

RJK60S5DPE

600V - 20A - SJ MOS FET
High Speed Power Switching

R07DS0639EJ0100
Rev.1.00
Apr 23, 2012

Features

- Superjunction MOSFET
- Low on-resistance
 $R_{DS(on)} = 0.150 \Omega$ typ. (at $I_D = 10 A$, $V_{GS} = 10 V$, $T_a = 25^\circ C$)
- High speed switching
 $t_f = 23 ns$ typ. (at $I_D = 10 A$, $V_{GS} = 10 V$, $R_L = 30 \Omega$, $R_g = 10 \Omega$, $T_a = 25^\circ C$)

Outline

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

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

Absolute Maximum Ratings

($T_a = 25^\circ C$)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	600	V
Gate to source voltage	V_{GSS}	+30, -20	V
Drain current	$T_c = 25^\circ C$	I_D ^{Note1}	20
	$T_c = 100^\circ C$	I_D ^{Note1}	12.6
Drain peak current	$I_{D(pulse)}$ ^{Note1}	40	A
Body-drain diode reverse drain current	I_{DR} ^{Note1}	20	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	40	A
Avalanche current	I_{AP} ^{Note3}	5	A
Avalanche energy	E_{AR} ^{Note3}	1.36	mJ
Channel dissipation	P_{ch} ^{Note2}	125	W
Channel to case thermal impedance	θ_{ch-c}	1.0	$^\circ C/W$
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature	T_{stg}	-55 to +150	$^\circ C$

- Notes: 1. Limited by T_{ch} max.
2. Value at $T_c = 25^\circ C$
3. $ST_{ch} = 25^\circ C$, $T_{ch} \leq 150^\circ C$

