RJK5020DPK

Silicon N Channel MOS FET
High Speed Power Switching

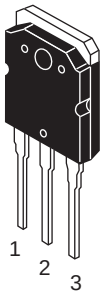
REJ03G1263-0300
Rev.3.00
Jun 30, 2010

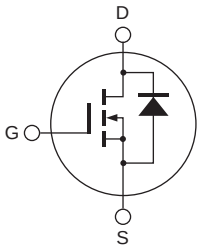
Features

- Low on-resistance
- Low leakage current
- High speed switching

Outline

RENESAS Package code: PRSS0004ZE-A
(Package name: TO-3P)





1. Gate
2. Drain (Flange)
3. Source

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	500	V
Gate to source voltage	V_{GSS}	±30	V
Drain current	I_D	40	A
Drain peak current	$I_{D\ (pulse)}$ Note1	120	A
Body-drain diode reverse drain current	I_{DR}	40	A
Body-drain diode reverse drain peak current	$I_{DR\ (pulse)}$ Note1	120	A
Avalanche current	I_{AP} Note3	12.5	A
Avalanche energy	E_{AR} Note3	8.6	mJ
Channel dissipation	Pch Note2	200	W
Channel to case thermal impedance	θch-c	0.625	°C/W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. STch = 25°C, Tch ≤ 150°C

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Electrical Characteristics

(Ta = 25°C)

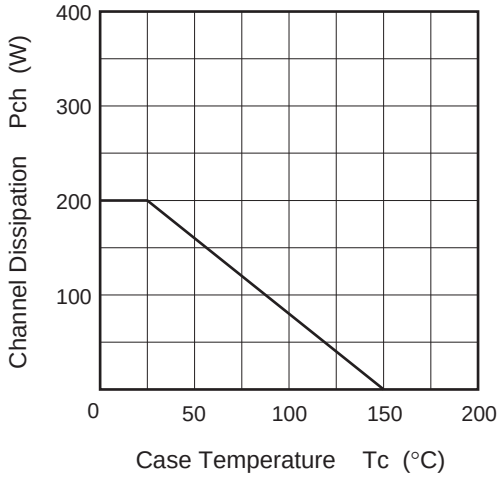
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	I_D = 10 mA, V_{GS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	V_{DS} = 500 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±0.1	μA	V_{GS} = ±30 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.5	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	0.102	0.118	Ω	I_D = 20 A, V_{GS} = 10 V Note4
Input capacitance	Ciss	—	5150	—	pF	V_{DS} = 25 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	525	—	pF	
Reverse transfer capacitance	Crss	—	55	—	pF	
Turn-on delay time	$t_{d(on)}$	—	52	—	ns	I_D = 20 A V_{GS} = 10 V R_L = 12.5 Ω Rg = 10 Ω
Rise time	t_r	—	115	—	ns	
Turn-off delay time	$t_{d(off)}$	—	180	—	ns	
Fall time	t_f	—	125	—	ns	
Total gate charge	Qg	—	126	—	nC	V_{DD} = 400 V V_{GS} = 10 V I_D = 40 A
Gate to source charge	Qgs	—	26	—	nC	
Gate to drain charge	Qgd	—	54	—	nC	
Body-drain diode forward voltage	V_{DF}	—	0.90	1.50	V	I_F = 40 A, V_{GS} = 0 Note4
Body-drain diode reverse recovery time	t_{rr}	—	450	—	ns	I_F = 40 A, V_{GS} = 0 di_F/dt = 100 A/μs

Notes: 4. Pulse test

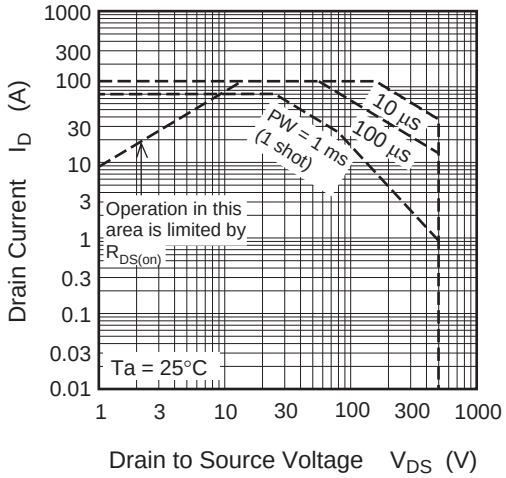
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Main Characteristics

