

RJF0622JSP

60V, 3A N Channel Thermal FET
Power Switching

R07DS1418EJ0100
Rev.1.00
Jun 04, 2018

Description

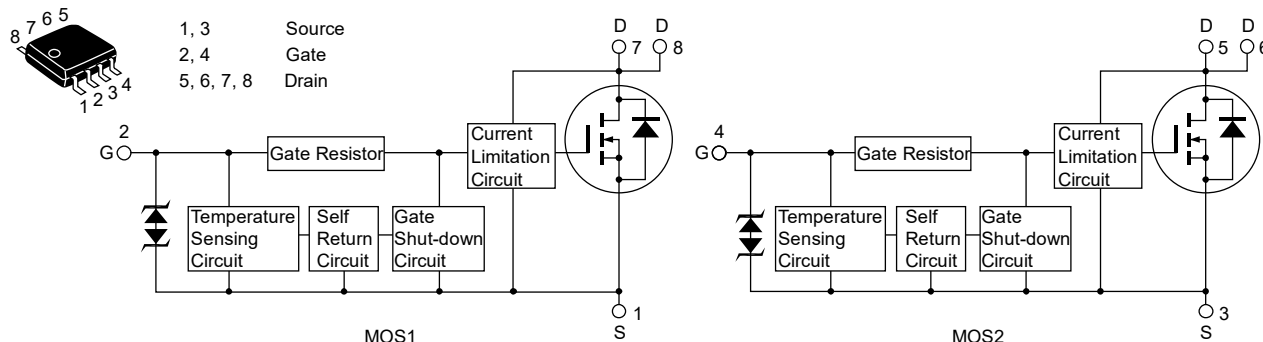
This FET has the over temperature shut-down capability sensing to the junction temperature. This FET has the built-in over temperature shut-down circuit in the gate area. And this circuit operation to shut-down the gate voltage in case of high junction temperature like applying over power consumption, over current etc..

Features

- Logic level operation.
- Built-in the over temperature shut-down circuit and current limitation circuit.
- High endurance capability against to the short circuit.
- Temperature hysteresis type.
- High density mounting
- Power supply voltage applies 12 V and 24 V. (Max Power supply voltage : 38 V)
- AEC-Q101 Compliant

Outline

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



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	60	V
Gate to source voltage	V_{GS}	16	V
Gate to source voltage	V_{GS}	-2.5	V
Drain current	I_D ^{Note 4}	3	A
Body-drain diode reverse drain current	I_{DR}	3	A
Avalanche current	I_{AP} ^{Note 3}	0.9	A
Avalanche energy	E_{AR} ^{Note 3}	69.4	mJ
Channel dissipation	P_{ch} ^{Note 1}	2	W
Channel dissipation	P_{ch} ^{Note 2}	3	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

- Notes:
1. Drive operation: When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), $PW \leq 10$ s
 2. Drive operation: When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), $PW \leq 10$ s
 3. $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$, $L = 100$ mH
 4. It provides by the current limitation lower bound value.

Typical Operation Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input voltage	V _{IH}	3.5	—	—	V	
	V _{IL}	—	—	1.2	V	
Input current (Gate non shut down)	I _{IH1}	—	—	100	μA	V _i = 8 V, V _{DS} = 0
	I _{IH2}	—	—	50	μA	V _i = 3.5 V, V _{DS} = 0
	I _{IL}	—	—	1	μA	V _i = 1.2 V, V _{DS} = 0
Input current (Gate shut down)	I _{IH(sd)1}	—	0.8	—	mA	V _i = 8 V, V _{DS} = 0
	I _{IH(sd)2}	—	0.35	—	mA	V _i = 3.5 V, V _{DS} = 0
Shut down temperature	T _{sd}	—	175	—	°C	Channel temperature
Return temperature	Thr	—	120	—	°C	Channel temperature
Gate operation voltage	V _{op}	3.5	—	12	V	
Drain current (Current limitation value)	I _{D limit}	3	—	—	A	V _{GS} = 5 V, V _{DS} = 10 V ^{Note 5}
Load short-circuit voltage	V _{DD}	—	—	32	V	V _{GS} = 5 V, R _L = 0

