

RJK0406JPE

Silicon N Channel MOS FET
High Speed Power Switching

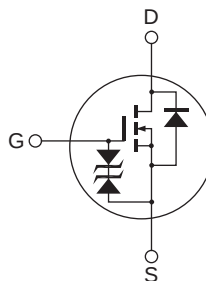
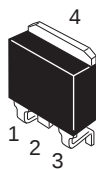
R07DS0335EJ0200
Rev.2.00
Dec 19, 2011

Features

- For Automotive application
- AEC-Q101 compliant
- Low on-resistance : $R_{DS(on)} = 1.65 \text{ m}\Omega$ typ.
- High current devices : $I_D = 160 \text{ A}$
- Low input capacitance : $C_{iss} = 6300 \text{ pF}$ typ

Outline

RENESAS Package code: PRSS0004AE-B
(Package name: LDPAK(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}	40	V
Gate to source voltage	V_{GSS}	+20 / -5	V
Drain current	I_D ^{Note3}	160	A
Drain peak current	I_D (pulse) ^{Note1}	640	A
Body-drain diode reverse drain current	I_{DR} ^{Note3}	160	A
Body-drain diode reverse drain peak current	I_{DR} (pulse) ^{Note1}	640	A
Avalanche current	I_{AP} ^{Note2}	70	A
Avalanche energy	E_{AR} ^{Note2}	653	mJ
Channel dissipation	P_{ch} ^{Note3}	192	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} : 0.781°C/W

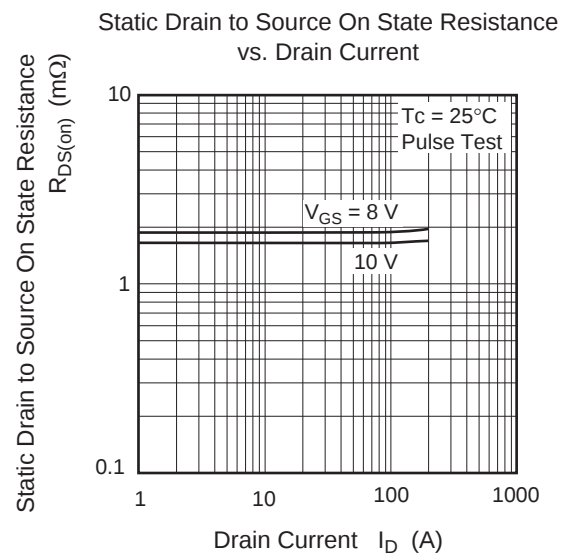
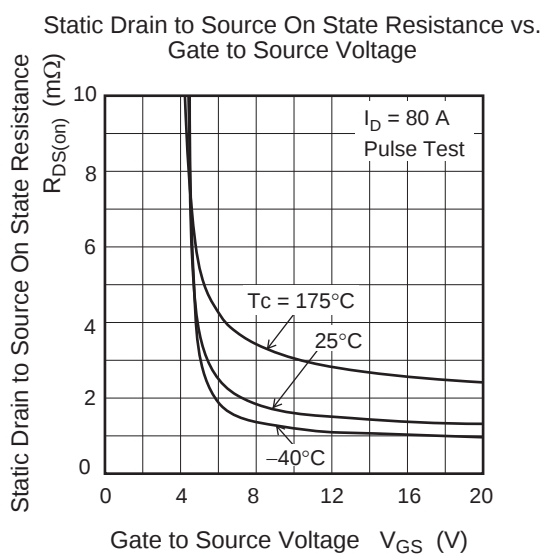
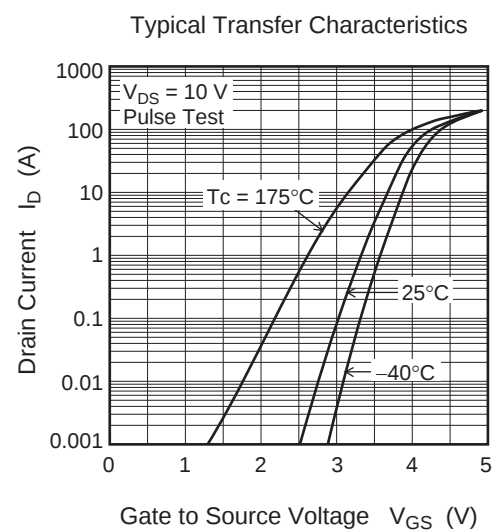
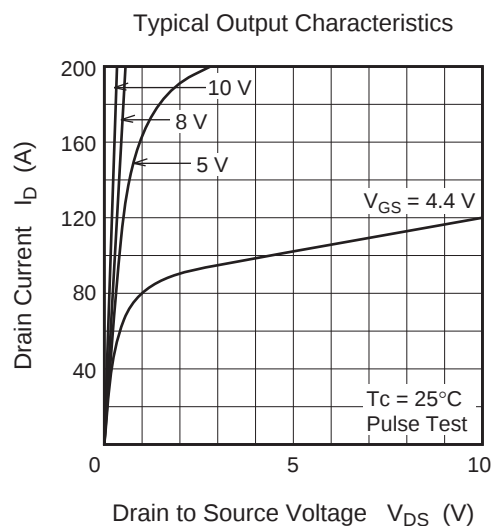
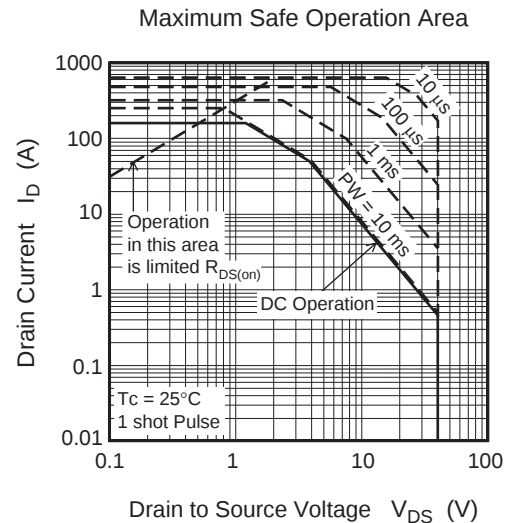
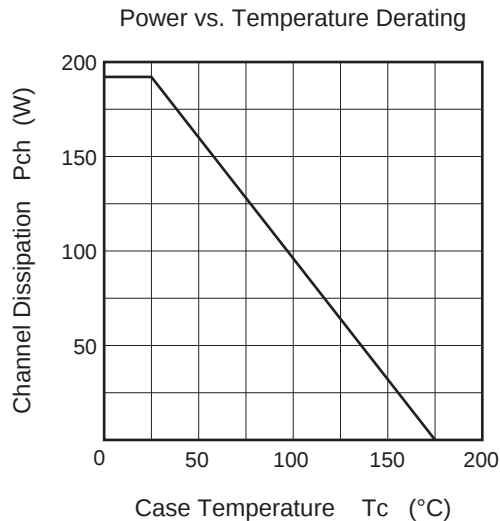
Electrical Characteristics

