

RJK0453DPB

Silicon N Channel Power MOS FET Power Switching

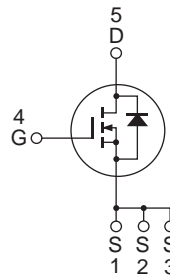
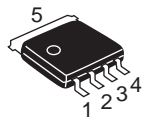
R07DS0075EJ0102
(Previous: REJ03G1762-0101)
Rev.1.02
Jul 30, 2010

Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
 $R_{DS(on)} = 1.9 \text{ m}\Omega$ typ. (at $V_{GS} = 10 \text{ V}$)
- Pb-free
- Halogen-free

Outline

RENESAS Package code: PTZZ0005DA-A
(Package name: LFPAK)



1, 2, 3 Source
4 Gate
5 Drain

Application

- Switching Mode Power Supply

Absolute Maximum Ratings

($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	40	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	55	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	220	A
Body-drain diode reverse drain current	I_{DR}	55	A
Avalanche current	I_{AP} ^{Note 2}	27.5	A
Avalanche energy	E_{AR} ^{Note 2}	60.5	mJ
Channel dissipation	P_{ch} ^{Note3}	65	W
Channel to Case Thermal Resistance	θ_{ch-C}	1.92	$^\circ\text{C}/\text{W}$
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

- Notes: 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$
 2. Value at $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$
 3. $T_c = 25^\circ\text{C}$

This product is for the low voltage drive ($\leq 10\text{V}$).
 If the driving voltage is over 10 V under normal conditions, please use the product for high gate to source cutoff voltage ($V_{GS(off)}$) which characteristics has been improved.