Notes: 5. Pulse test

Electrical Characteristics

(Ta = 25°C)

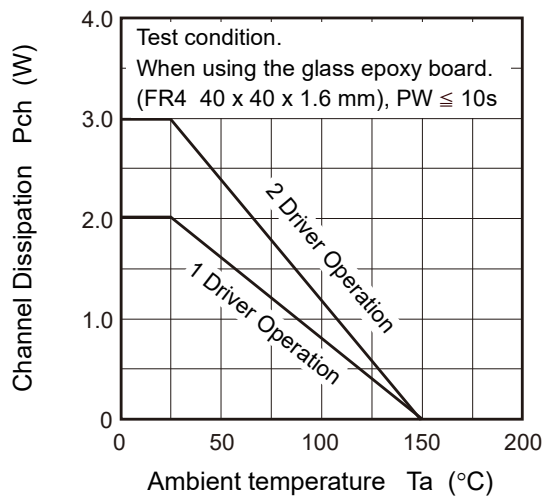
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain current	I _{D1}	—	—	10	mA	V _{GS} = 1.2 V, V _{DS} = 10 V
	I _{D2}	3	—	—	A	V _{GS} = 5 V, V _{DS} = 10 V ^{Note 6}
Drain to source breakdown voltage	V _{(BR)DSS}	60	—	80	V	I _D = 10 mA, V _{GS} = 0
Gate to source breakdown voltage	V _{(BR)GSS}	16	—	—	V	I _G = 800 μA, V _{DS} = 0
	V _{(BR)GSS}	-2.5	—	—	V	I _G = -100 μA, V _{DS} = 0
Gate to source leak current	I _{GSS1}	—	—	100	μA	V _{GS} = 8 V, V _{DS} = 0
	I _{GSS2}	—	—	50	μA	V _{GS} = 3.5 V, V _{DS} = 0
	I _{GSS3}	—	—	1	μA	V _{GS} = 1.2 V, V _{DS} = 0
	I _{GSS4}	—	—	-100	μA	V _{GS} = -2.4 V, V _{DS} = 0
Input current (shut down)	I _{GS(OP)1}	—	0.8	—	mA	V _{GS} = 8 V, V _{DS} = 0
	I _{GS(OP)2}	—	0.35	—	mA	V _{GS} = 3.5 V, V _{DS} = 0
Zero gate voltage drain current	I _{DSS}	—	—	10	μA	V _{DS} = 32 V, V _{GS} = 0, Ta = 125°C
Gate to source cutoff voltage	V _{GS(off)}	1.1	—	2.1	V	I _D = 1 mA, V _{DS} = 10 V
Static drain to source on state resistance	R _{DS(on)}	—	159	180	mΩ	I _D = 2.5 A, V _{GS} = 5 V ^{Note 6}
	R _{DS(on)}	—	139	160	mΩ	I _D = 2.5 A, V _{GS} = 10 V ^{Note 6}
Forward transfer admittance	y _{fs}	3.3	5.4	—	S	I _D = 2.5 A, V _{DS} = 10 V ^{Note 6}
Output capacitance	C _{oss}	—	154	—	pF	V _{DS} = 10 V, V _{GS} = 0, f = 1MHz
Turn-on delay time	t _{d(on)}	—	1.9	—	μs	I _D = 2.5 A V _{GS} = 5 V, R _L = 12 Ω
Rise time	t _r	—	11.0	—	μs	
Turn-off delay time	t _{d(off)}	—	1.1	—	μs	
Fall time	t _f	—	3.0	—	μs	
Body-drain diode forward voltage	V _{DF}	—	0.91	—	V	I _F = 5 A, V _{GS} = 0
Body-drain diode reverse recovery time	t _{rr}	—	662	—	ns	I _F = 3 A, V _{GS} = 0 di _F /dt = 50 A/μs
Over load shut down operation time ^{Note 7}	t _{os1}	—	0.29	—	ms	V _{GS} = 5 V, V _{DD} = 16 V
	t _{os2}	—	0.18	—	ms	V _{GS} = 5 V, V _{DD} = 24 V

