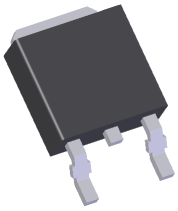
N0608N

N-channel MOSFET
60 V, 52 A, 14.3 mΩ

R07DS1402EJ0200
Rev.2.00
2019.9.30

Features

- Low on-state resistance
  $R_{DS(on)}$ = 14.3 mΩ max. (V_{GS} = 10 V, I_D = 26 A)
- Low C_{iss} : C_{iss} = 1950 pF typ. (V_{DS} = 25 V)
- High current : $I_{D(DC)}$ = ±52A
- RoHS Compliant
- Quality Grade : Standard
- Applications : For high current switching



TO-252

Ordering Information

Orderable Part Number	Package	Packing
N0608N-ZK-E1-AY	TO-252, Pb-free Note1	3000 pcs / Tape and Reel

Notes: 1. Pb-free means that this product does not contain lead in the external electrode.

Absolute Maximum Ratings (T_A = 25°C)

Item	Symbol	Ratings	Unit
Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	60	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	± 20	V
Drain Current (DC) (T_C = 25 °C)	$I_{D(DC)}$	± 52	A
Drain Current (pulse) Note2	$I_{D(pulse)}$	± 104	A
Total Power Dissipation (T_C = 25 °C)	P_{T1}	50.2	W
Total Power Dissipation (T_A = 25 °C)	P_{T2}	1.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to 150	°C
Single Avalanche Current Note3	I_{AS}	21	A
Single Avalanche Energy Note3	E_{AS}	47	mJ

Note: Continuous heavy condition (e.g. high temperature/voltage/current or high variation of temperature) may affect a reliability even if it is within the absolute maximum ratings. Please consider derating condition for appropriate reliability in reference Renesas Semiconductor Reliability Handbook (Recommendation for Handling and Usage of Semiconductor Devices) and individual reliability data.

Notes: 2. PW ≤ 10 μs, Duty Cycle ≤ 1%

3. Starting T_{ch} = 25°C, V_{DD} = 30 V, R_G = 25 Ω, V_{GS} = 20 → 0 V, L = 100 μH

Thermal Resistance

Item	Symbol	Max. Value Note4	Unit
Channel to Case Thermal Resistance	$R_{th(ch-C)}$	2.5	°C/W
Channel to Ambient Thermal Resistance	$R_{th(ch-A)}$	125	°C/W

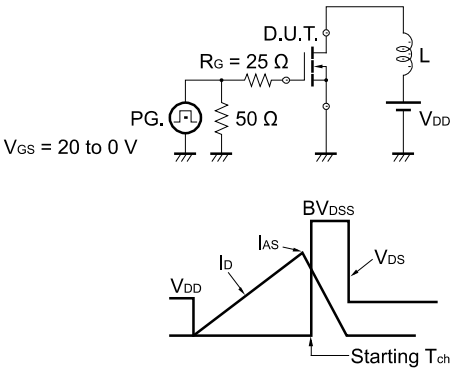
Notes: 4. This data is the designed target maximum value on Renesas's measurement condition. (Not tested)

Electrical Characteristics (T_A = 25°C)

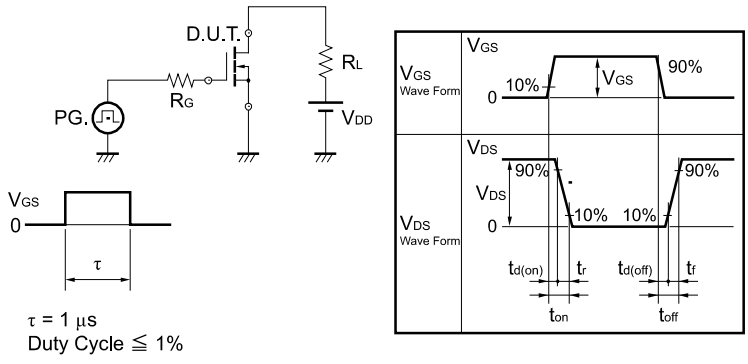
Item	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I_{DSS}			1	μA	V_{DS} = 60 V, V_{GS} = 0 V
Gate Leakage Current	I_{GSS}			±100	nA	V_{GS} = ± 20 V, V_{DS} = 0 V
Gate to Source Cut-off Voltage	$V_{GS(off)}$	2.0		4.0	V	V_{DS} = 10 V, I_D = 1 mA
Forward Transfer Admittance Note5	| y_{fs} |		32		S	V_{DS} = 5 V, I_D = 26 A
Drain to Source On-state Resistance Note5	$R_{DS(on)}$		12.3	14.3	mΩ	V_{GS} = 10 V, I_D = 26 A
Input Capacitance	C_{iss}		1950		pF	V_{DS} = 25 V V_{GS} = 0 V f = 1 MHz
Output Capacitance	C_{oss}		140		pF	
Reverse Transfer Capacitance	C_{rss}		70		pF	
Turn-on Delay Time	$t_{d(on)}$		19		ns	V_{DD} = 30 V, I_D = 26 A V_{GS} = 10 V R_G = 0 Ω
Rise Time	t_r		11		ns	
Turn-off Delay Time	$t_{d(off)}$		41		ns	
Fall Time	t_f		5		ns	
Total Gate Charge	Q_G		37		nC	V_{DD} = 48 V V_{GS} = 10 V I_D = 52 A
Gate to Source Charge	Q_{GS}		10		nC	
Gate to Drain Charge	Q_{GD}		11		nC	
Body Diode Forward Voltage Note5	$V_{F(S-D)}$			1.5	V	I_F = 52 A, V_{GS} = 0 V
Reverse Recovery Time	t_{rr}		29		ns	I_F = 52 A, V_{GS} = 0 V di/dt = 100 A/μs
Reverse Recovery Charge	Q_{rr}		25		nC	

