

HAT3006R

Silicon N Channel / P Channel Power MOS FET
High Speed Power Switching

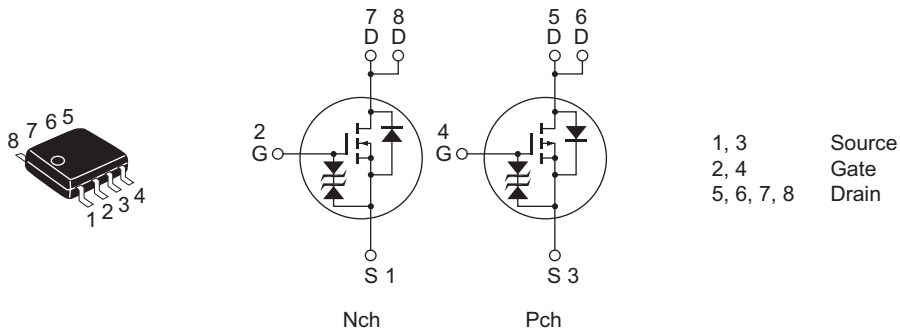
REJ03G1197-0800
(Previous: ADE-208-480F)
Rev.8.00
Sep 07, 2005

Features

- Low on-resistance
- Capable of 4 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	Value		Unit
		Nch	Pch	
Drain to source voltage	V_{DSS}	30	-30	V
Gate to source voltage	V_{GSS}	±20	±20	V
Drain current	I_D	6.5	-4.5	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	52	-36	A
Body-drain diode reverse drain current	I_{DR}	6.5	-4.5	A
Channel dissipation	P_{ch} ^{Note 2}	2		W
Channel dissipation	P_{ch} ^{Note 3}	3		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 × 40 × 1.6 mm), $PW \leq 10 s$ 3. 2 Drive operation: When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), $PW \leq 10 s$

Electrical Characteristics

N Channel

(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 breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \mu A$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.03	0.045	Ω	$I_D = 4 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 4}
	$R_{DS(on)}$	—	0.05	0.08	Ω	$I_D = 4 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note 4}
Forward transfer admittance	$ y_{fs} $	5	8	—	S	$I_D = 4 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Input capacitance	C_{iss}	—	560	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	380	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	170	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	$V_{GS} = 4 \text{ V}$, $I_D = 4 \text{ A}$
Rise time	t_r	—	270	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	40	—	ns	
Fall time	t_f	—	65	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.9	1.4	V	$I_F = 6.5 \text{ A}$, $V_{GS} = 0$ ^{Note 4}
Body-drain diode reverse recovery time	t_{rr}	—	45	—	ns	$I_F = 6.5 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 20 \text{ A}/\mu s$