(Ta = 25°C)

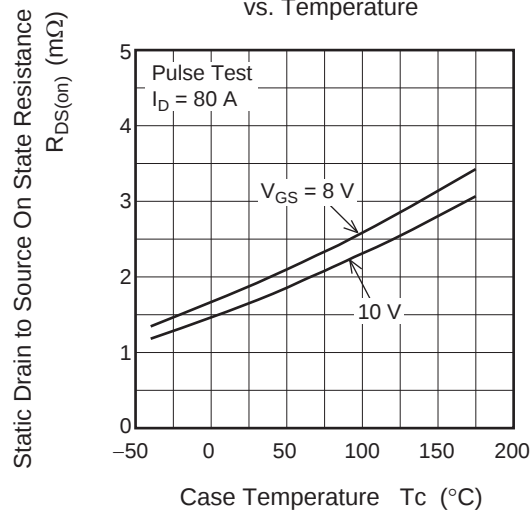
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = +20/-5\text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 40\text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	3.5	V	$I_D = 1\text{ mA}$, $V_{DS} = 10\text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	1.65	2.0	mΩ	$I_D = 80\text{ A}$, $V_{GS} = 10\text{ V}$ ^{Note5}
Input capacitance	C_{iss}	—	6300	—	pF	$V_{DS} = 10\text{ V}$, $V_{GS} = 0$ $f = 1\text{ MHz}$
Output capacitance	C_{oss}	—	2200	—	pF	
Reverse transfer capacitance	C_{rss}	—	1900	—	pF	
Total gate charge	Q_g	—	155	—	nC	$V_{DD} = 25\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 80\text{ A}$
Gate to source charge	Q_{gs}	—	20	—	nC	
Gate to drain charge	Q_{gd}	—	70	—	nC	
Turn-on delay time	$t_{d(on)}$	—	40	—	ns	$I_D = 80\text{ A}$, $R_L = 0.375\text{ Ω}$, $V_{GS} = 10\text{ V}$, $R_G = 4.7\text{ Ω}$
Rise time	t_r	—	80	—	ns	
Turn-off delay time	$t_{d(off)}$	—	110	—	ns	
Fall time	t_f	—	75	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.94	1.22	V	$I_F = 160\text{ A}$, $V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	60	—	ns	$I_F = 80\text{ A}$, $V_{GS} = 0$, $di_F/dt = 100\text{ A/μs}$

