To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RQK0609CQDQS

Silicon N Channel MOS FET
Power Switching

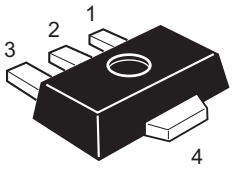
REJ03G1622-0100
Rev.1.00
Mar 03, 2008

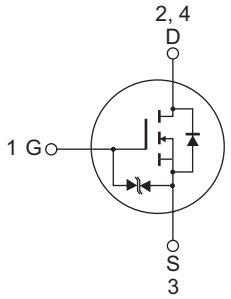
Features

- Low on-resistance
  $R_{DS(on)}$ = 78 mΩ typ.(at V_{GS} = 4.5 V, I_D = 2 A)
- Low drive current
- High speed switching
- V_{DSS} : 60 V and capable of 2.5 V gate drive

Outline

RENESAS package code: PLZZ0004CA-A
(Package name: UPAK®)





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

Note: Marking is “CQ“.

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	60	V
Gate to source voltage	V_{GSS}	±12	V
Drain current	I_D	4	A
Drain peak current	$I_{D(pulse)}$ Note1	12	A
Body - drain diode reverse drain current	I_{DR}	4	A
Channel dissipation	Pch Note2	1.5	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 µs, Duty cycle ≤ 1%
2. When using the glass epoxy board (FR-4 40 × 40 × 1 mm)

Electrical Characteristics

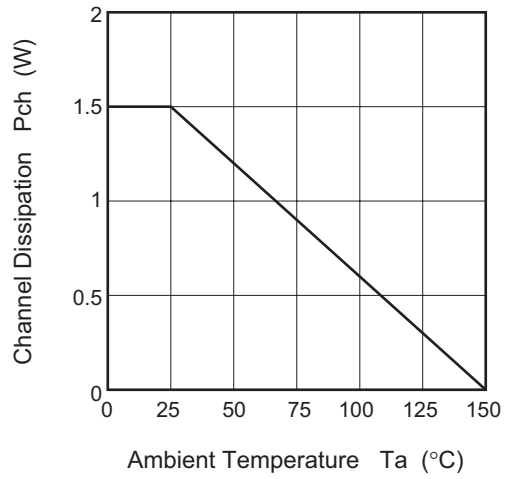
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	+12	—	—	V	I_G = +100 µA, V_{DS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	–12	—	—	V	I_G = –100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	+10	µA	V_{GS} = +10 V, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	–10	µA	V_{GS} = –10 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	µA	V_{DS} = 60 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	0.4	—	1.4	V	V_{DS} = 10 V, I_D = 1 mA
Drain to source on state resistance	$R_{DS(on)}$	—	78	100	mΩ	I_D = 2 A, V_{GS} = 4.5 V [Note3]
Drain to source on state resistance	$R_{DS(on)}$	—	90	125	mΩ	I_D = 2 A, V_{GS} = 2.5 V [Note3]
Forward transfer admittance	$\|y_{fs}\|$	7.5	12	—	S	I_D = 2 A, V_{DS} = 10 V [Note3]
Input capacitance	Ciss	—	470	—	pF	V_{DS} = 10 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	52	—	pF	
Reverse transfer capacitance	Crss	—	30	—	pF	
Turn - on delay time	$t_{d(on)}$	—	14	—	ns	I_D = 2 A V_{GS} = 4.5 V R_L = 5 Ω Rg = 4.7 Ω
Rise time	t_r	—	56	—	ns	
Turn - off delay time	$t_{d(off)}$	—	38	—	ns	
Fall time	t_f	—	5	—	ns	
Total gate charge	Qg	—	5	—	nC	V_{DD} = 10 V V_{GS} = 4.5 V I_D = 4 A
Gate to Source charge	Qgs	—	0.8	—	nC	
Gate to drain charge	Qgd	—	1	—	nC	
Body - drain diode forward voltage	V_{DF}	—	0.8	—	V	I_F = 4 A, V_{GS} = 0 [Note3]