Note: 4. Pulse test

P Channel

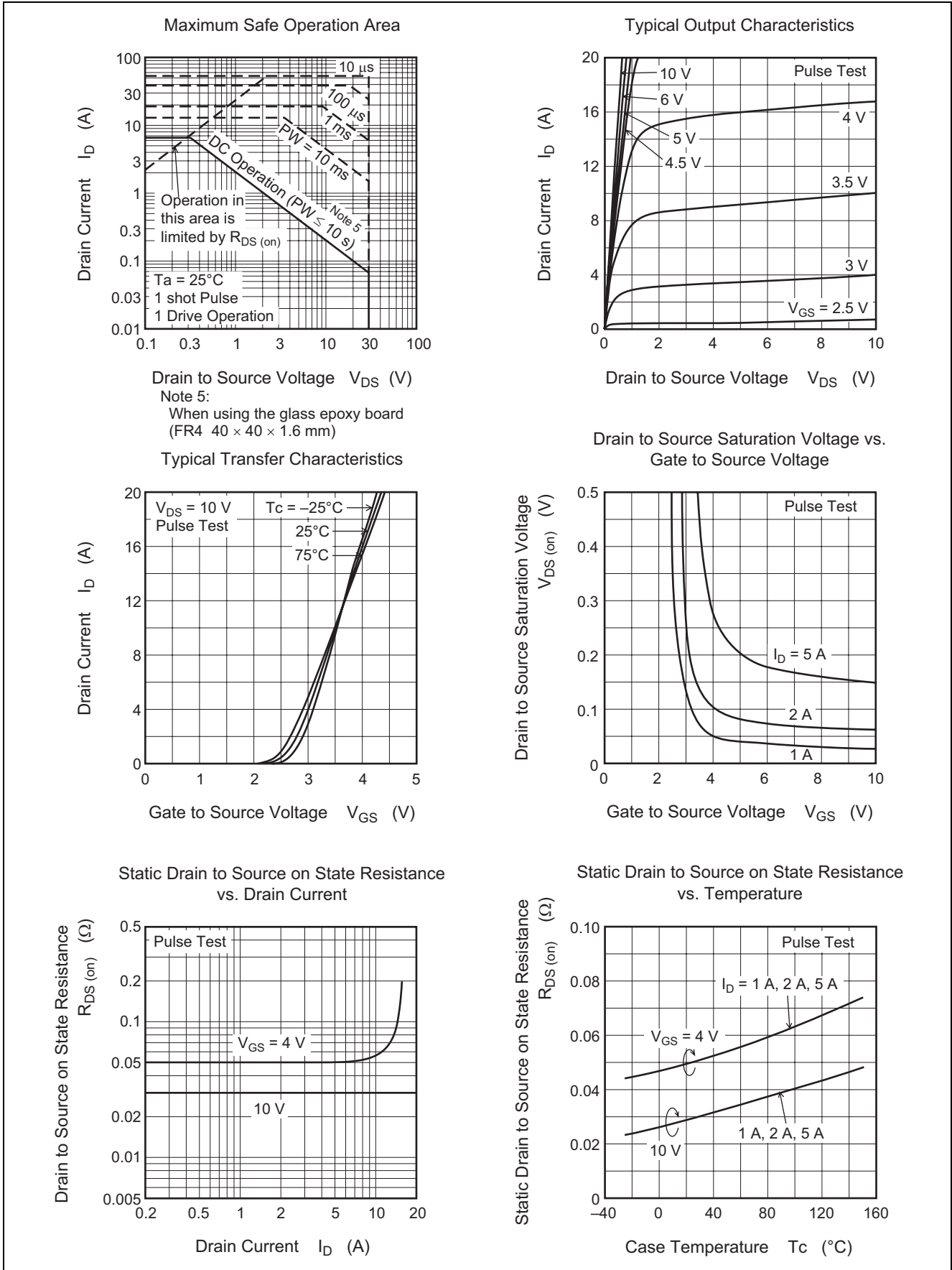
(Ta = 25°C)