Note: 5. Pulse test

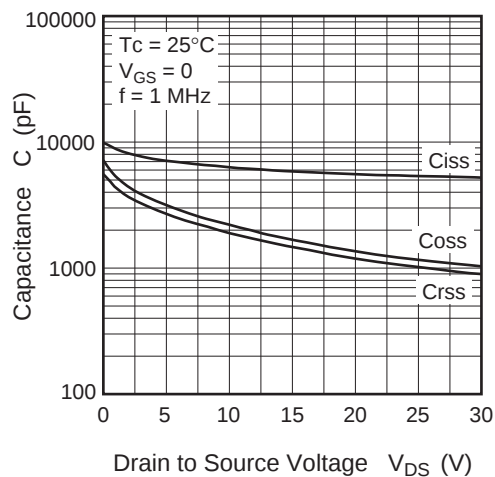
Main Characteristics



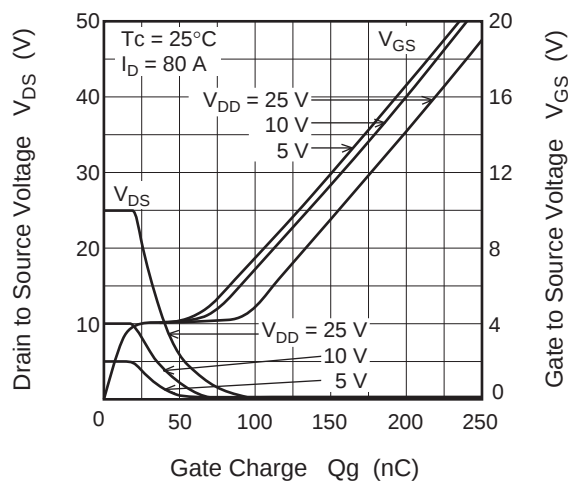
Static Drain to Source On State Resistance vs. Temperature



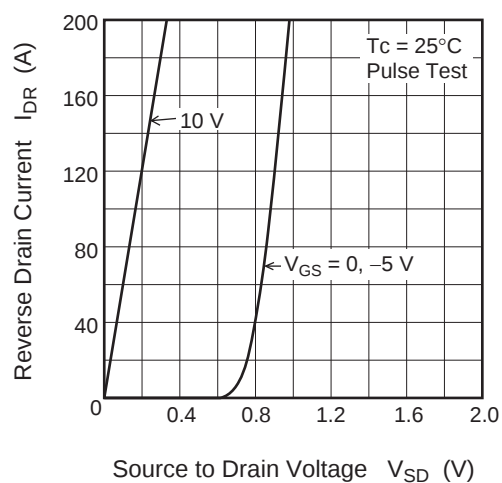
Typical Capacitance vs. Drain to Source Voltage