Notes: 6. Pulse test

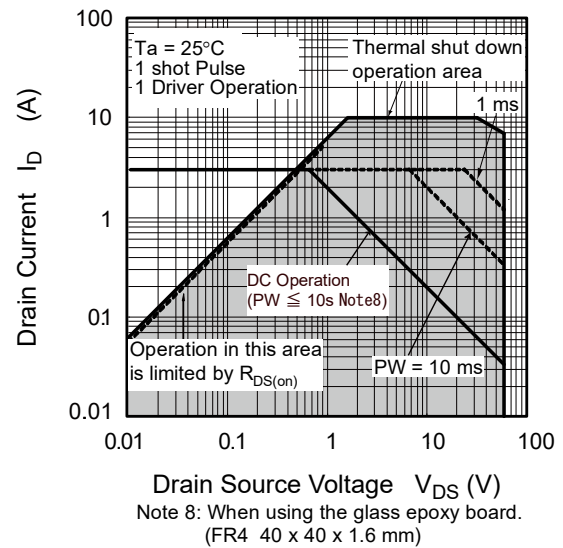
7. Including the junction temperature rise of the over loaded condition.

Main Characteristics

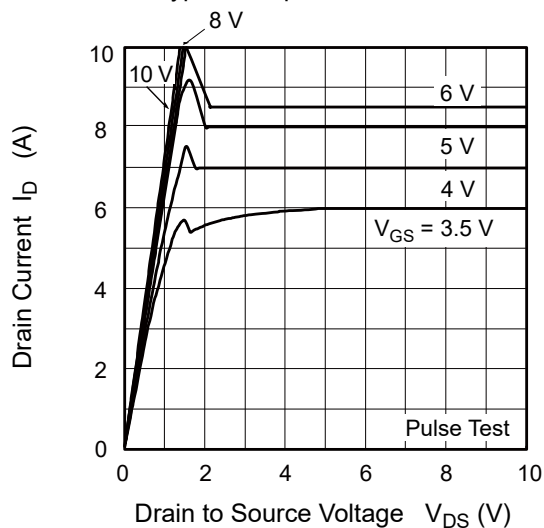
Power vs. Temperature Derating



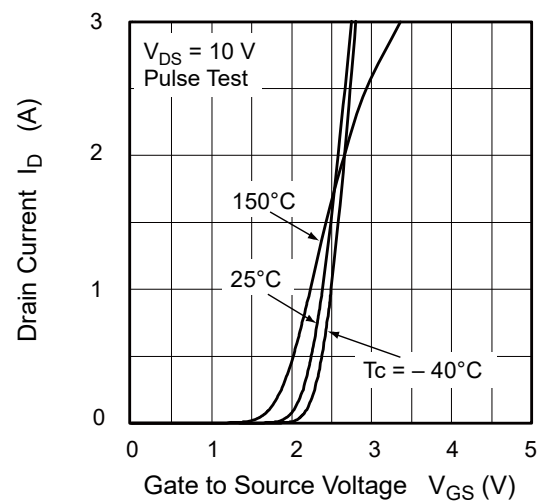
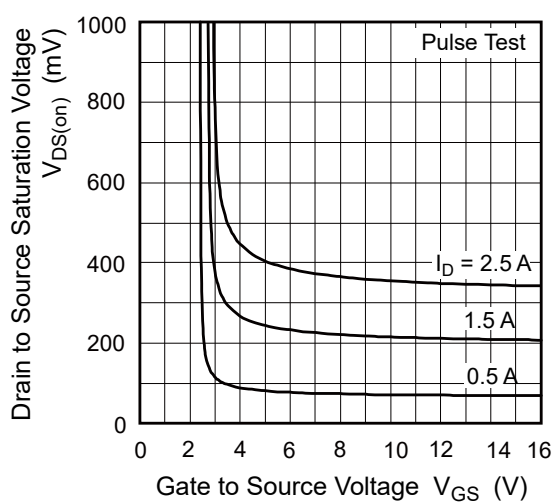
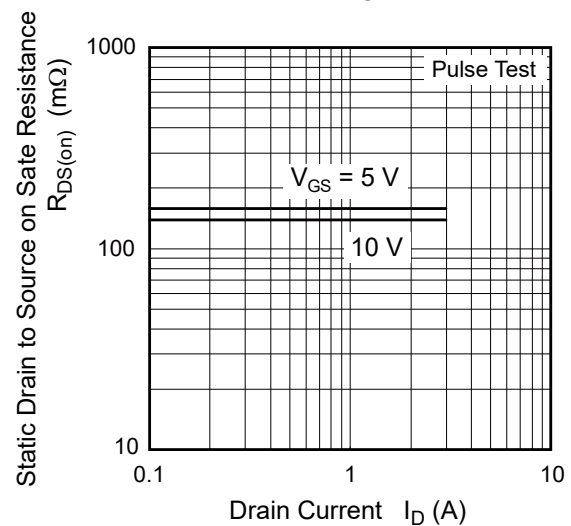
