

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# RJK0455DPB

## Silicon N Channel Power MOS FET Power Switching

REJ03G1878-0200

Rev.2.00

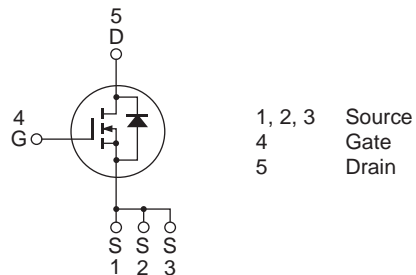
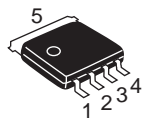
Mar 04, 2010

### Features

- High speed switching
- Low drive current
- Low on-resistance
- $R_{DS(on)} = 3.1\text{ m}\Omega$  typ. (at  $V_{GS} = 10\text{ V}$ )
- Pb-free
- Halogen-free
- High density mounting

### Outline

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



### 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	$V_{GSS}$	$\pm 20$	V
Drain current	$I_D$	45	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	180	A
Body-drain diode reverse drain current	$I_{DR}$	45	A
Avalanche current	$I_{AP}$ <sup>Note 2</sup>	45	A
Avalanche energy	$E_{AR}$ <sup>Note 2</sup>	16	mJ
Channel dissipation	$P_{ch}$ <sup>Note3</sup>	60	W
Channel to Case Thermal Resistance	$\theta_{ch-C}$	2.08	$^\circ\text{C/W}$
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  $L=10\ \mu\text{H}$ ,  $T_{ch} = 25^\circ\text{C}$ ,  $R_g \geq 50\ \Omega$   
 3.  $T_c = 25^\circ\text{C}$