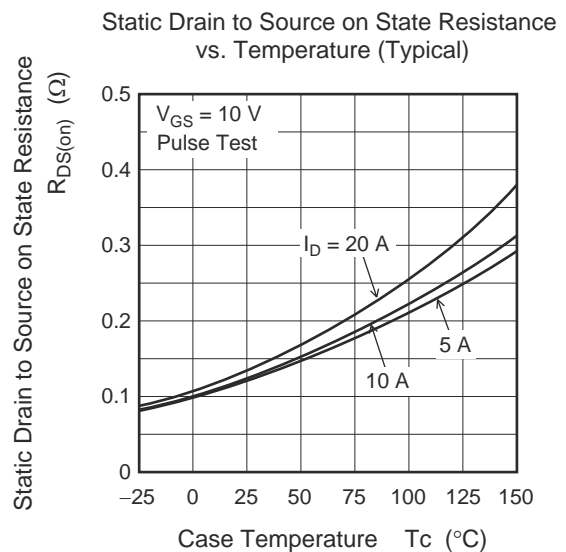
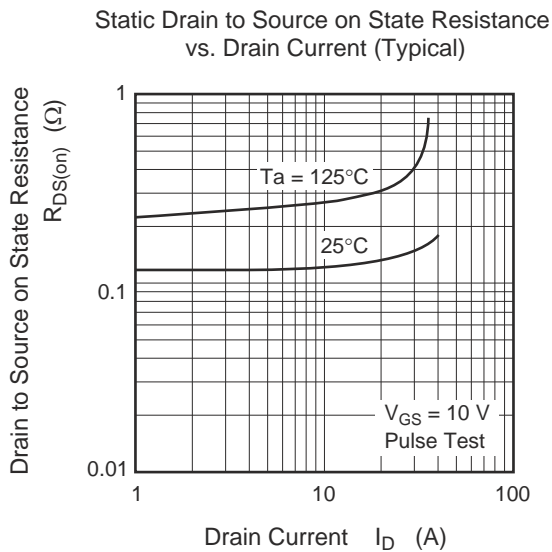
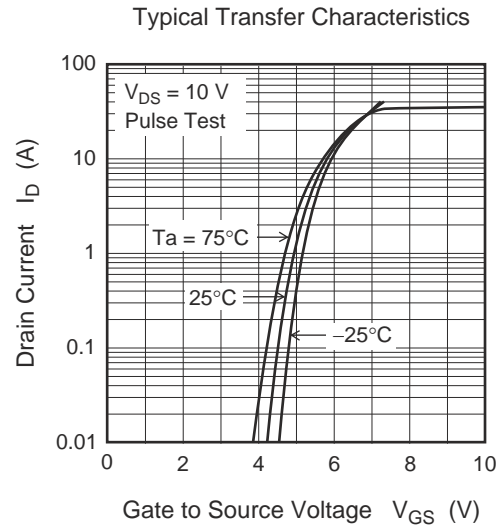
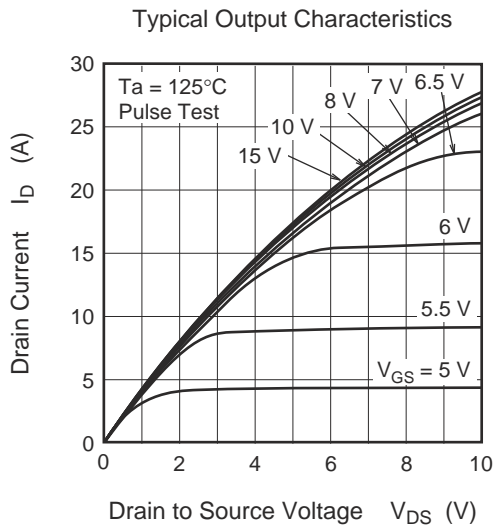
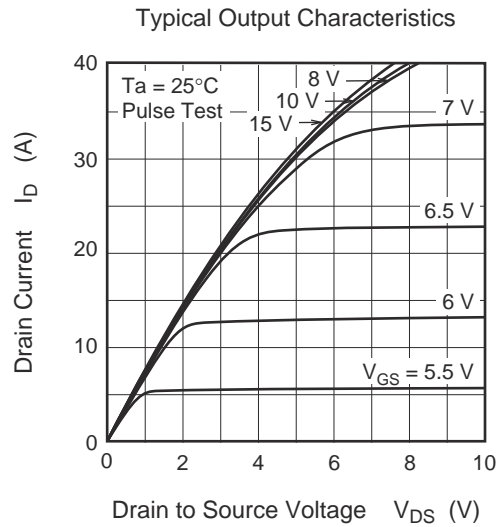
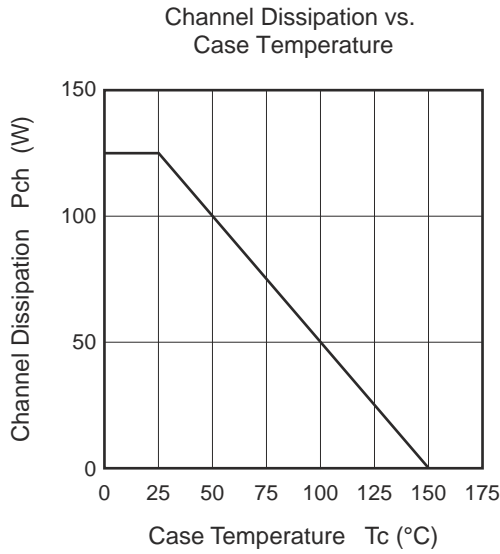
Electrical Characteristics

(Ta = 25°C)

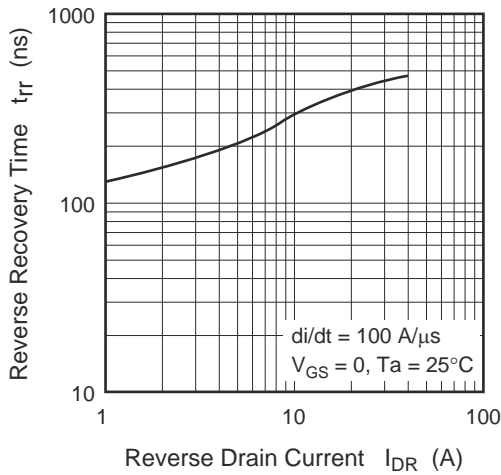
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	mA	$V_{DS} = 600 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = +30\text{V}$, -20 V , $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3	—	5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.150	0.178	Ω	$I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	0.375	—	Ω	Ta = 150°C $I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
Gate resistance	Rg	—	2.5	—	Ω	f = 1 MHz $V_{DS} = 25 \text{ V}$, $V_{GS} = 0$
Input capacitance	Ciss	—	1600	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ f = 100kHz
Output capacitance	Coss	—	2160	—	pF	
Reverse transfer capacitance	Crss	—	8.2	—	pF	
Turn-on delay time	$t_{d(on)}$	—	23	—	ns	$I_D = 10 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 30 \Omega$ Rg = 10 Ω ^{Note4}
Rise time	t_r	—	25	—	ns	
Turn-off delay time	$t_{d(off)}$	—	49	—	ns	
Fall time	t_f	—	23	—	ns	
Total gate charge	Qg	—	27	—	nC	$V_{DD} = 480 \text{ V}$
Gate to source charge	Qgs	—	10.5	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Qgd	—	8.5	—	nC	$I_D = 20 \text{ A}$ ^{Note4}
Body-drain diode forward voltage	V_{DF}	—	0.96	1.60	V	$I_F = 20 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	400	—	ns	$I_F = 20 \text{ A}$ $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{S}$ ^{Note4}
Body-drain diode reverse recovery current	I_{rr}	—	25	—	A	
Body-drain diode reverse recovery charge	Q _{rr}	—	5.6	—	μC	