Maximum Safe Operation Area



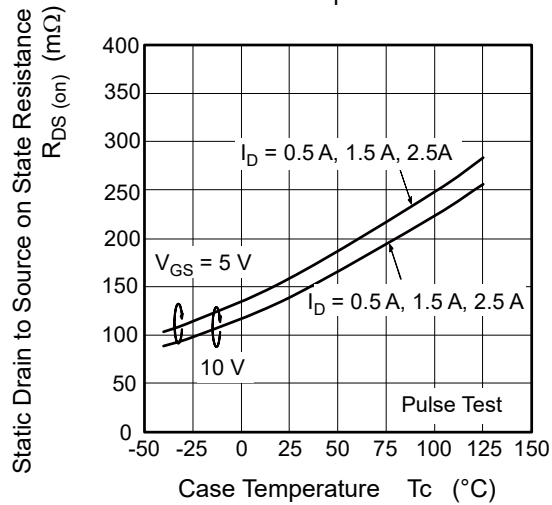
Typical Output Characteristics



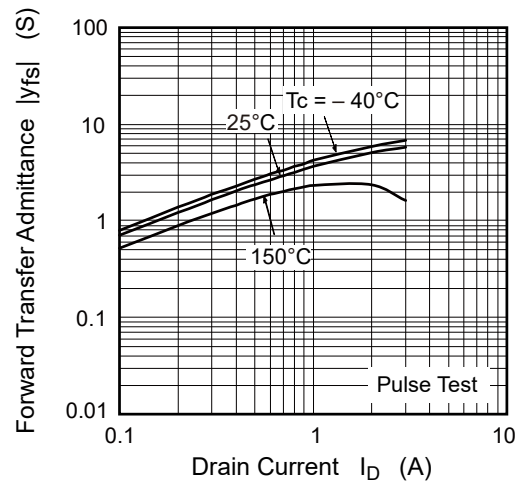
Typical Transfer Characteristics

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

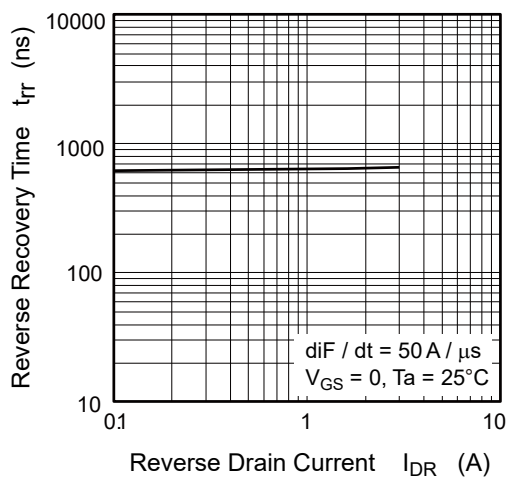
Static Drain to Source on State Resistance vs. Temperature