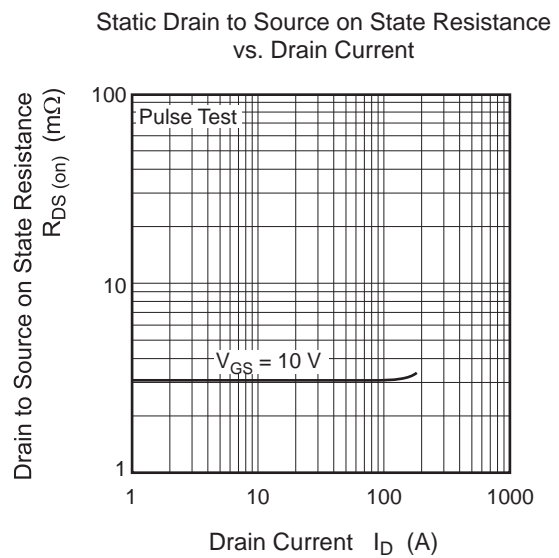
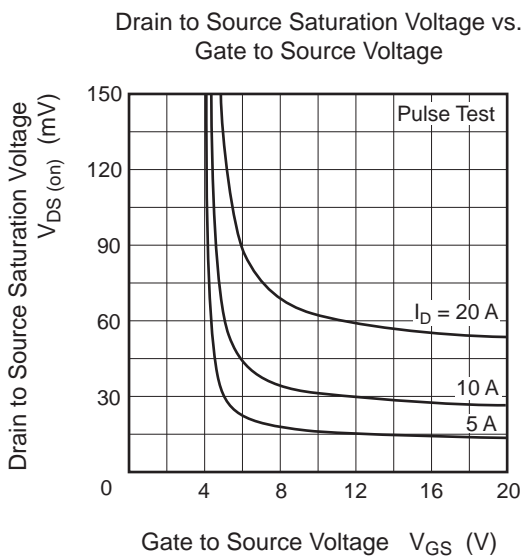
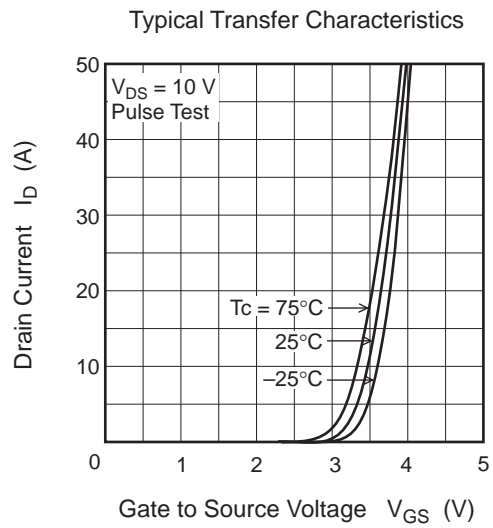
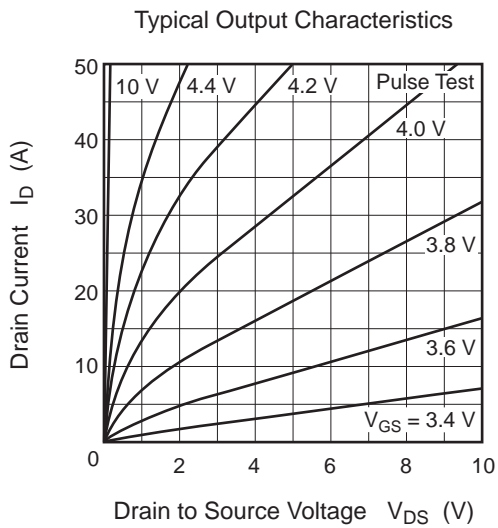
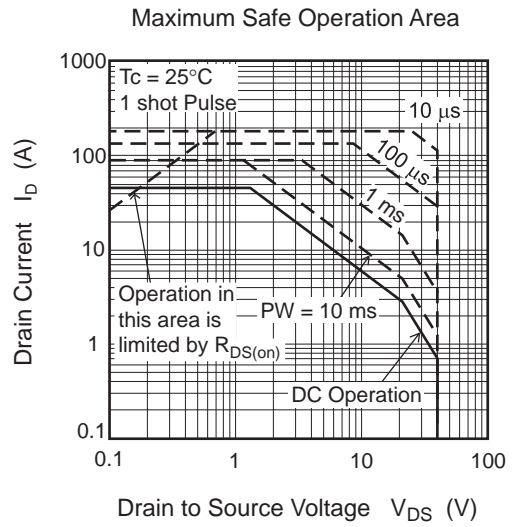
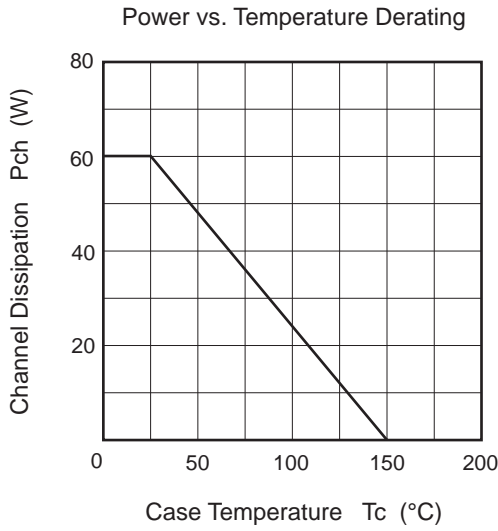
## Electrical Characteristics

