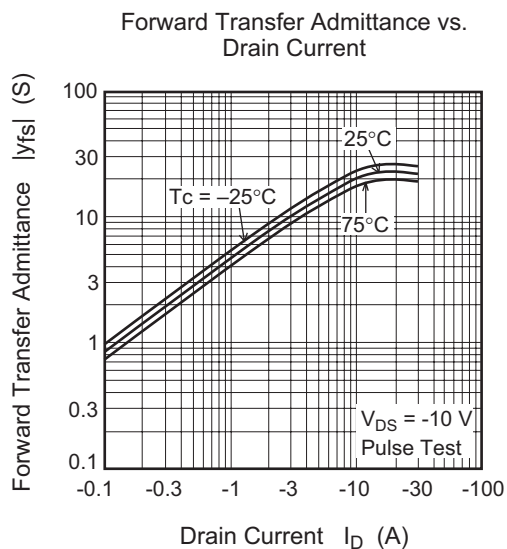
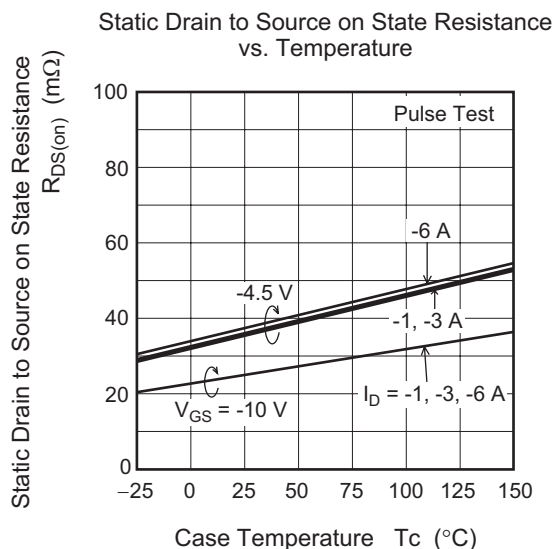


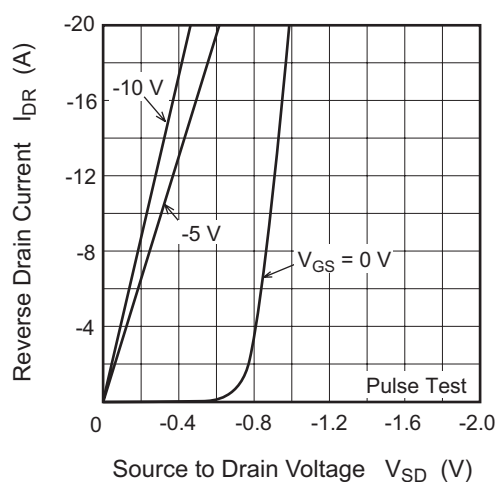
Drain to Source Saturation Voltage vs. Gate to Source Voltage



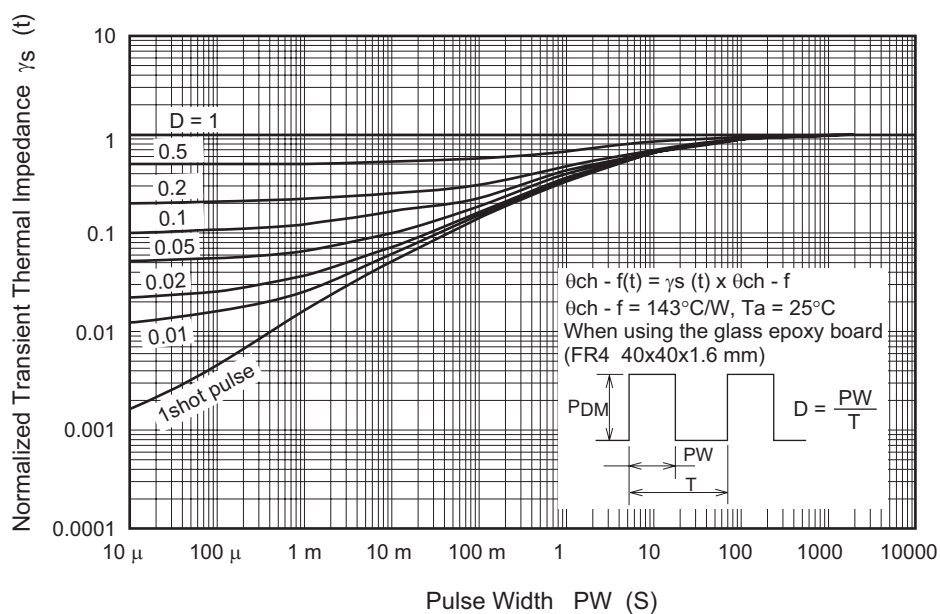
Static Drain to Source on State Resistance vs. Drain Current