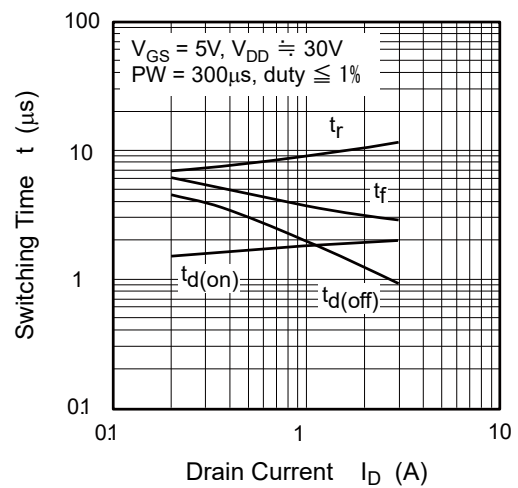
Forward Transfer Admittance vs. Drain Current



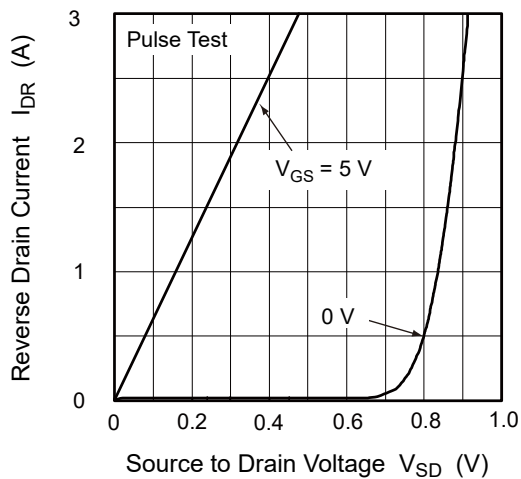
Body-Drain Diode Reverse Recovery Time



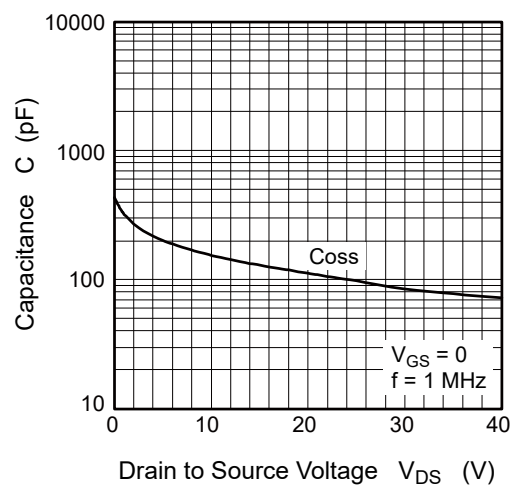
