

RJK0631JPE

Silicon N Channel Power MOS FET
High Speed Power Switching

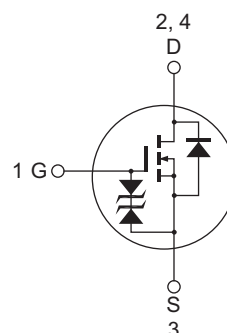
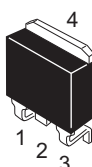
R07DS0341EJ0300
Rev.3.00
Jul 24, 2013

Features

- For Automotive application
- AEC-Q101 compliant
- Low on-resistance : $R_{DS(on)} = 12 \text{ m}\Omega$ typ.
- Capable of 4.5 V gate drive
- Low input capacitance: $C_{iss} = 1350 \text{ pF}$ typ

Outline

RENESAS Package code: PRSS0004AE-B
(Package name: LDBAK (S)-(1))



1. Gate
2. Drain
3. Source
4. Drain

Absolute Maximum Ratings

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

Item	Symbol	Value	Unit
Drain to source voltage	V_{DSS}	60	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	30	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	120	A
Body-drain diode reverse drain current	I_{DR}	30	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	120	A
Avalanche current	I_{AP} ^{Note2}	18	A
Avalanche energy	E_{AR} ^{Note2}	27.8	mJ
Channel dissipation	P_{ch} ^{Note3}	60	W
Channel temperature	T_{ch} ^{Note4}	175	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

- Notes: 1. $PW \leq 10\mu\text{s}$ duty cycle $\leq 1\%$
 2. $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$
 3. $T_c = 25^\circ\text{C}$
 4. AEC-Q101 compliant

Thermal Impedance Characteristics

- Channel to case thermal impedance θ_{ch-c} : 2.5°C/W

Electrical Characteristics

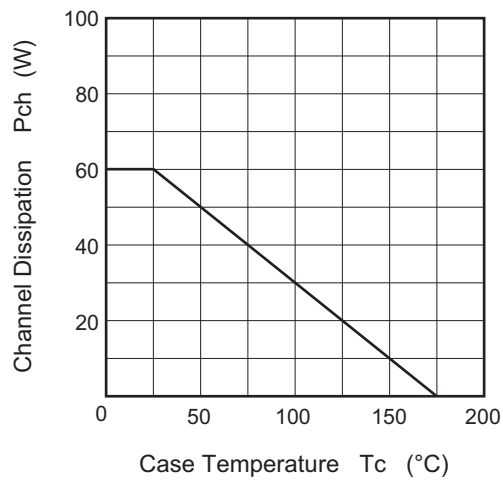
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 20V, V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 60V, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	V	$I_D = 1mA, V_{DS} = 10V$
Static drain to source on state resistance	$R_{DS(on)}$	—	12	15	mΩ	$I_D = 15A, V_{GS} = 10V$ ^{Note5}
		—	15	20	mΩ	$I_D = 15A, V_{GS} = 4.5V$ ^{Note5}
Input capacitance	C_{iss}	—	1350	—	pF	$V_{DS} = 10V, V_{GS} = 0,$ $f = 1MHz$
Output capacitance	C_{oss}	—	360	—	pF	
Reverse transfer capacitance	C_{rss}	—	270	—	pF	
Total gate charge	Q_g	—	32	—	nC	$V_{DD} = 25V, V_{GS} = 10V,$ $I_D = 30A$
Gate to source charge	Q_{gs}	—	3.6	—	nC	
Gate to drain charge	Q_{gd}	—	10	—	nC	
Turn-on delay time	$t_{d(on)}$	—	13	—	ns	$I_D = 15A, R_L = 2\Omega,$ $V_{GS} = 10V, R_G = 4.7\Omega$
Rise time	t_r	—	15	—	ns	
Turn-off delay time	$t_{d(off)}$	—	60	—	ns	
Fall time	t_f	—	15	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.94	1.22	V	$I_F = 30A, V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	40	—	ns	$I_F = 30A, V_{GS} = 0$ $di_F/dt = 100A/\mu s$