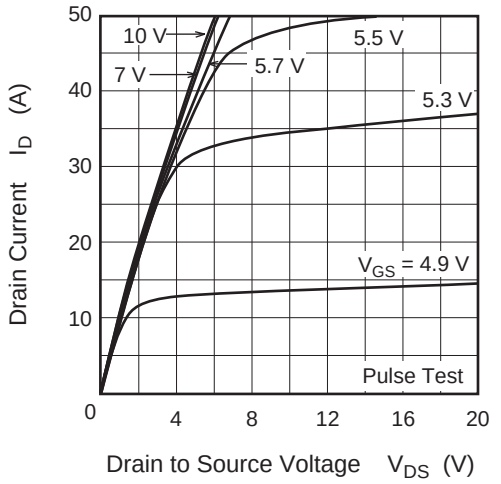
Power vs. Temperature Derating



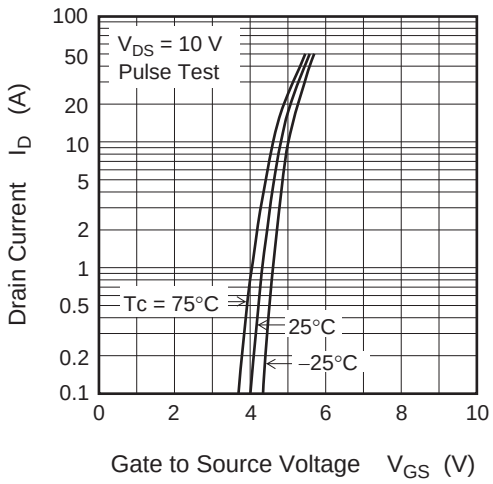
Maximum Safe Operation Area



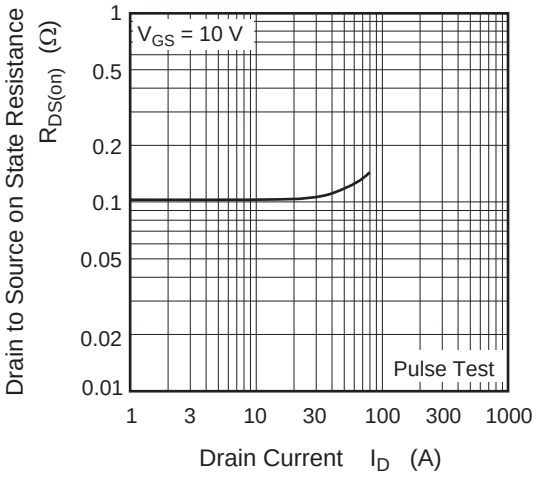
Typical Output Characteristics



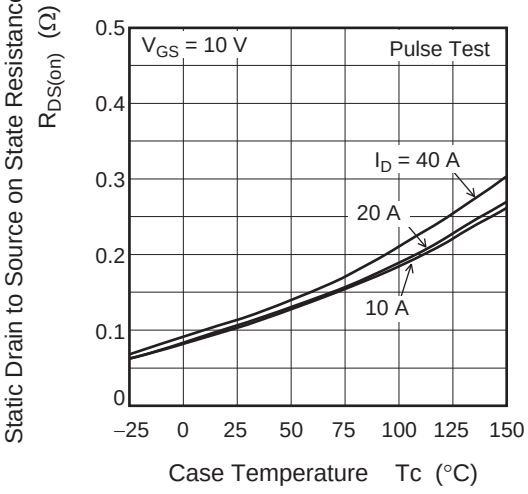
Typical Transfer Characteristics



Static Drain to Source on State Resistance vs. Drain Current