Switching Characteristics

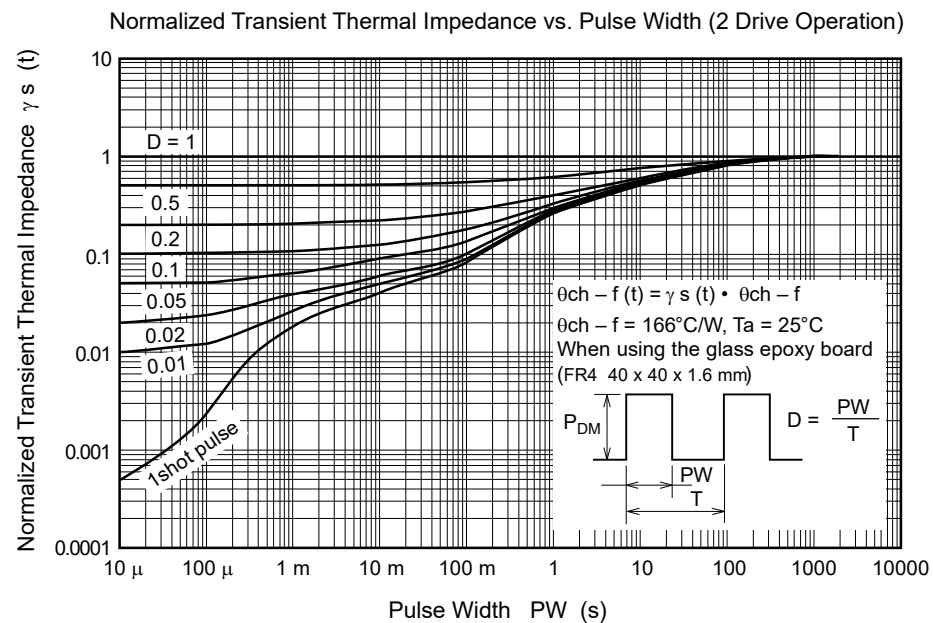
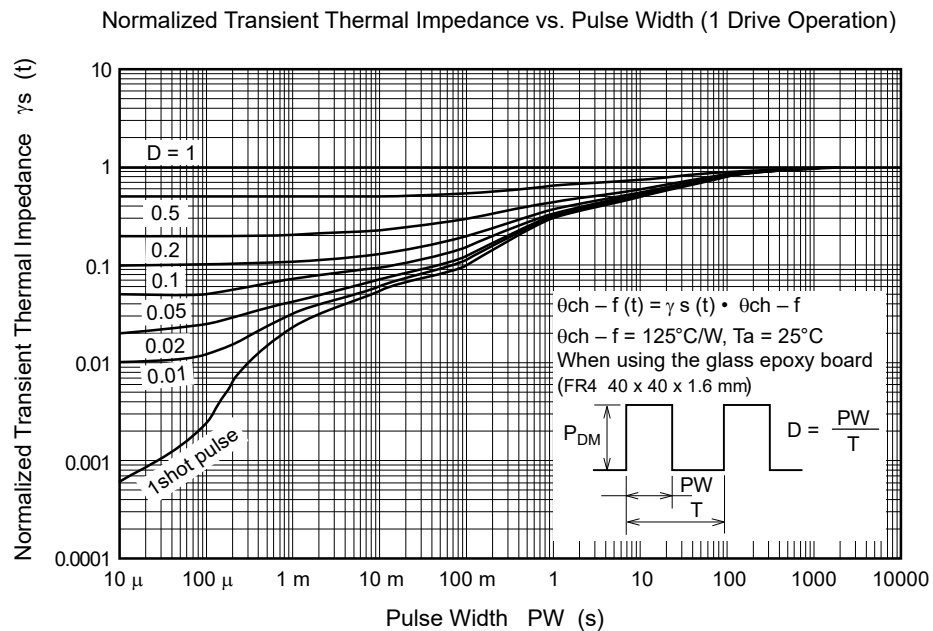
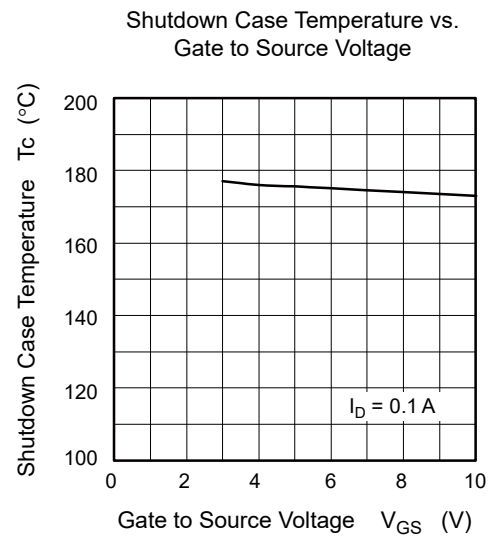
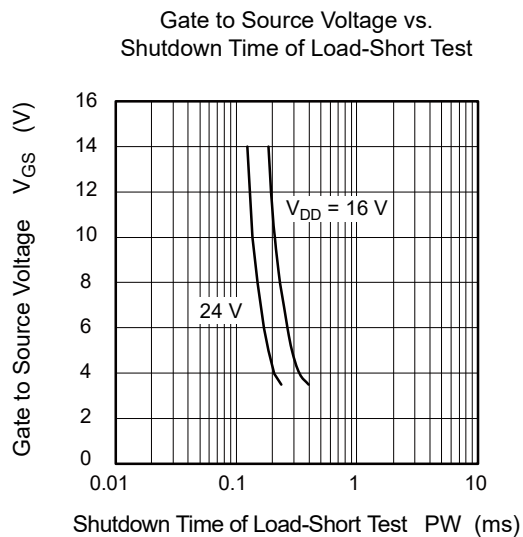