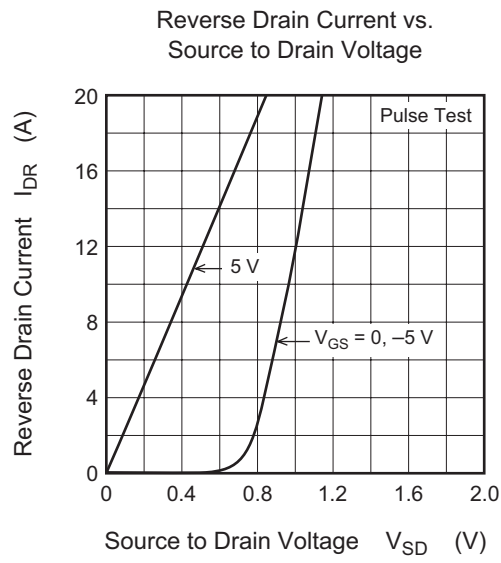
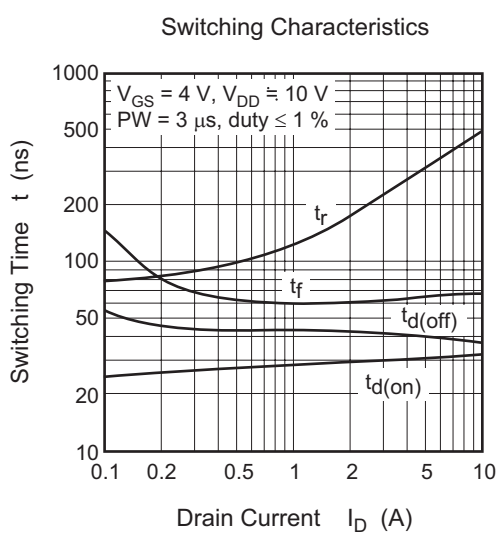
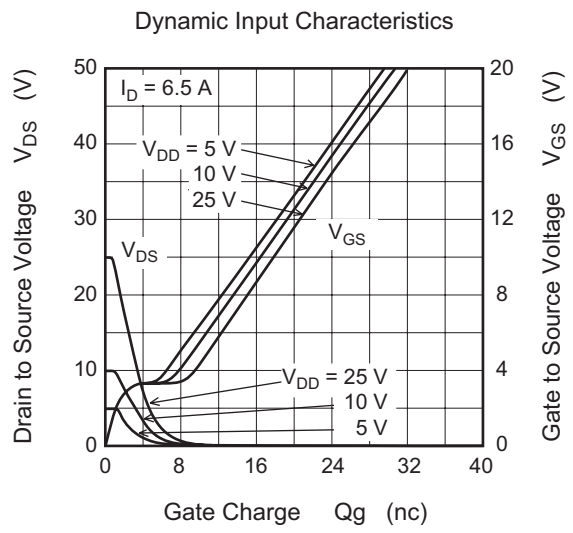
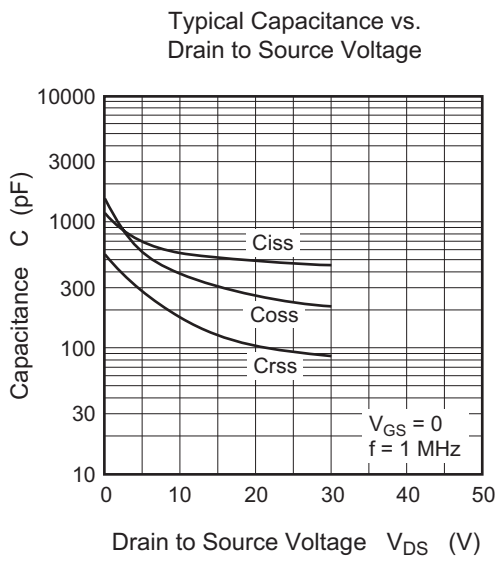
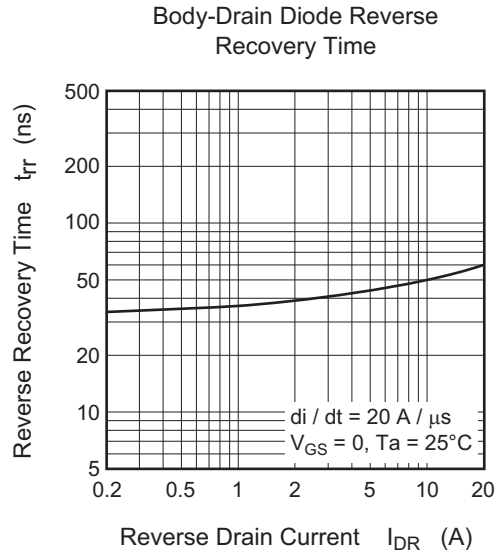
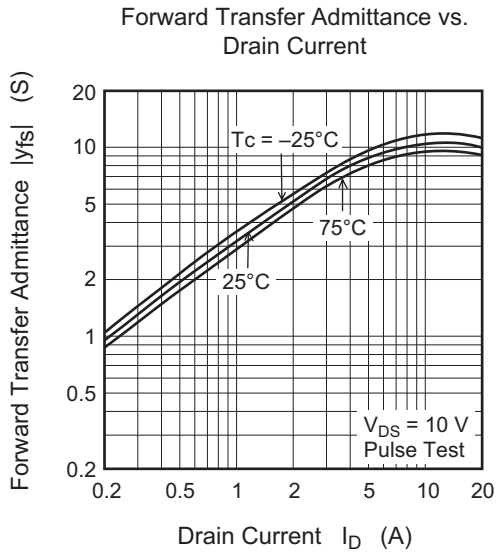
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-30	—	—	V	$I_D = -10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	-10	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	$R_{DS(on)}$	—	0.07	0.09	Ω	$I_D = -3 \text{ A}$, $V_{GS} = -10 \text{ V}$ ^{Note 5}
	$R_{DS(on)}$	—	0.11	0.18	Ω	$I_D = -3 \text{ A}$, $V_{GS} = -4 \text{ V}$ ^{Note 5}
Forward transfer admittance	$ y_{fs} $	4	6	—	S	$I_D = -3 \text{ A}$, $V_{DS} = -10 \text{ V}$ ^{Note 5}
Input capacitance	C_{iss}	—	660	—	pF	$V_{DS} = -10 \text{ V}$
Output capacitance	C_{oss}	—	440	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	140	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	24	—	ns	$V_{GS} = -4 \text{ V}$, $I_D = -3 \text{ A}$
Rise time	t_r	—	165	—	ns	$V_{DD} \cong -10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	35	—	ns	
Fall time	t_f	—	70	—	ns	
Body-drain diode forward voltage	V_{DF}	—	-0.9	-1.4	V	$I_F = -4.5 \text{ A}$, $V_{GS} = 0$ ^{Note 5}
Body-drain diode reverse recovery time	t_{rr}	—	60	—	ns	$I_F = -4.5 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 20 \text{ A}/\mu\text{s}$