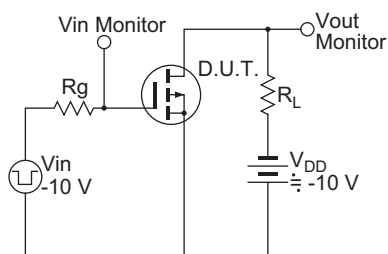


Reverse Drain Current vs.
Source to Drain Voltage

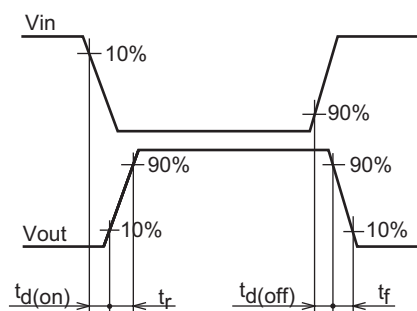
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

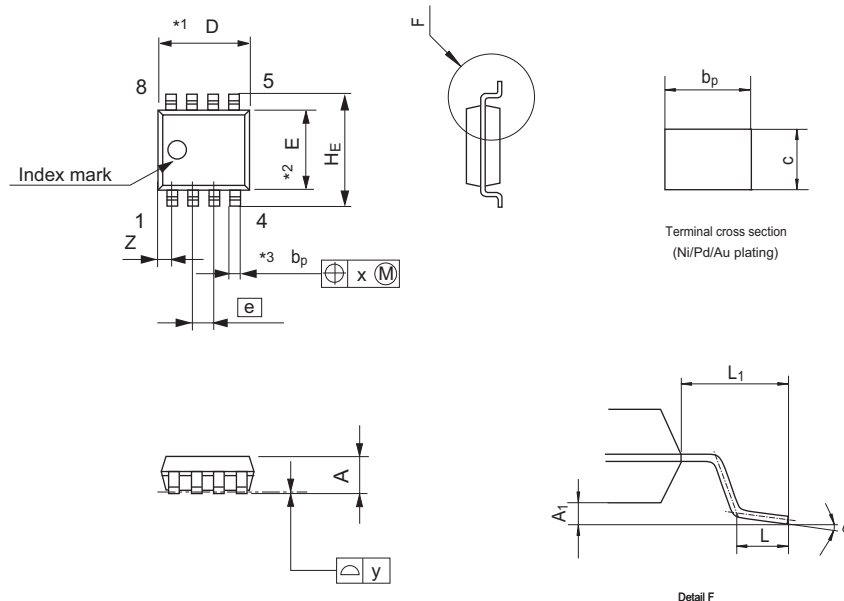


Switching Time Waveform



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
ϕ	—	1.27	—
x	—	—	0.25
y	—	—	0.1
Z	—	—	0.75
L	0.40	0.60	1.27
L ₁	—	1.08	—

Ordering Information

Orderable Part Number	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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瑞萨电子产品无意用于且未被授权用于可能对人类生命造成直接威胁的产品或系统及可能造成人身伤害的产品或系统（人工生命维持装置或系统、植埋于体内的装置等）中，或者可能造成重大财产损失的产品或系统（核反应堆控制系统、军用设备等）中。在将每种瑞萨电子产品用于某种特定应用之前，用户应先确认其质量等级。不得将瑞萨电子产品用于超出其设计用途之外的任何应用。对于用户或第三方因将瑞萨电子产品用于其设计用途之外而遭受的任何损害或损失，瑞萨电子不承担任何责任。
- 使用本文档中记载的瑞萨电子产品时，应在瑞萨电子指定的范围内，特别是在最大额定值、电源工作电压范围、移动电源电压范围、热辐射特性、安装条件以及其他产品特性的范围内使用。对于在上述指定范围之外使用瑞萨电子产品而产生的故障或损失，瑞萨电子不承担任何责任。
- 虽然瑞萨电子一直致力于提高瑞萨电子产品的质量和可靠性，但是，半导体产品有其自身的具体特性，如一定的故障发生率以及在某些使用条件下会发生故障等。此外，瑞萨电子产品均未进行防辐射设计。所以请采取安全保护措施，以避免当瑞萨电子产品在发生故障而造成火灾时导致人身事故、伤害或损害的事故。例如进行软硬件安全设计（包括但不限于冗余设计、防火控制以及故障预防等）、适当的老化处理或其他适当的措施等。由于难于对微机软件单独进行评估，所以请用户自行对最终产品或系统进行安全评估。
- 关于环境保护方面的详细内容，例如每种瑞萨电子产品的环境兼容性等，请与瑞萨电子的营业部门联系。使用瑞萨电子产品时，请遵守对管制物质的使用或含量进行管理的所有相应法律法规（包括但不限于（欧盟RoHS指令））。对于因用户未遵守相应法律法规而导致的损害或损失，瑞萨电子不承担任何责任。
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