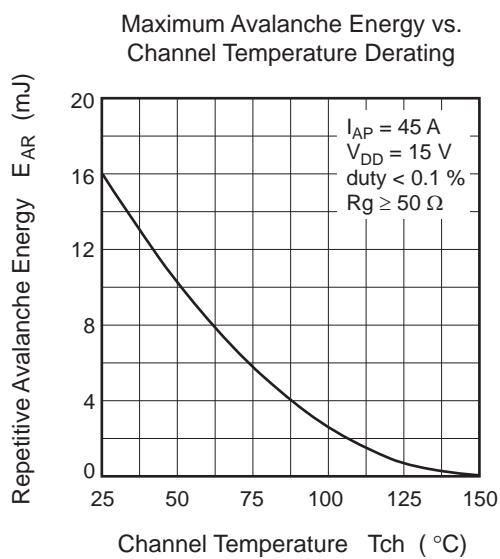
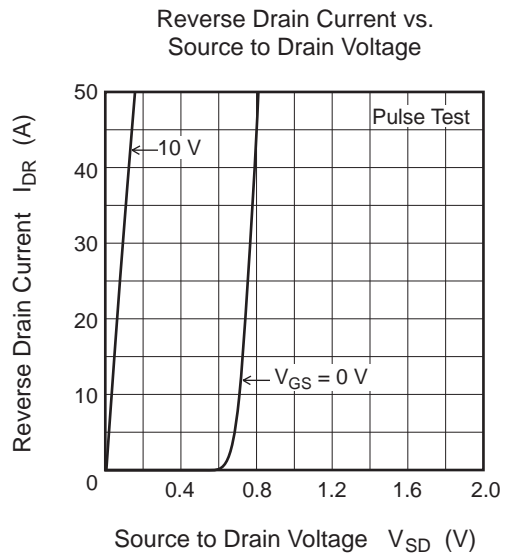
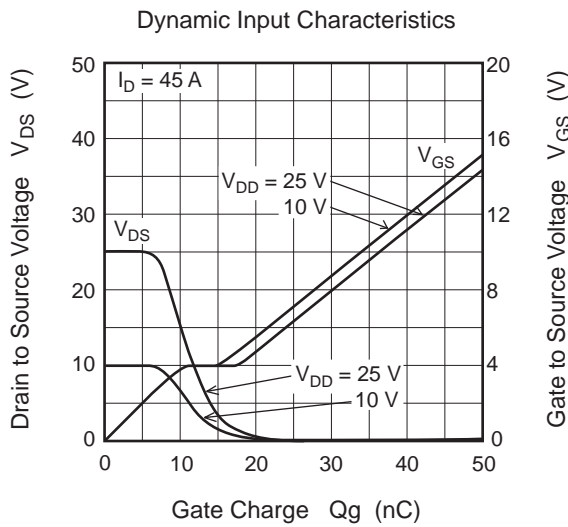
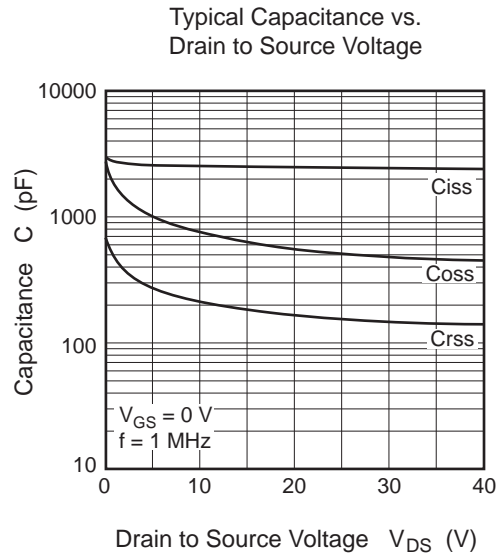
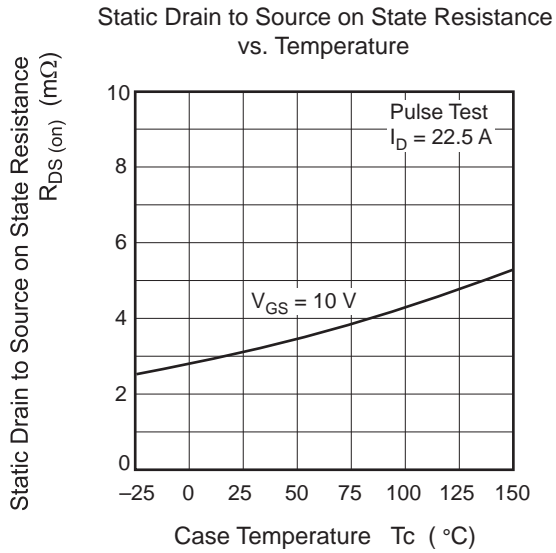
(Ta = 25°C)

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	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0 \text{ V}$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 40 \text{ V}$ , $V_{GS} = 0 \text{ V}$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	4.0	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	3.1	3.8	$\text{m}\Omega$	$I_D = 22.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	—	52	—	S	$I_D = 22.5 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	2550	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	760	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	210	—	pF	
Gate Resistance	$R_g$	—	0.5	—	$\Omega$	$V_{DD} = 10 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 45 \text{ A}$
Total gate charge	$Q_g$	—	34	—	nC	
Gate to source charge	$Q_{gs}$	—	11	—	nC	
Gate to drain charge	$Q_{gd}$	—	4.5	—	nC	$V_{GS} = 10 \text{ V}$ , $I_D = 22.5 \text{ A}$ , $V_{DD} \cong 10 \text{ V}$ , $R_L = 0.4 \Omega$ , $R_g = 4.7 \Omega$
Turn-on delay time	$t_{d(on)}$	—	12	—	ns	
Rise time	$t_r$	—	6.0	—	ns	
Turn-off delay time	$t_{d(off)}$	—	32	—	ns	
Fall time	$t_f$	—	7.2	—	ns	$I_F = 45 \text{ A}$ , $V_{GS} = 0 \text{ V}$ <sup>Note4</sup>
Body-drain diode forward voltage	$V_{DF}$	—	0.8	1.1	V	
Body-drain diode reverse recovery time	$t_{rr}$	—	39	—	ns	$I_F = 45 \text{ A}$ , $V_{GS} = 0 \text{ V}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