Notes: 3. Pulse test

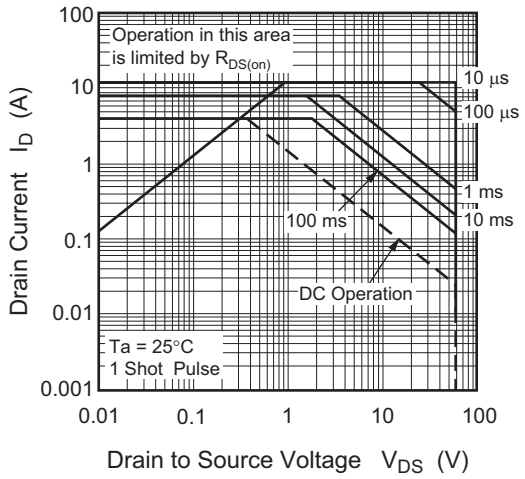
Main Characteristics

Maximum Channel Power Dissipation Curve

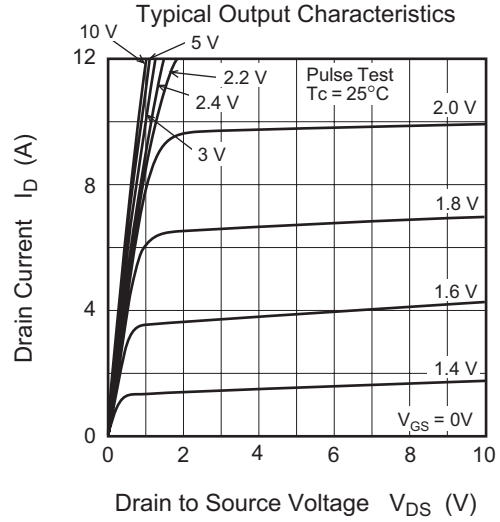


*When using the glass epoxy board (FR-4 40 x 40 x 1 mm)

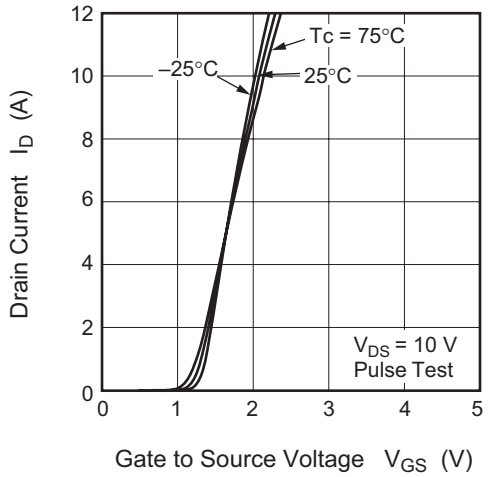
Maximum Safe Operation Area



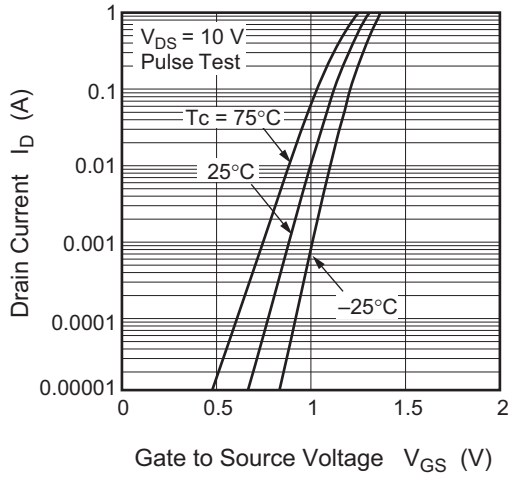
Typical Output Characteristics



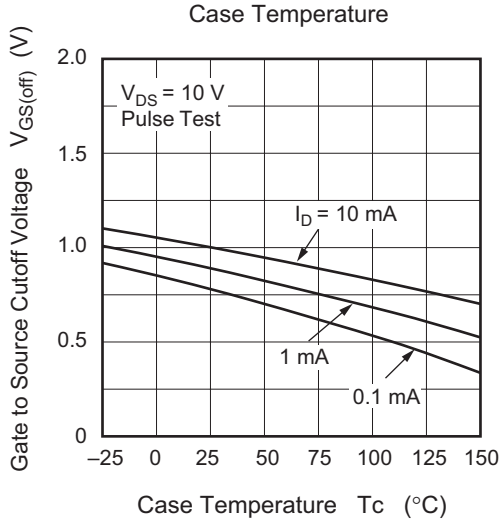
Typical Transfer Characteristics (1)