Note: 5. Pulse test

Main Characteristics

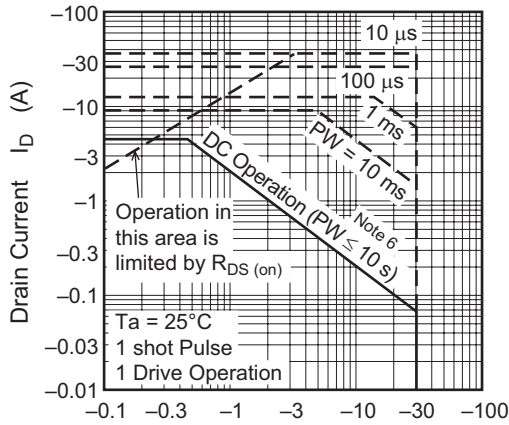
N Channel





P Channel

Maximum Safe Operation Area

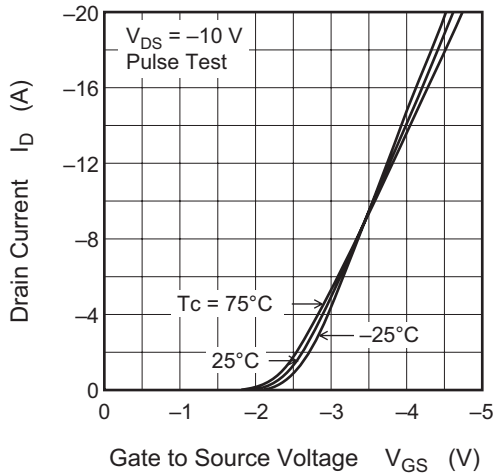


Drain to Source Voltage V_{DS} (V)

Note 6:

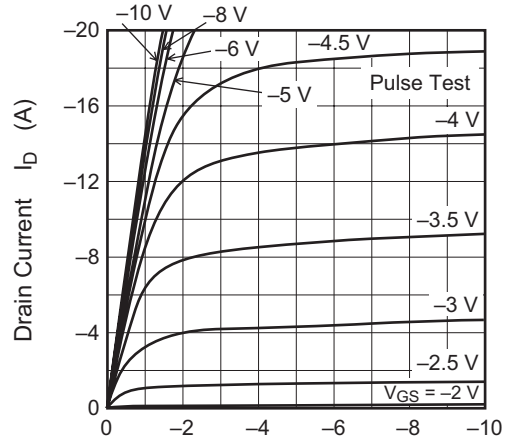
When using the glass epoxy board (FR4 40 × 40 × 1.6 mm)

Typical Transfer Characteristics



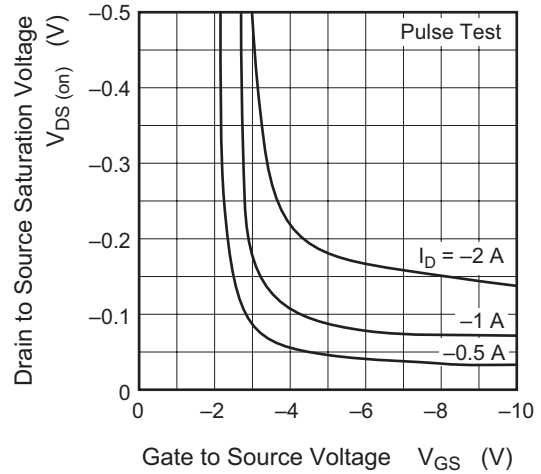
Gate to Source Voltage V_{GS} (V)

Typical Output Characteristics

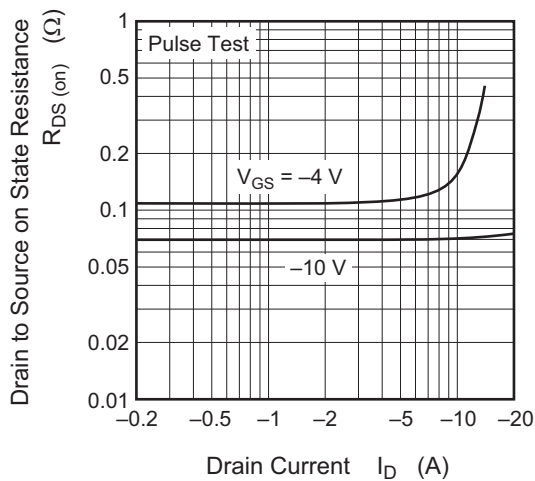


Drain to Source Voltage V_{DS} (V)