Notes: 4. Pulse test

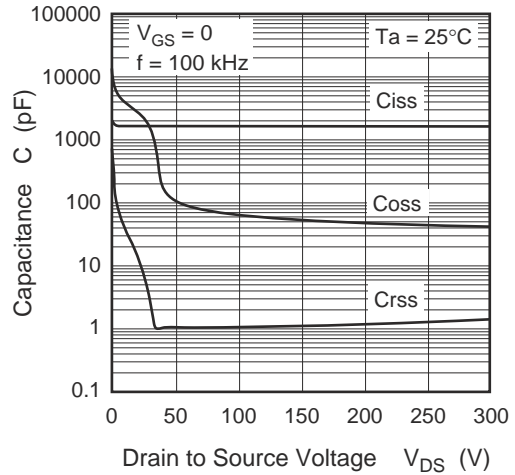
Main Characteristics



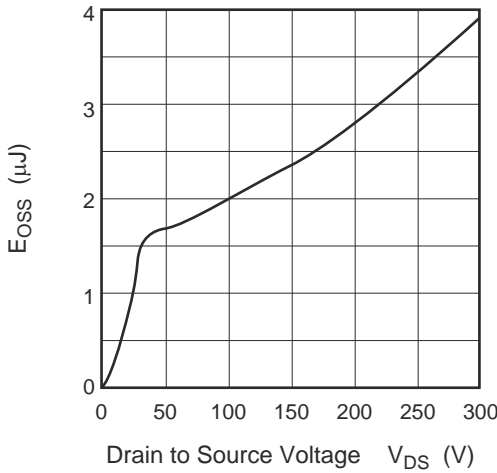
Body-Drain Diode Reverse Recovery Time (Typical)



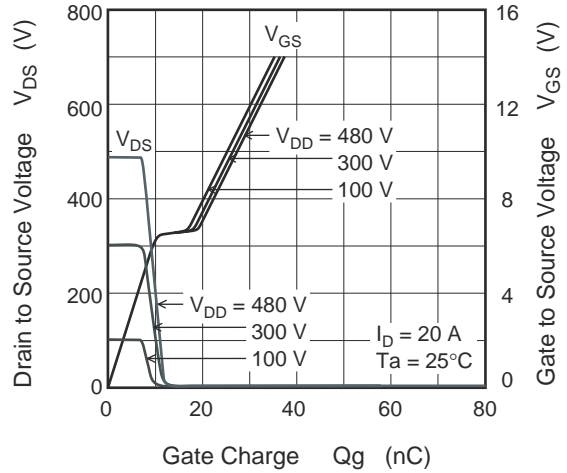
Typical Capacitance vs. Drain to Source Voltage



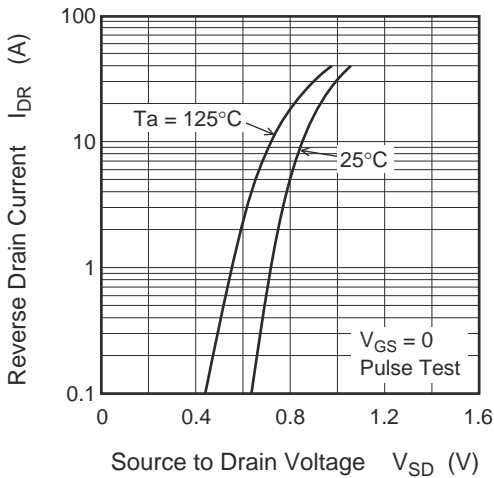
C_{OSS} Stored Energy (Typical)