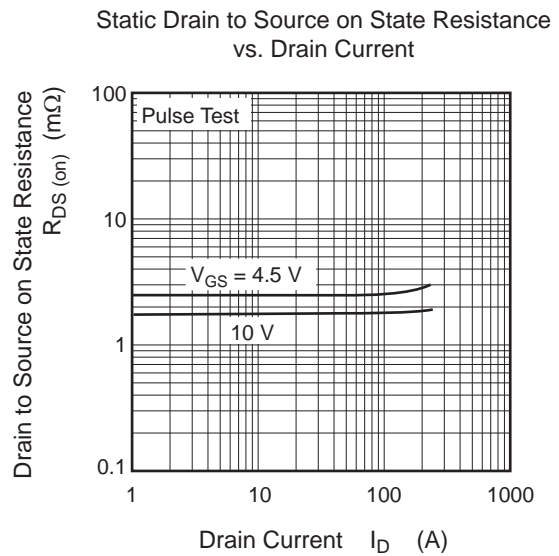
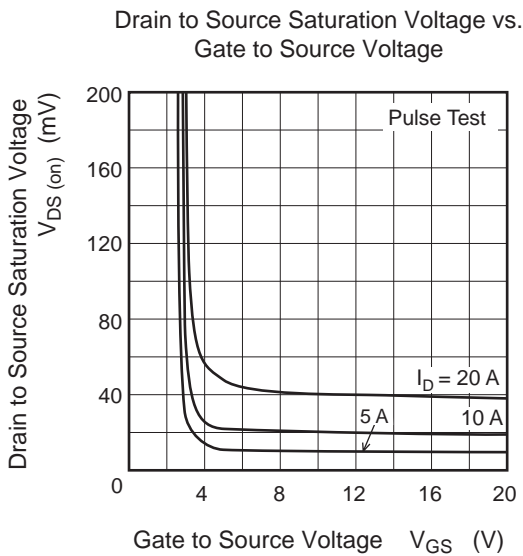
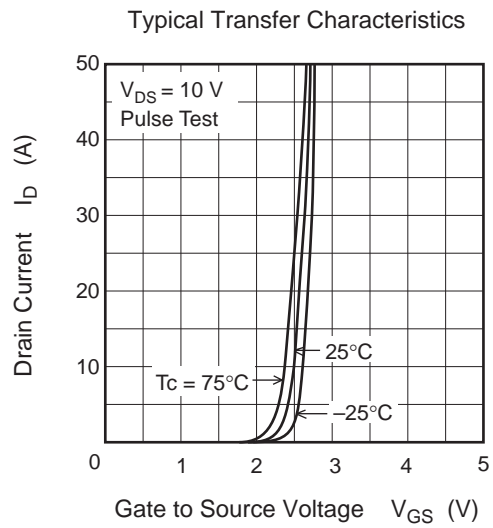
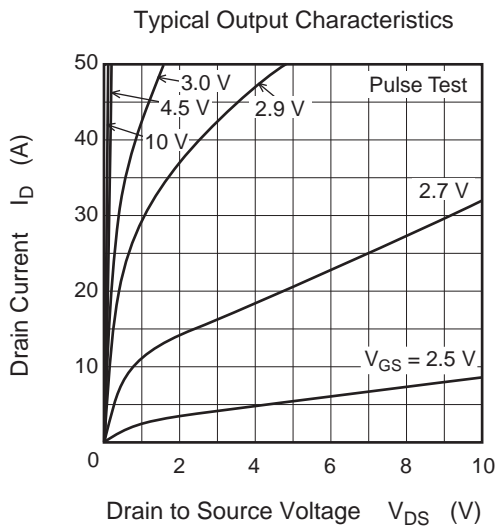
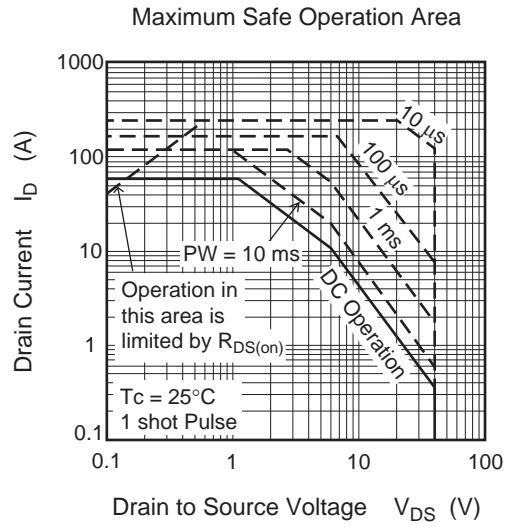
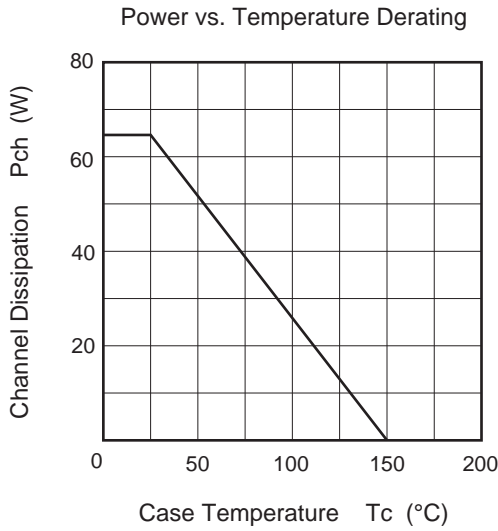
Electrical Characteristics