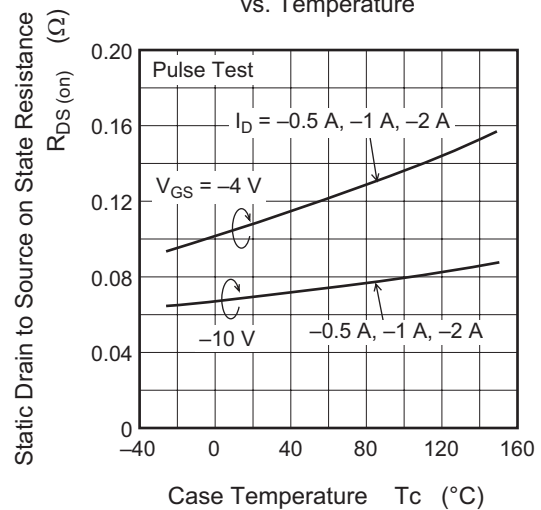
Drain to Source Saturation Voltage vs. Gate to Source Voltage

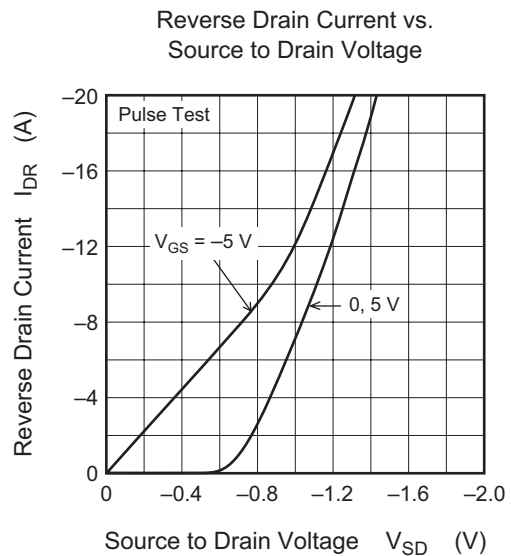
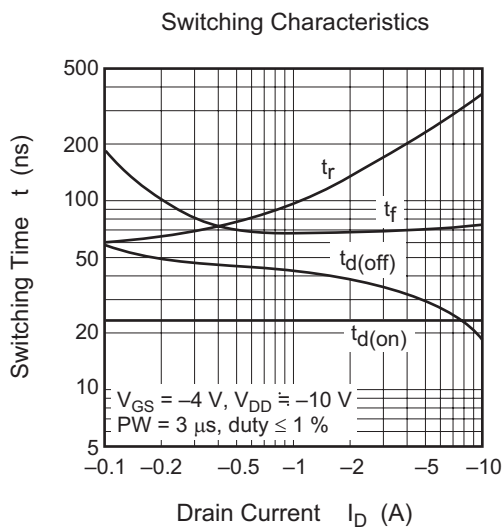
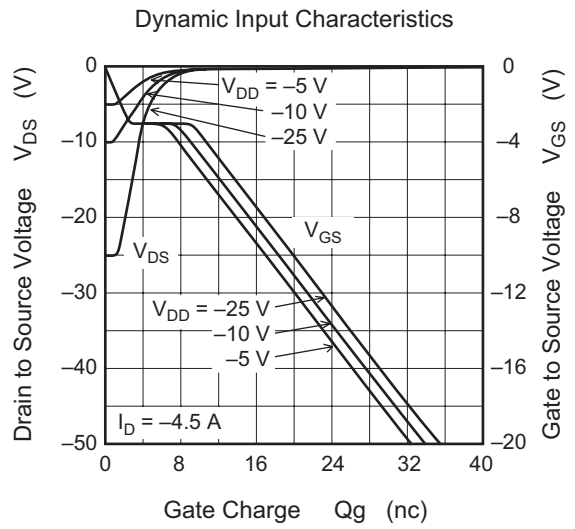
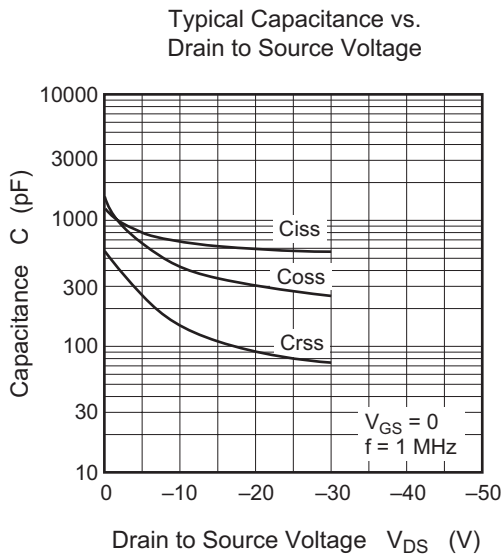
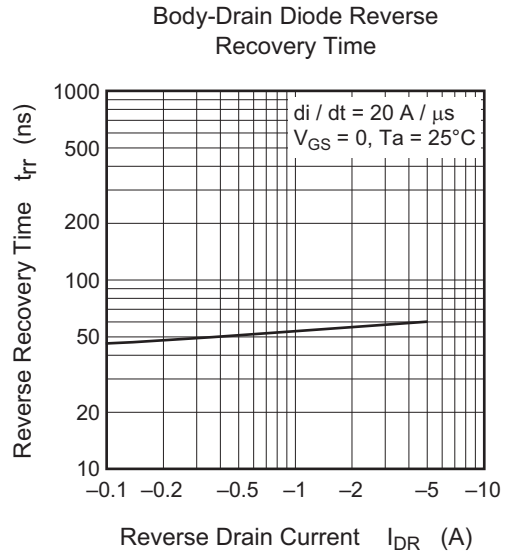
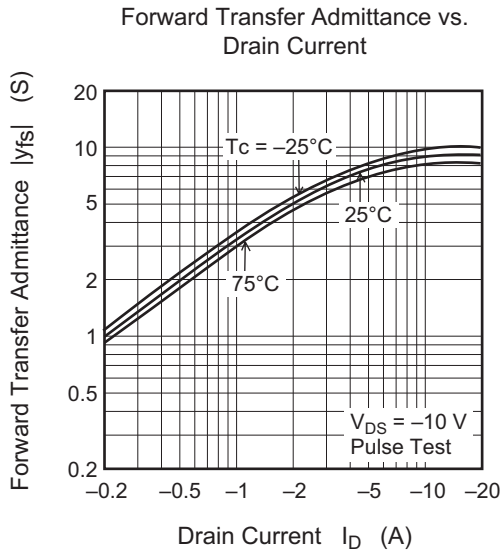