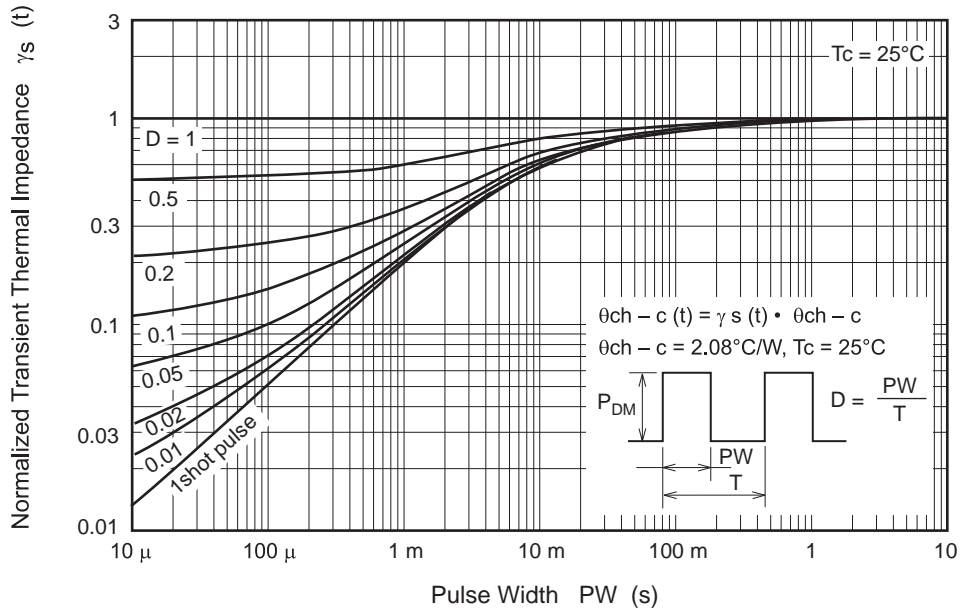
Notes: 4. Pulse test

### Main Characteristics

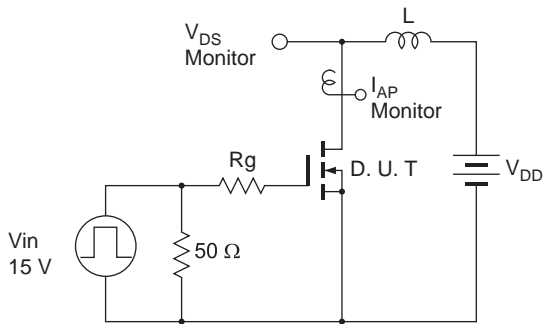




Normalized Transient Thermal Impedance vs. Pulse Width

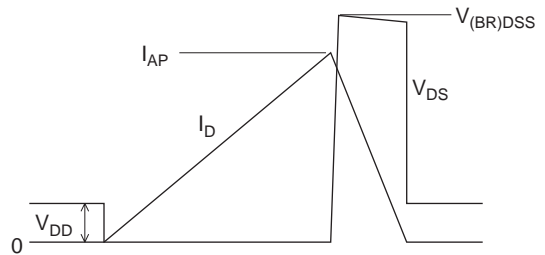


Avalanche Test Circuit

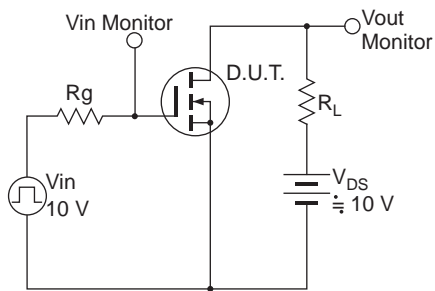


Avalanche Waveform

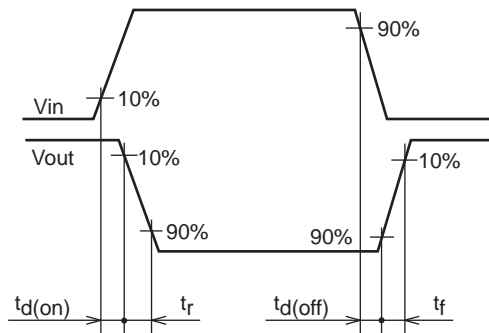
$$E_{AR} = \frac{1}{2} L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