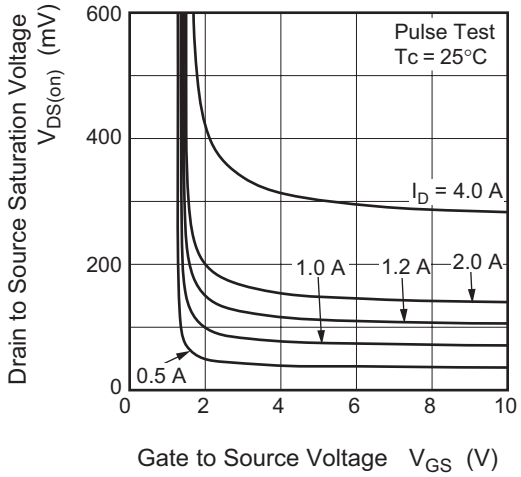
Typical Transfer Characteristics (2)



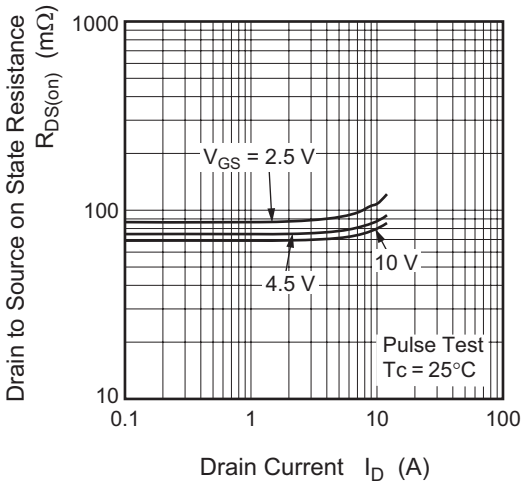
Gate to Source Cutoff Voltage vs. Case Temperature



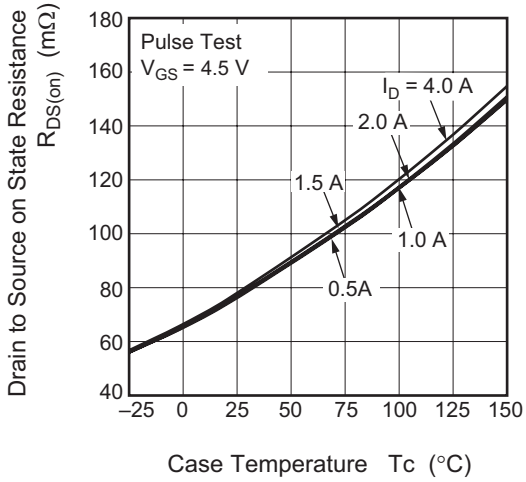
Drain to Source Saturation Voltage vs. Gate to Source Voltage



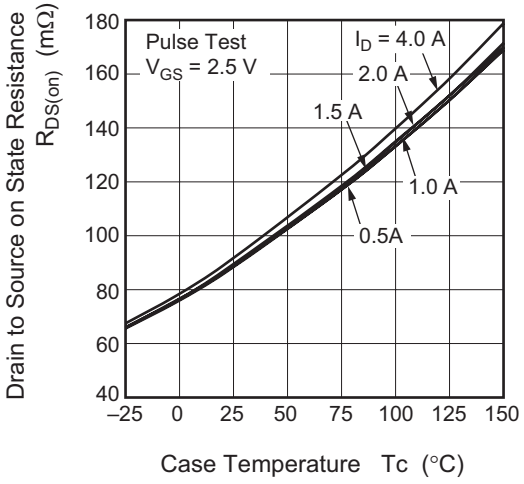
Static Drain to Source on State Resistance vs. Drain Current



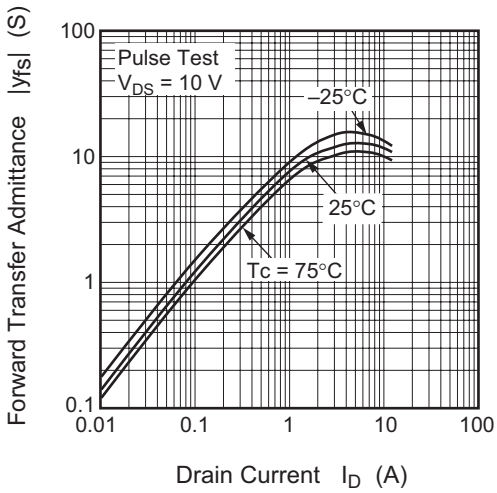
Static Drain to Source on State Resistance vs. Case Temperature (1)