Notes: 5. Pulsed test

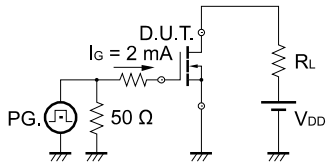
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

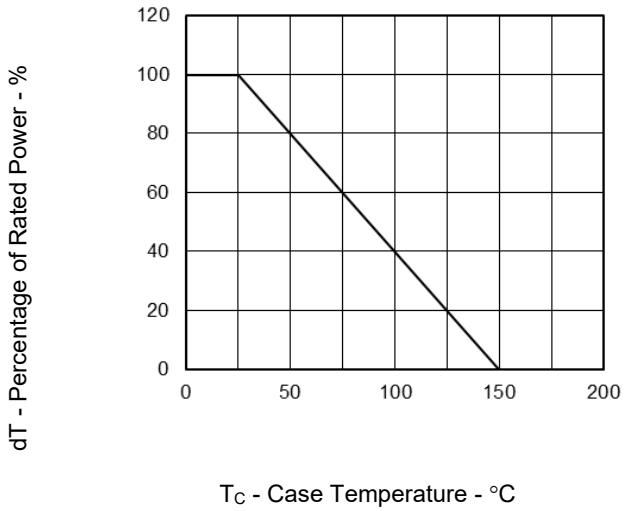


TEST CIRCUIT 3 GATE CHARGE

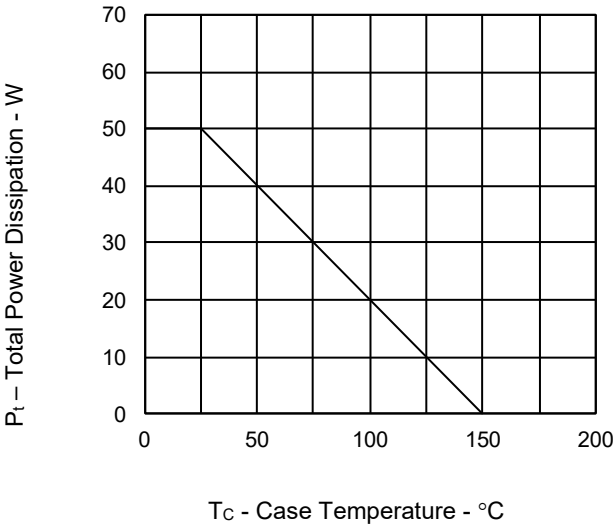


Typical Characteristics Note6

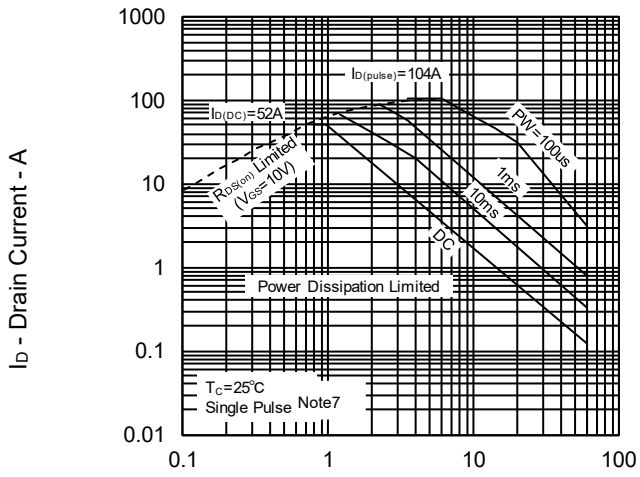
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