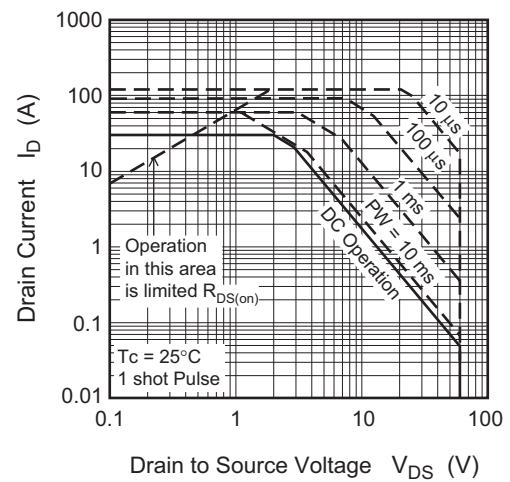
Note: 5. Pulse test

Main Characteristics

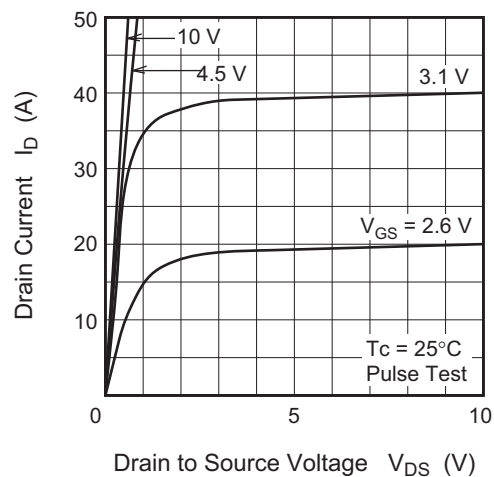
Power vs. Temperature Derating



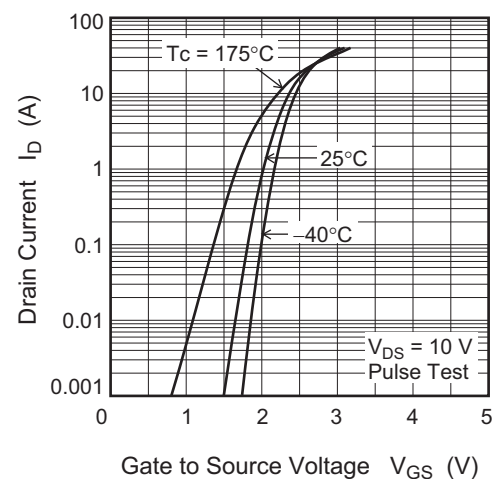
Maximum Safe Operation Area



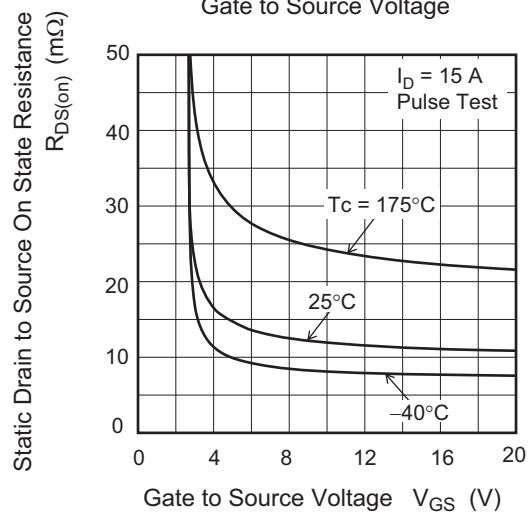
Typical Output Characteristics