Reverse Drain Current vs. Source to Drain Voltage

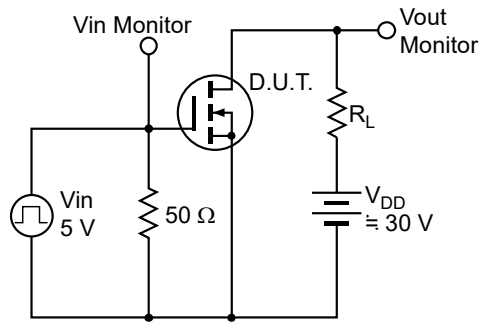


Typical Capacitance vs. Drain to Source Voltage

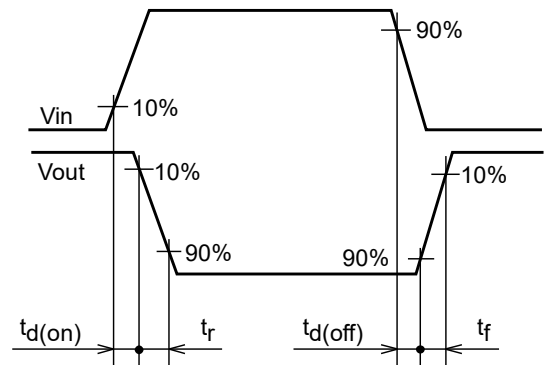




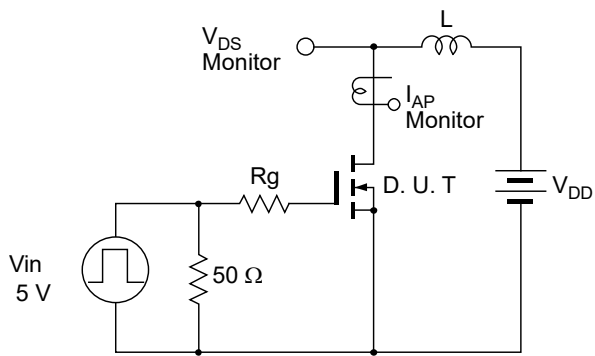
Switching Time Test Circuit



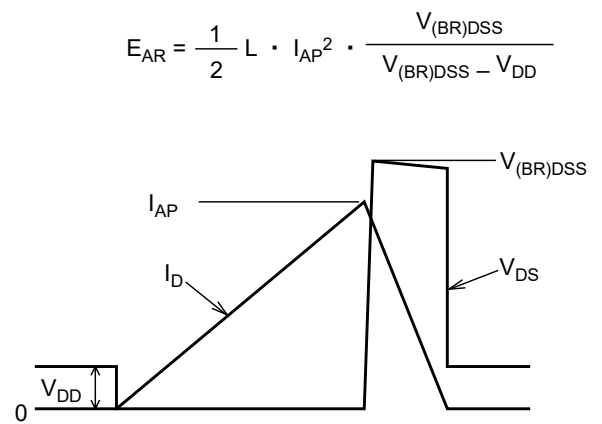
Waveform