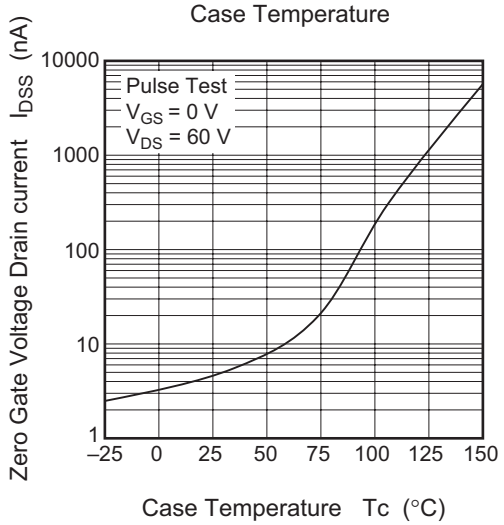
Static Drain to Source on State Resistance vs. Case Temperature (2)



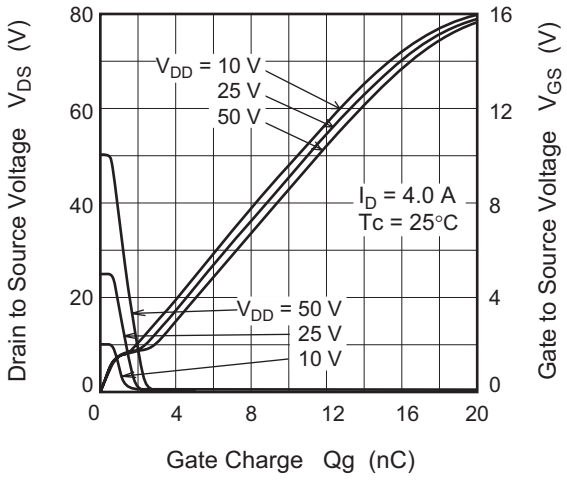
Forward Transfer Admittance vs. Drain Current



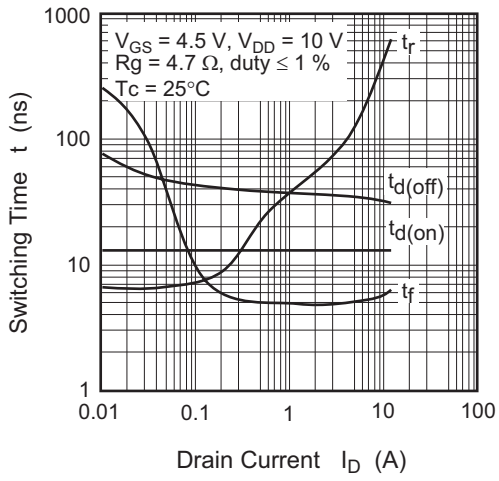
Zero Gate Voltage Drain current vs. Case Temperature