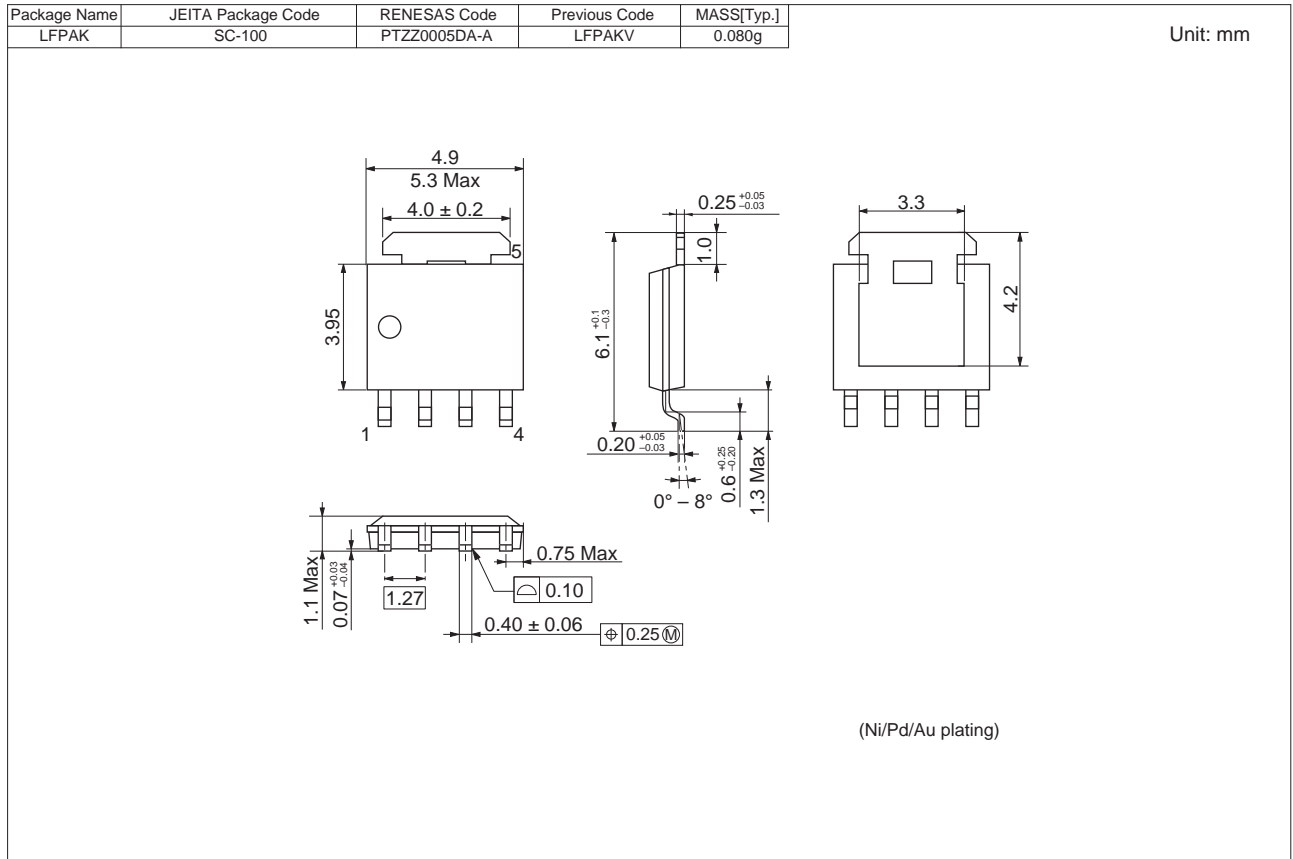
Switching Time Test Circuit



Switching Time Waveform



### Package Dimensions



### Ordering Information

Part No.	Quantity	Shipping Container
RJK0455DPB-00-J5	2500 pcs	Taping



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