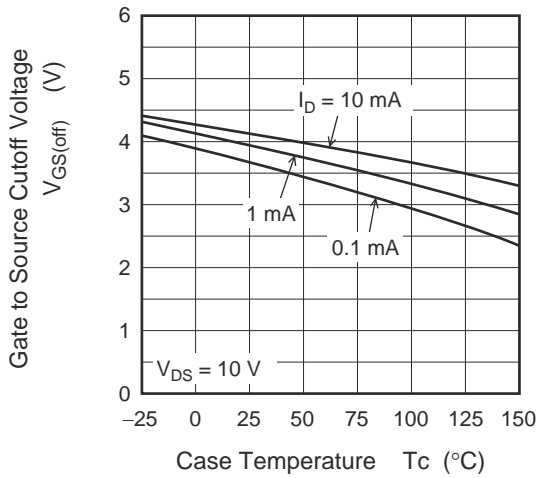
Dynamic Input Characteristics (Typical)



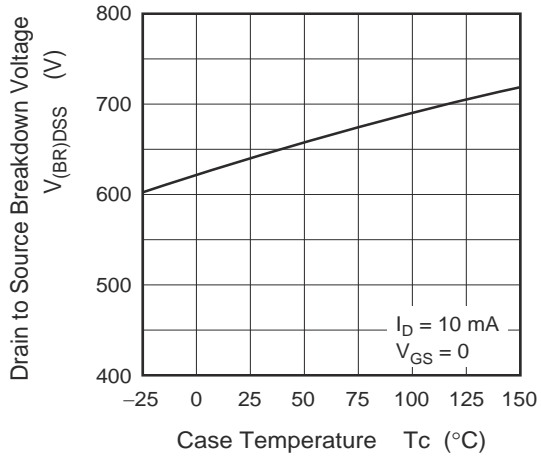
Reverse Drain Current vs. Source to Drain Voltage (Typical)



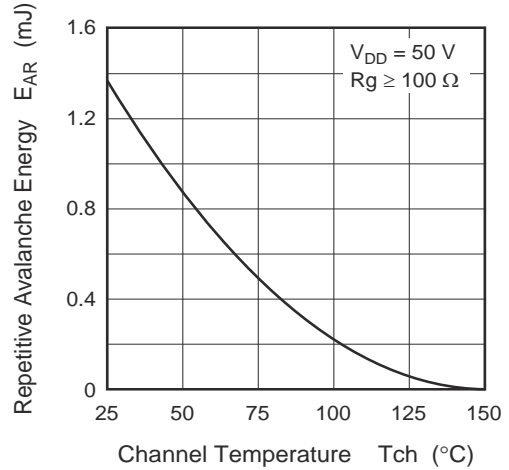
Gate to Source Cutoff Voltage vs. Case Temperature (Typical)



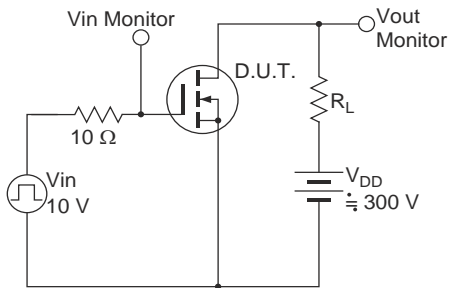
Drain to Source Breakdown Voltage vs. Case Temperature (Typical)



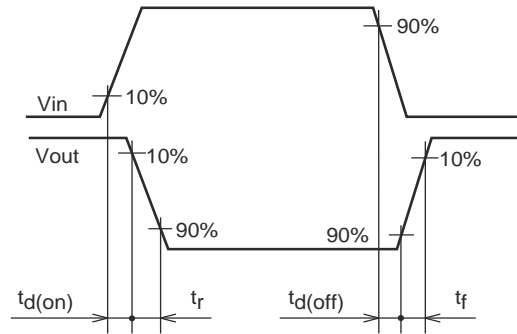
Maximum Avalanche Energy vs. Channel Temperature Derating