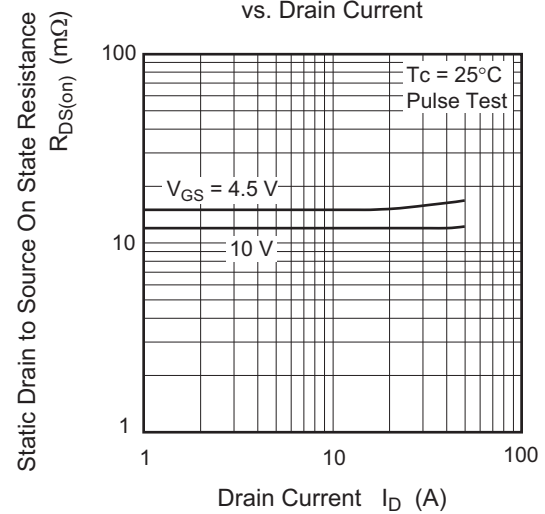
Typical Transfer Characteristics

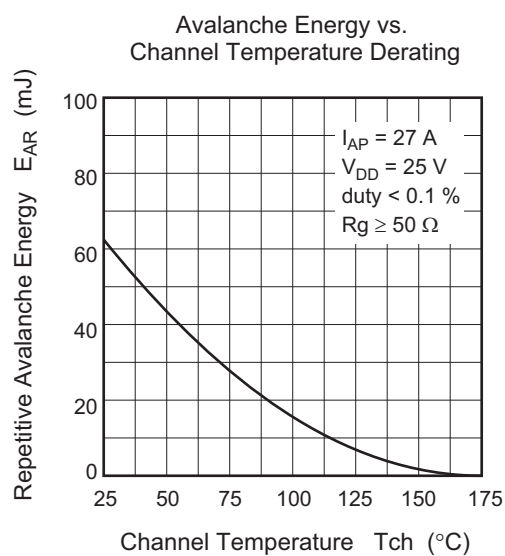
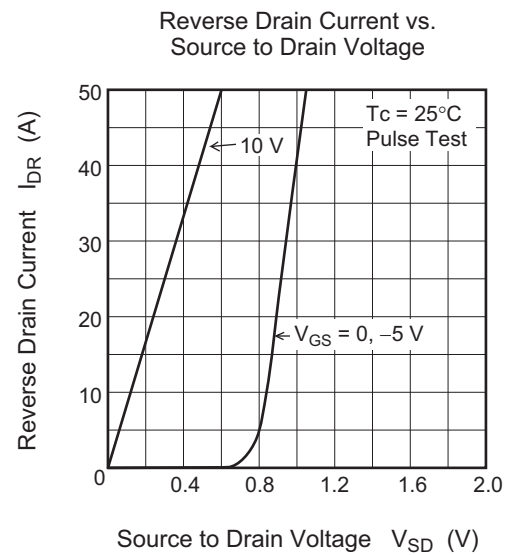
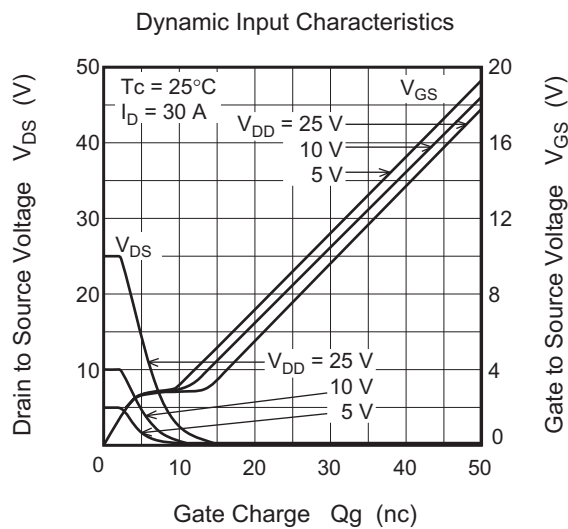
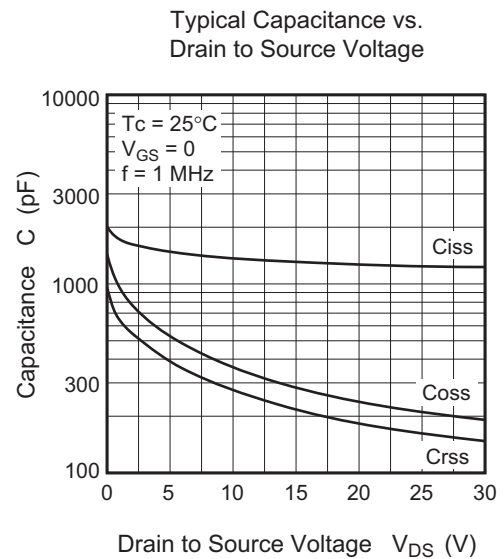
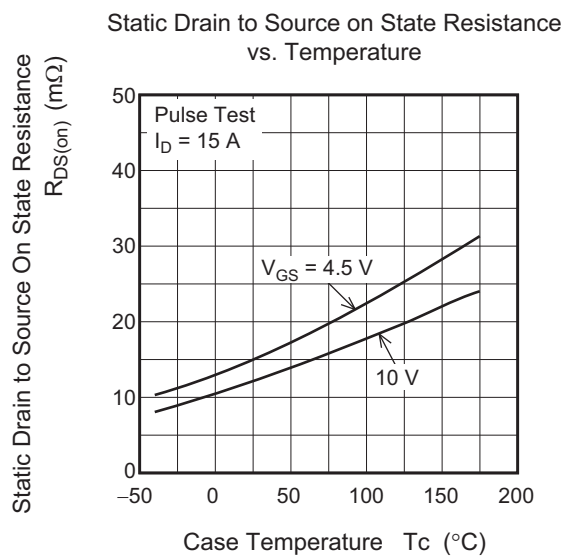