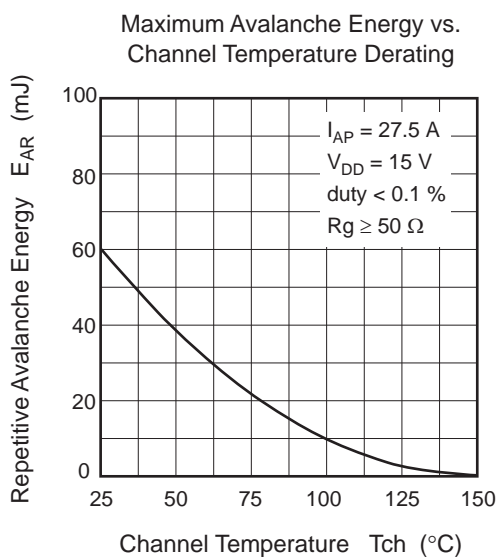
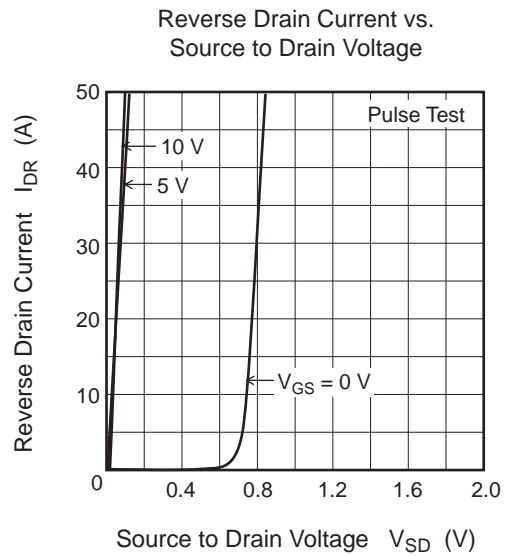
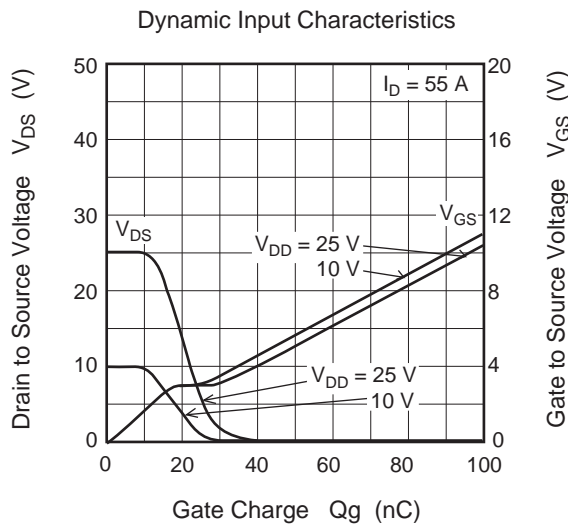
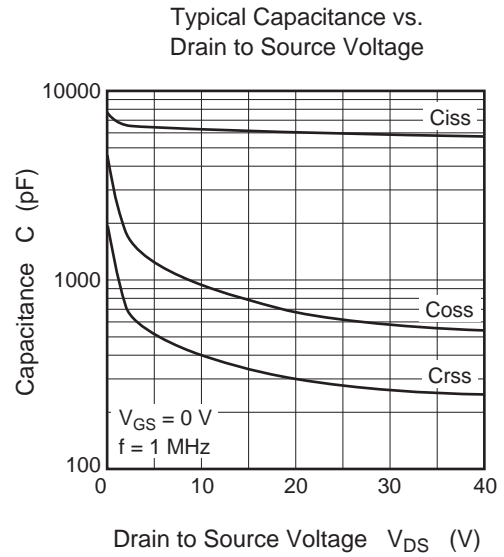
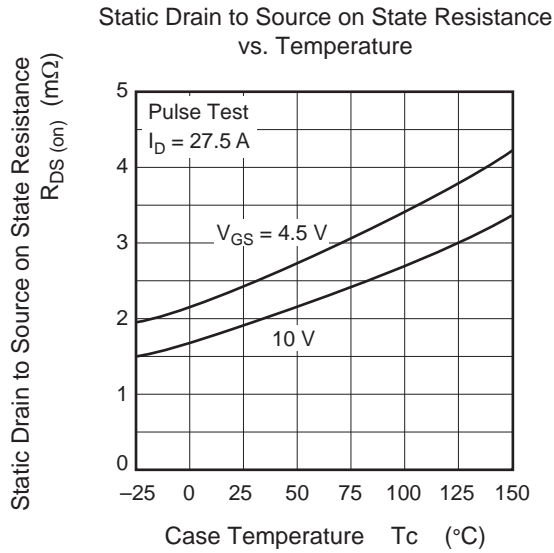
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	40	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0 \text{ V}$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 40 \text{ V}$, $V_{GS} = 0 \text{ V}$
Gate to source cutoff voltage	$V_{GS(off)}$	1.2	—	2.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	1.9	2.3	$\text{m}\Omega$	$I_D = 27.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	2.4	3.2	$\text{m}\Omega$	$I_D = 27.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	—	123	—	S	$I_D = 27.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	6040	—	pF	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	930	—	pF	
Reverse transfer capacitance	C_{rss}	—	400	—	pF	
Gate Resistance	R_g	—	0.5	—	Ω	
Total gate charge	Q_g	—	41	—	nC	$V_{DD} = 10 \text{ V}$, $V_{GS} = 4.5 \text{ V}$, $I_D = 55 \text{ A}$
Gate to source charge	Q_{gs}	—	18	—	nC	
Gate to drain charge	Q_{gd}	—	9.0	—	nC	
Turn-on delay time	$t_{d(on)}$	—	20	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 27.5 \text{ A}$, $V_{DD} \cong 10 \text{ V}$, $R_L = 0.36 \Omega$, $R_g = 4.7 \Omega$
Rise time	t_r	—	6.5	—	ns	
Turn-off delay time	$t_{d(off)}$	—	80	—	ns	
Fall time	t_f	—	12	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.83	1.1	V	$I_F = 55 \text{ A}$, $V_{GS} = 0 \text{ V}$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	40	—	ns	$I_F = 55 \text{ A}$, $V_{GS} = 0 \text{ V}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