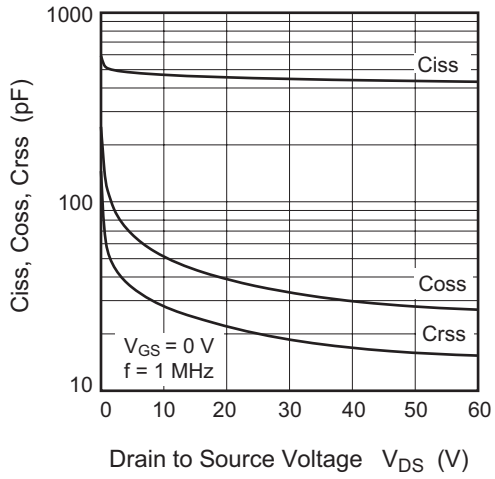
Dynamic Input Characteristics



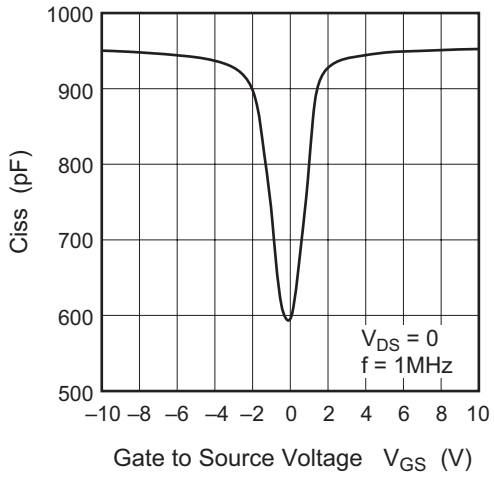
Switching Characteristics



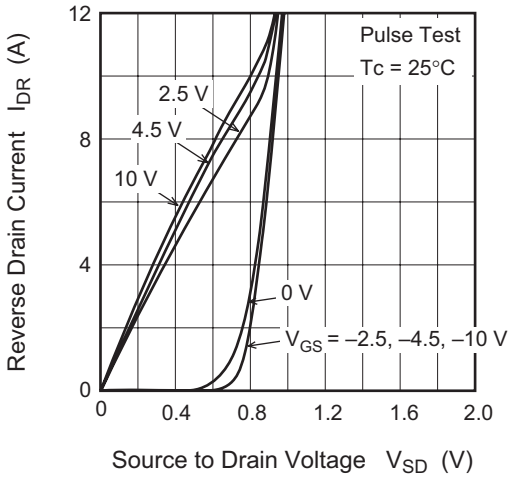
Typical Capacitance vs.
Drain to Source Voltage



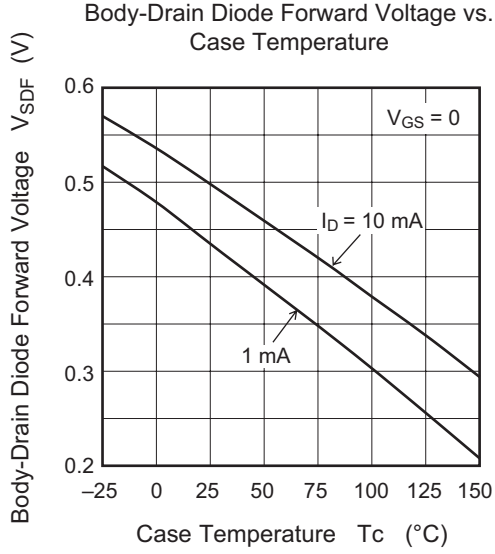
Input Capacitance vs.
Gate to Source Voltage



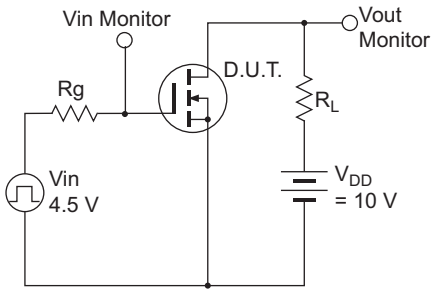
Reverse Drain Current vs.
Source to Drain Voltage



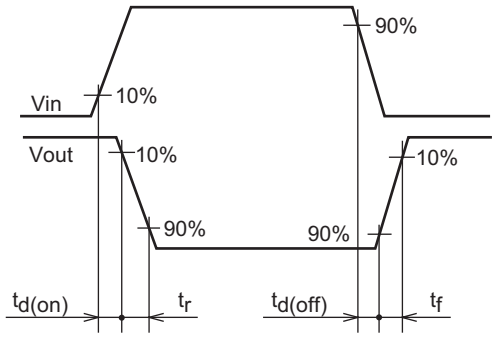
Body-Drain Diode Forward Voltage vs.
Case Temperature



Switching Time Test Circuit



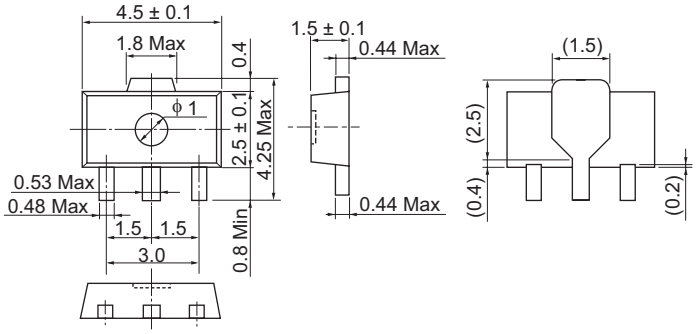
Switching Time Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
UPAK	SC-62	PLZZ0004CA-A	UPAK / UPAKV	0.050g

Unit: mm



Ordering Information

Part No.	Quantity	Shipping Container
RQK0609CQDQSTL-E	1000 pcs.	φ178 mm reel, 12 mm Emboss taping

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Colophon .7.2