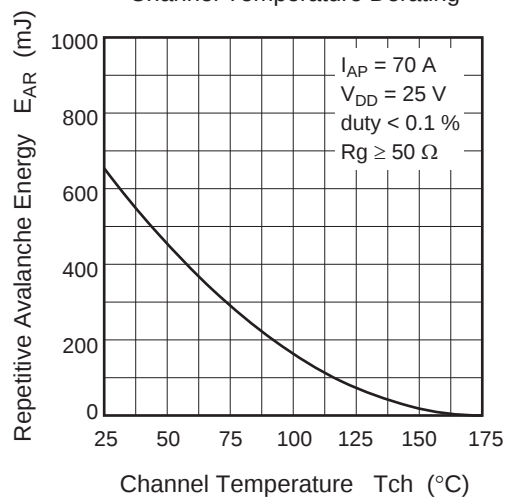
Dynamic Input Characteristics

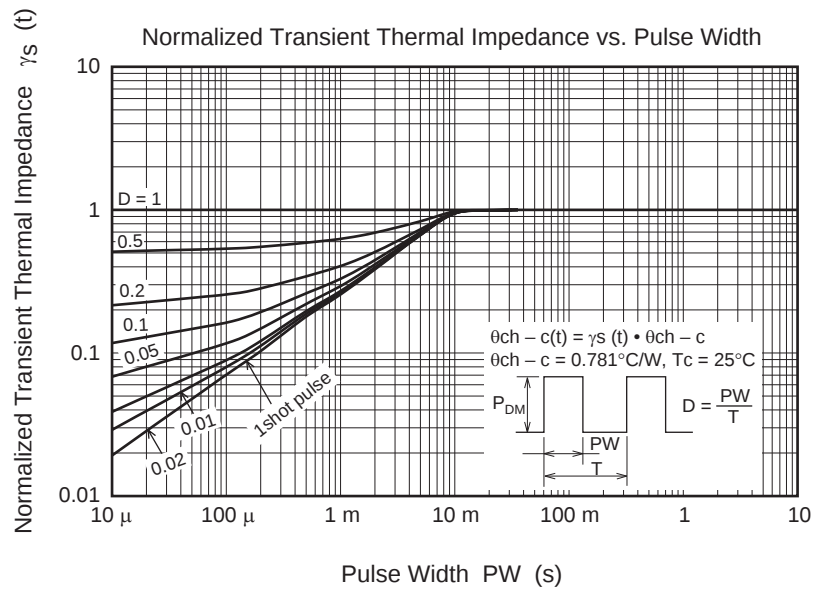


Reverse Drain Current vs. Source to Drain Voltage

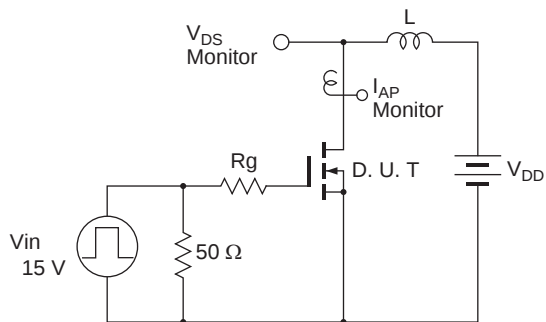


Avalanche Energy vs. Channel Temperature Derating

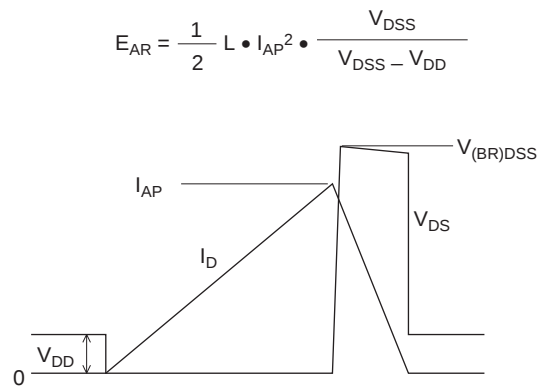




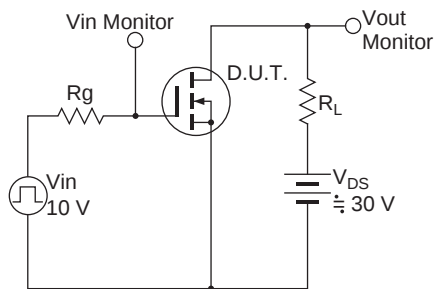
Avalanche Test Circuit



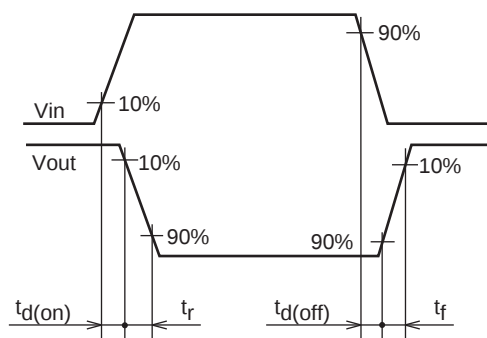
Avalanche Waveform



Switching Time Test Circuit



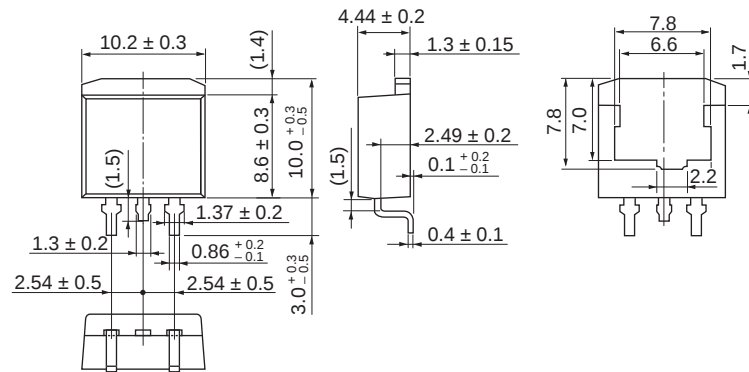
Switching Time Waveform



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
RJK0406JPE-00-J3	1000 pcs	Taping (Sinistrorse)

Note: The symbol of a "#" are occasionally presented as a "-".

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