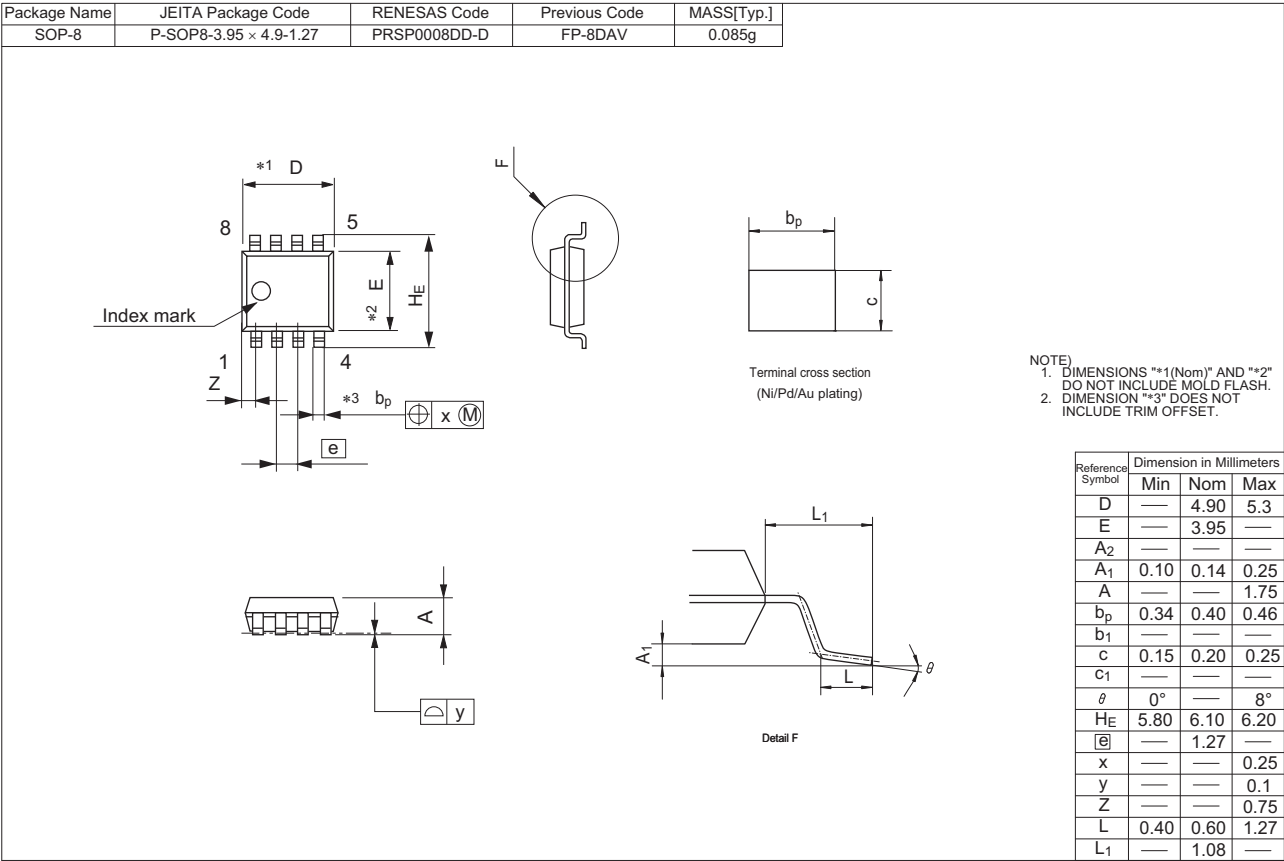
Avalanche Test Circuit



Avalanche Waveform



Package Dimensions



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJF0622JSP-00-J0	2500 pcs/Reel	Taping (Reel)

Note: The symbol of 2nd "-" is occasionally presented as "#".

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