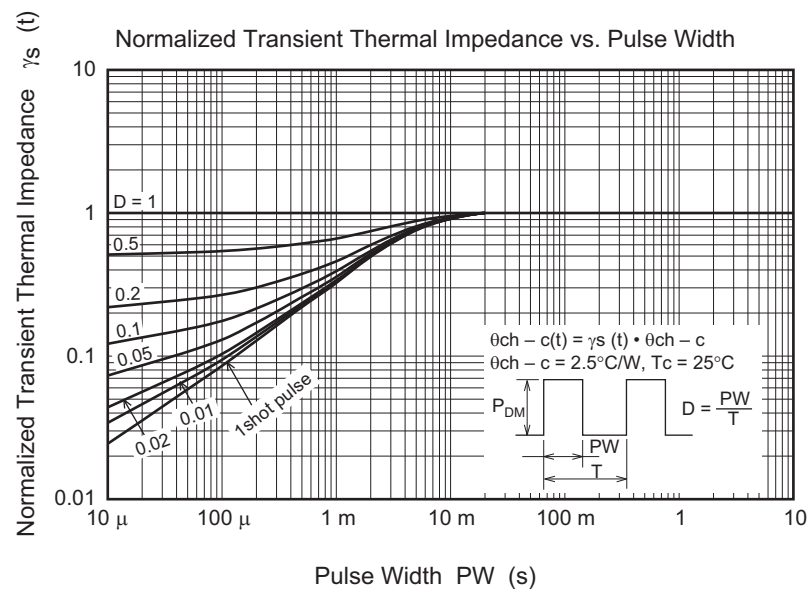
Drain Source Saturation Voltage vs. Gate to Source Voltage



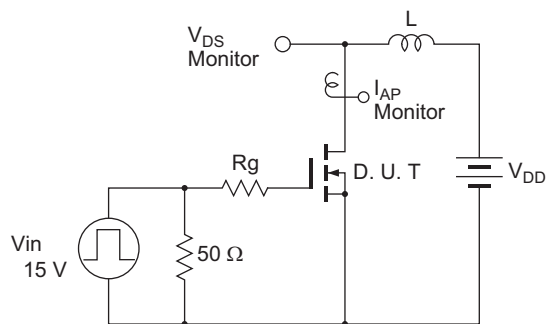
Static Drain to Source State Resistance vs. Drain Current





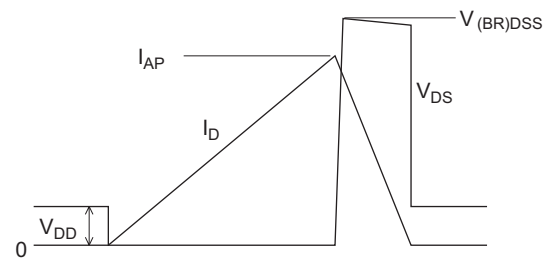


Avalanche Test Circuit

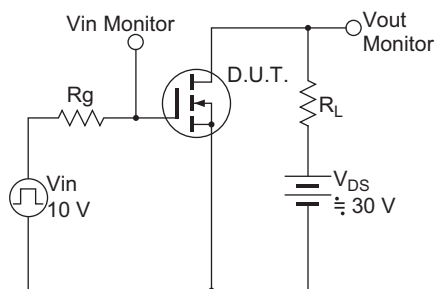


Avalanche Waveform

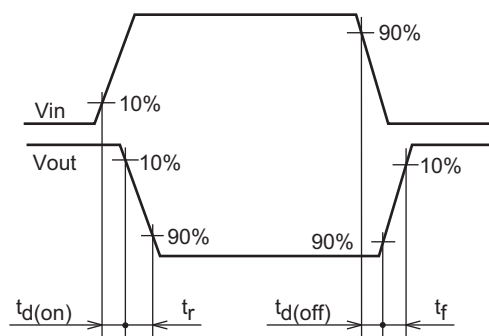
$$E_{AR} = \frac{1}{2} L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit



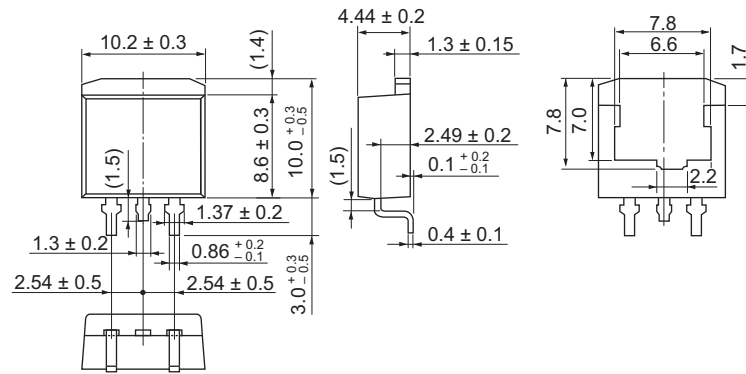
Switching Time Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
LDBAK(S)-(1)	SC-83	PRSS0004AE-B	LDBAK(S)-(1) / LDBAK(S)-(1)V	1.30g

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK0631JPE-00-J3	1000 pcs	Taping (Left-winded)

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

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