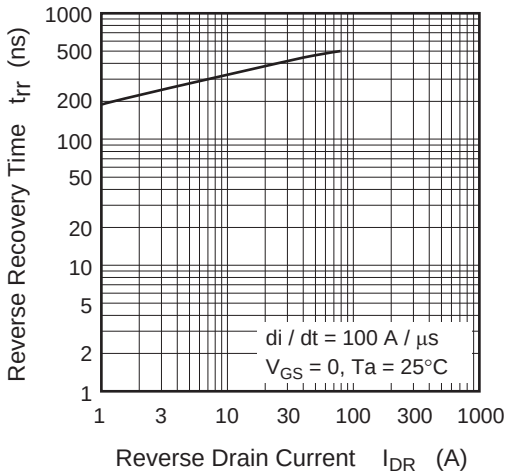


Static Drain to Source on State Resistance vs. Temperature

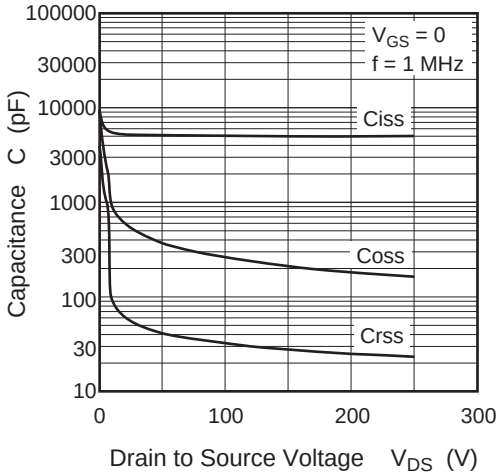


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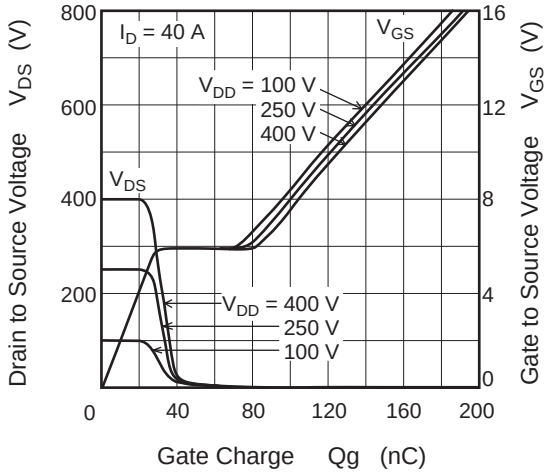
Body-Drain Diode Reverse Recovery Time



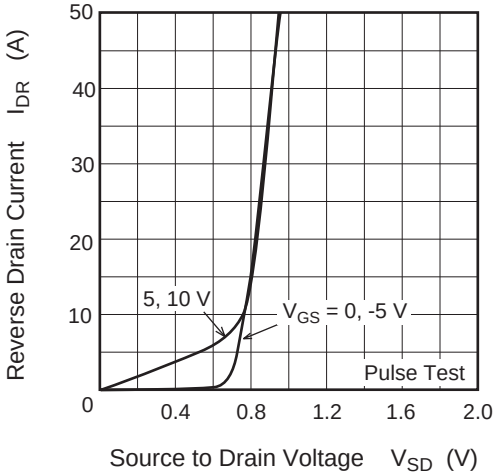
Typical Capacitance vs. Drain to Source Voltage