Static Drain to Source on State Resistance vs. Drain Current

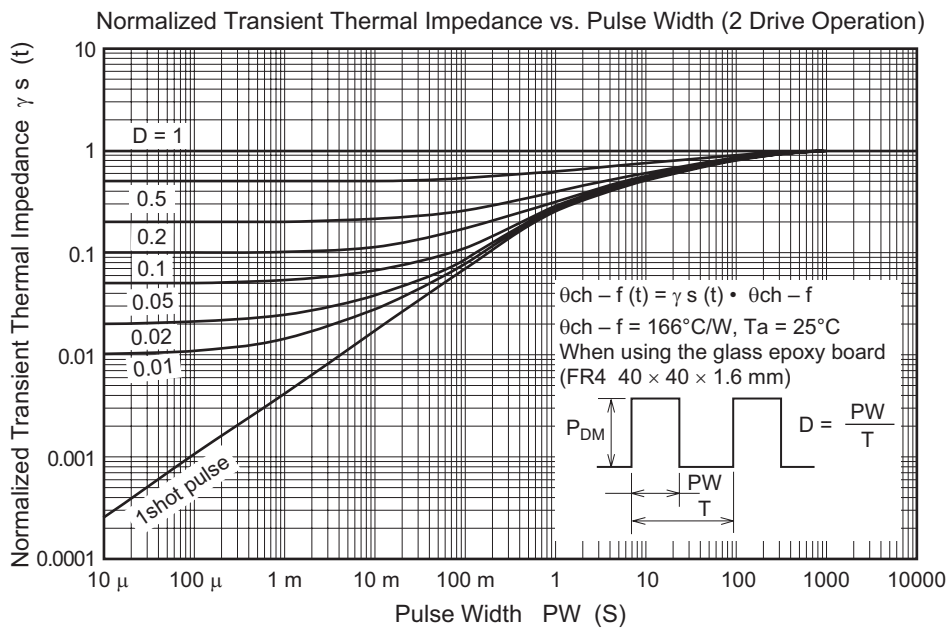
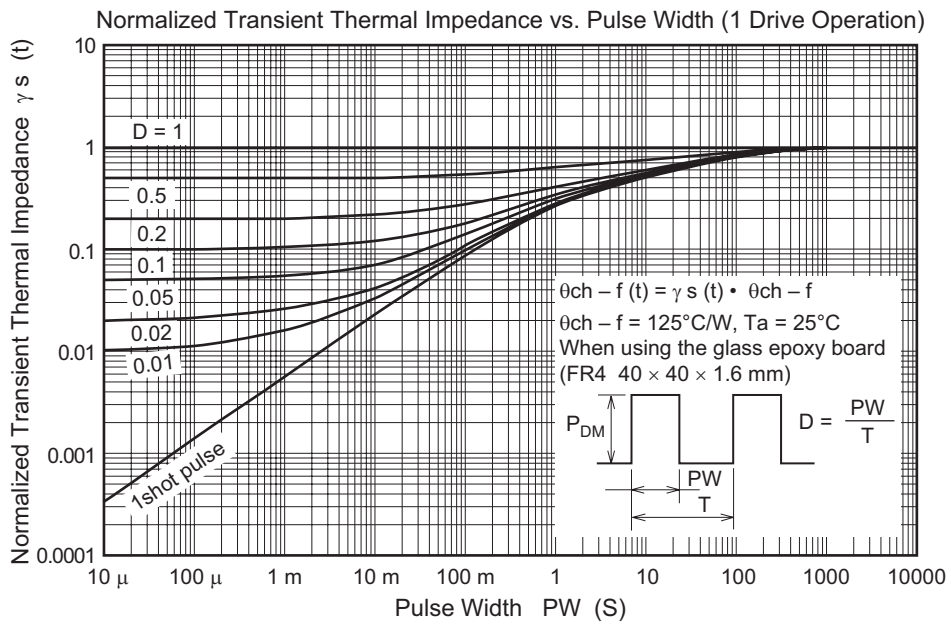
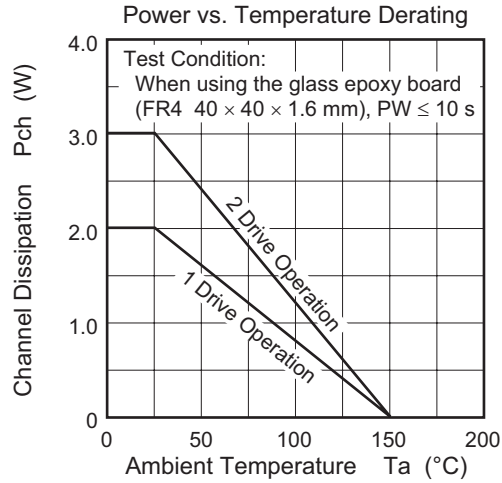