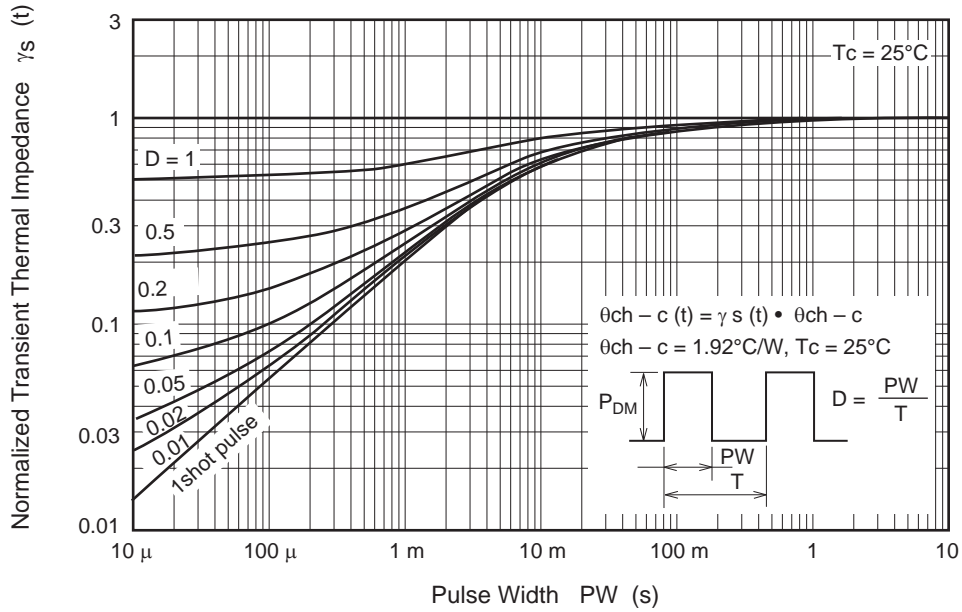
Notes: 4. Pulse test

Main Characteristics

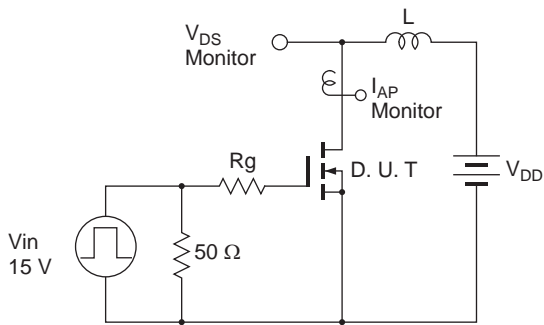




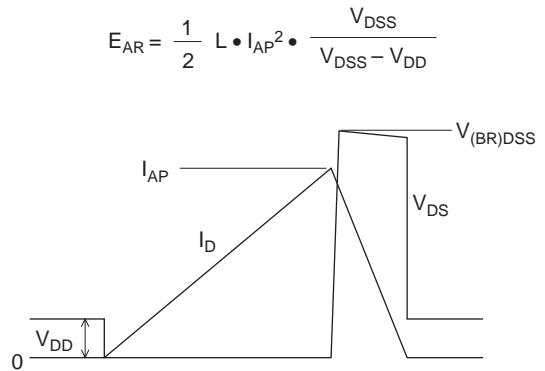
Normalized Transient Thermal Impedance vs. Pulse Width