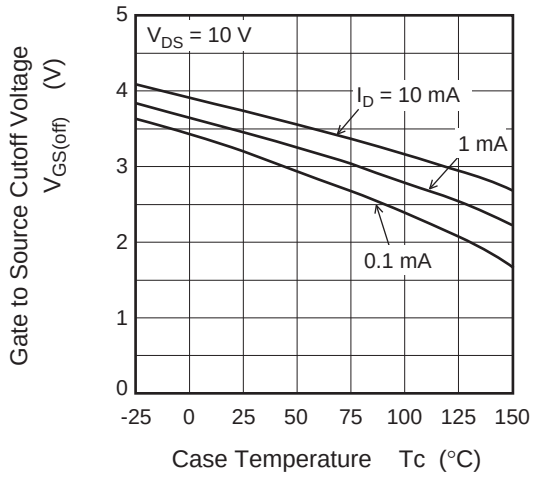
Dynamic Input Characteristics



Reverse Drain Current vs. Source to Drain Voltage

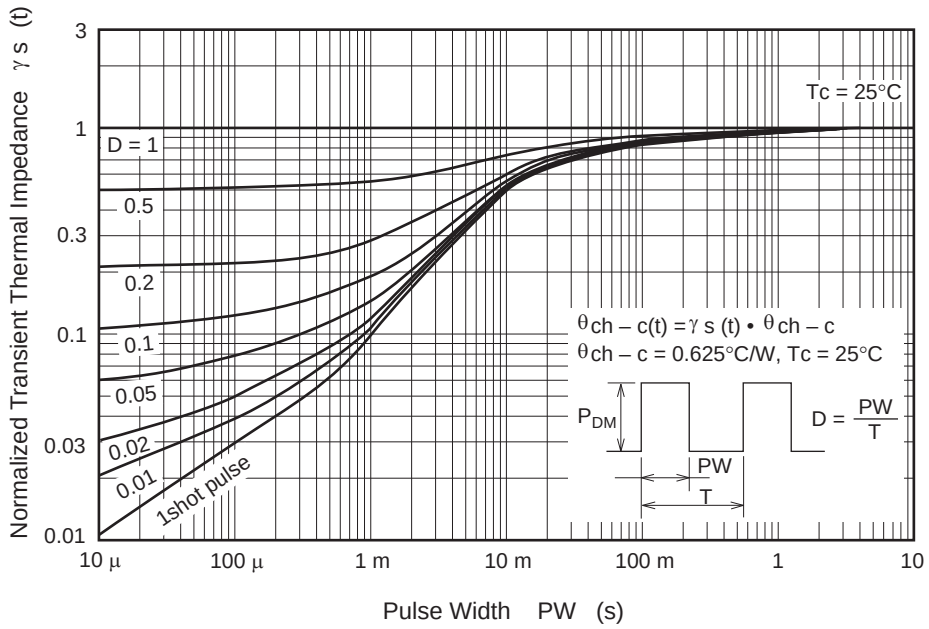


Gate to Source Cutoff Voltage vs. Case Temperature

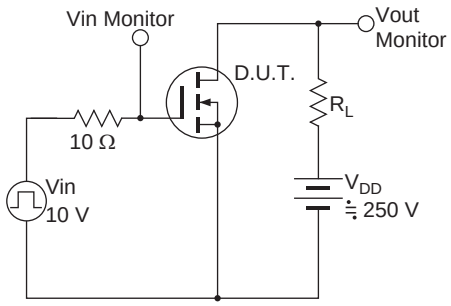


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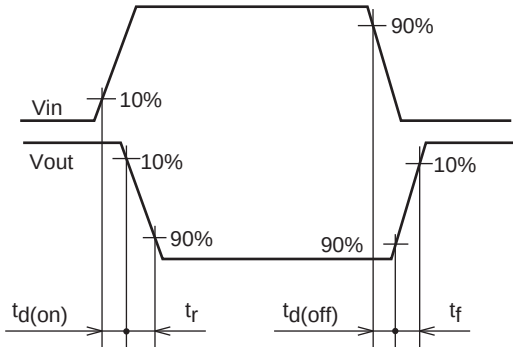
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform

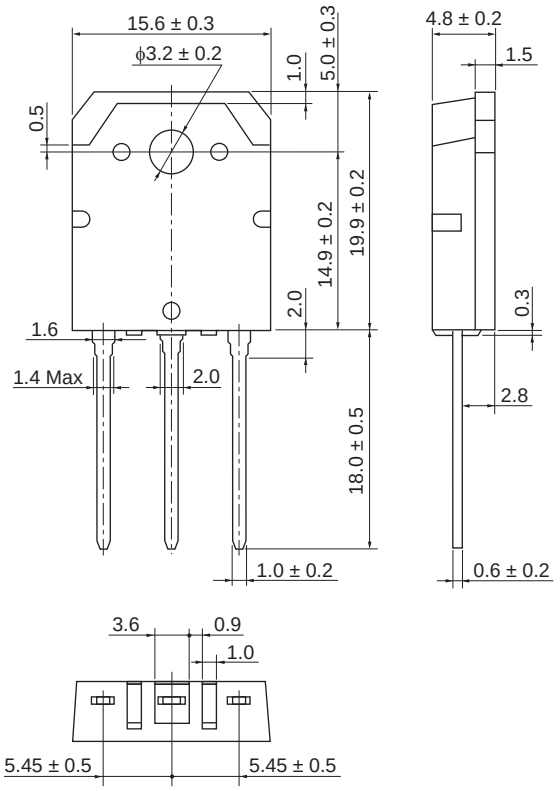


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Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-3P	SC-65	PRSS0004ZE-A	TO-3P / TO-3PV	5.0g

Unit: mm



Ordering Information

Part No.	Quantity	Shipping Container
RJK5020DPK-00-T0	360 pcs	Box (Tube)

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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