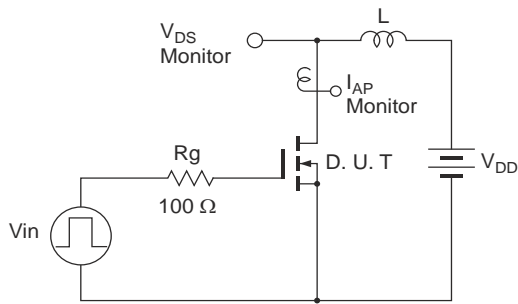
Switching Time Test Circuit



Waveform

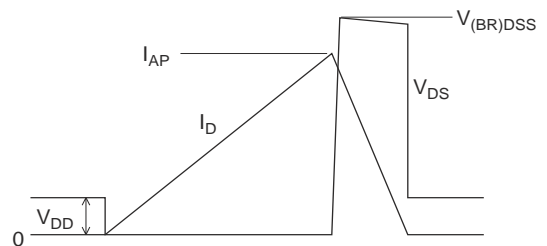


Avalanche Test Circuit

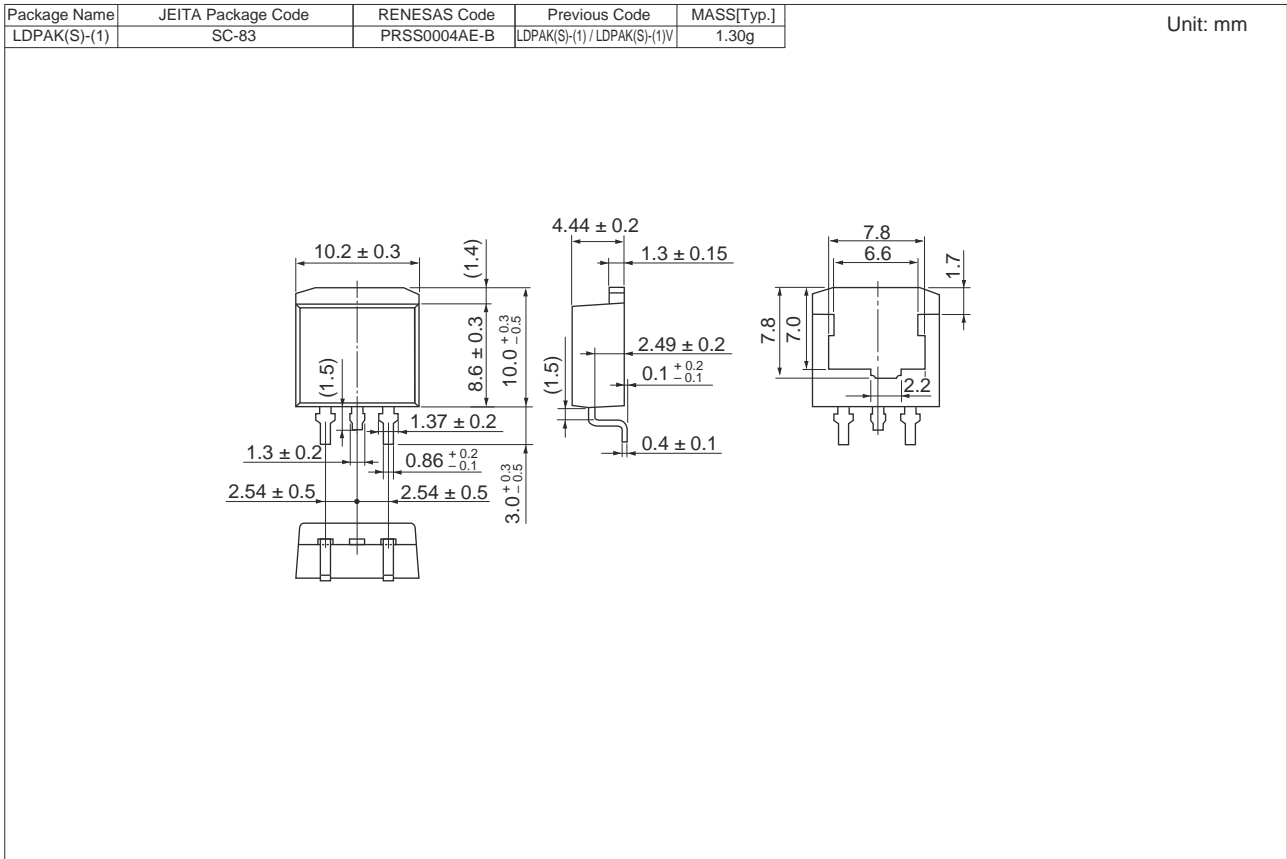


Avalanche Waveform

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



Package Dimension



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK60S5DPE-00#J3	1000 pcs	Taping

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