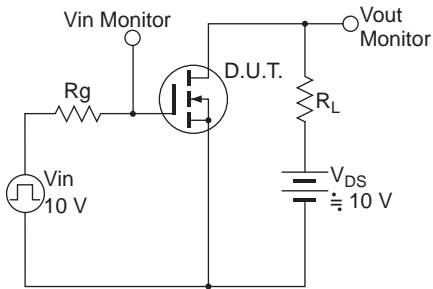
Avalanche Test Circuit



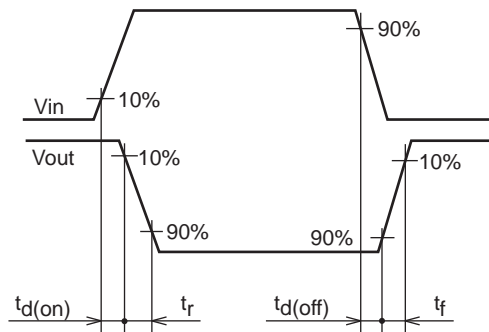
Avalanche Waveform



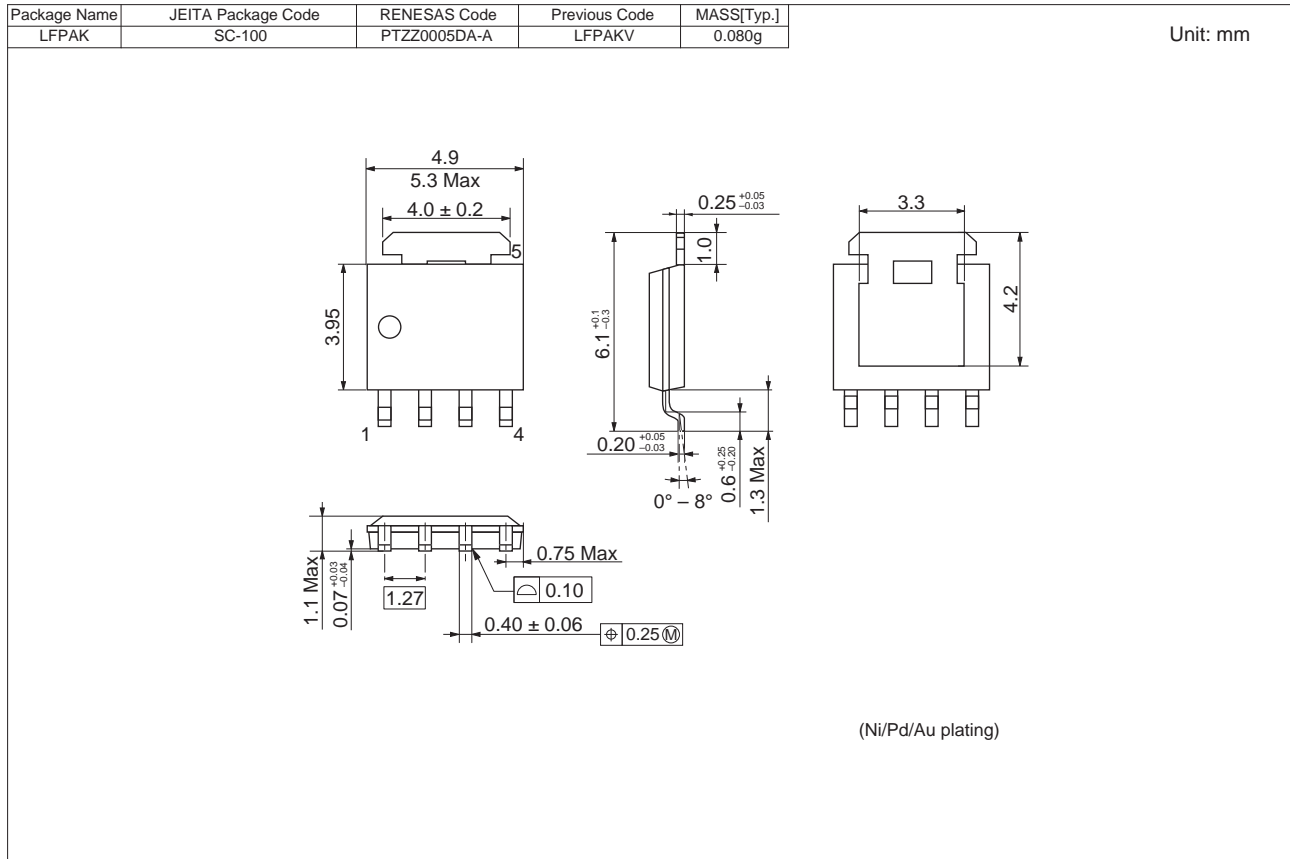
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part No.	Quantity	Shipping Container
RJK0453DPB-00-J5	2500 pcs	Taping

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