Static Drain to Source on State Resistance vs. Temperature



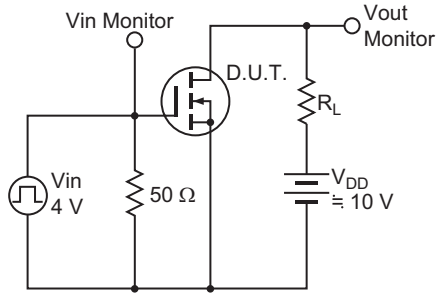


Common

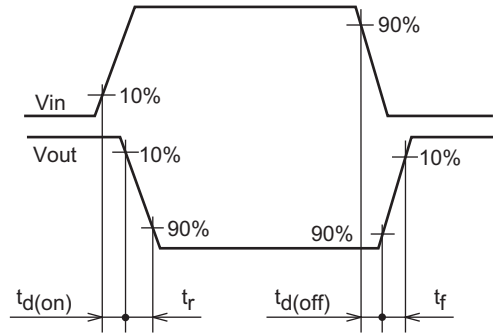


N channel

Switching Time Test Circuit

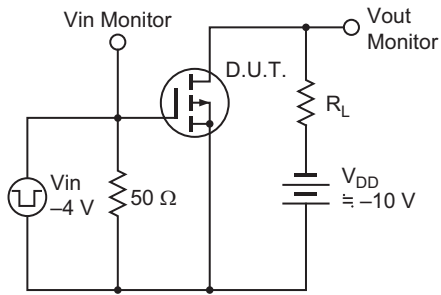


Switching Time Waveform

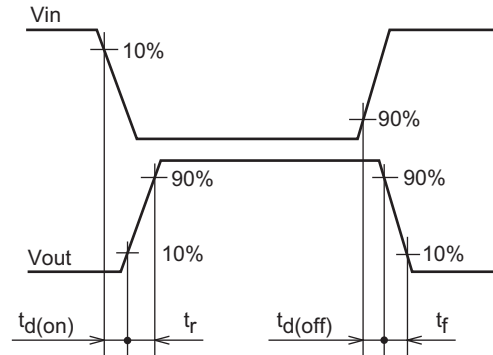


P channel

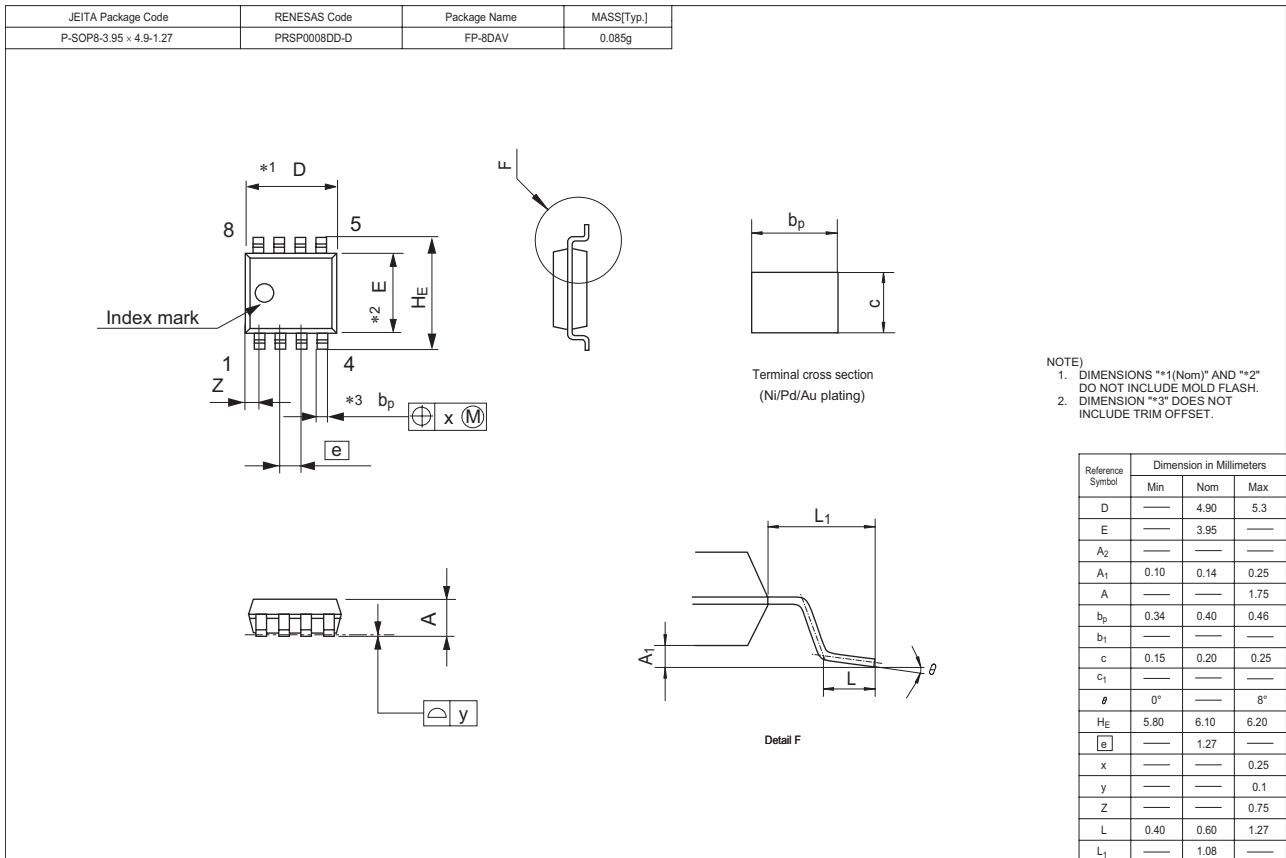
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAT3006R-EL-E	2500 pcs	Taping

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