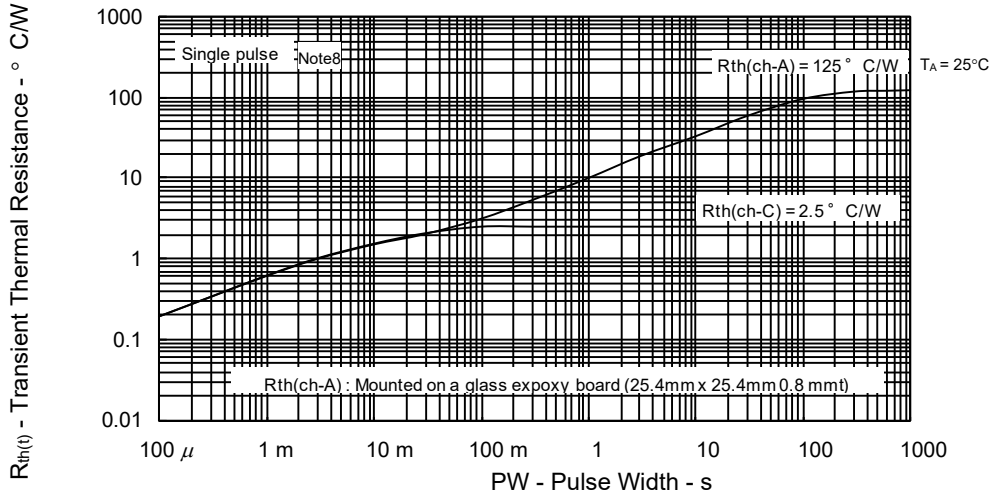
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



FORWARD BIAS SAFE OPERATING AREA

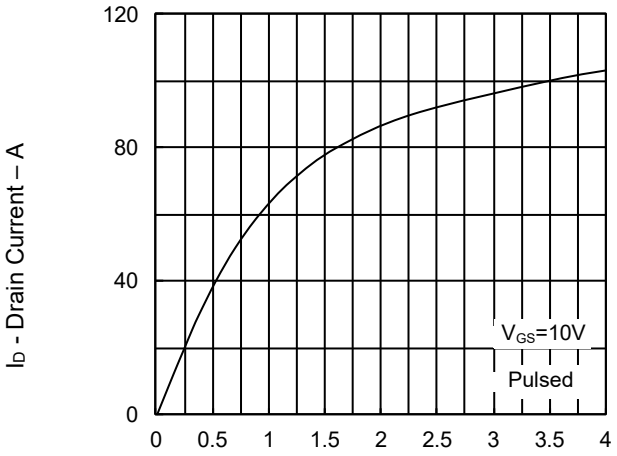


TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



Notes: 6. Designed target value on Renesas measurement condition. (T_C = 25°C, unless otherwise specified)
7. This data is the designed value on Renesas's measurement condition. Renesas recommends that operating conditions are designed according to a document "Power MOSFET/IGBT Attention of Handling Semiconductor Devices (R07ZZ0010)".
8. This data is the designed target maximum value on Renesas's measurement condition.

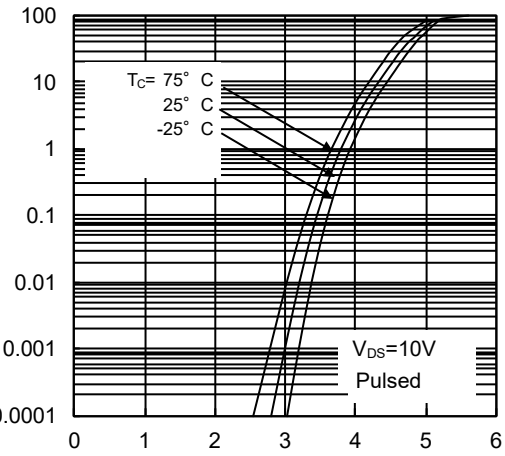
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



I_D - Drain Current – A

V_{DS} - Drain to Source Voltage - V

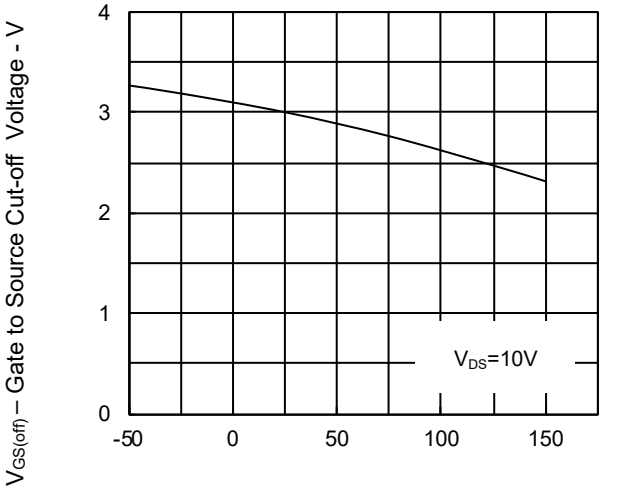
FORWARD TRANSFER CHARACTERISTICS



I_D - Drain Current - A

V_{GS} - Gate to Source Voltage - V

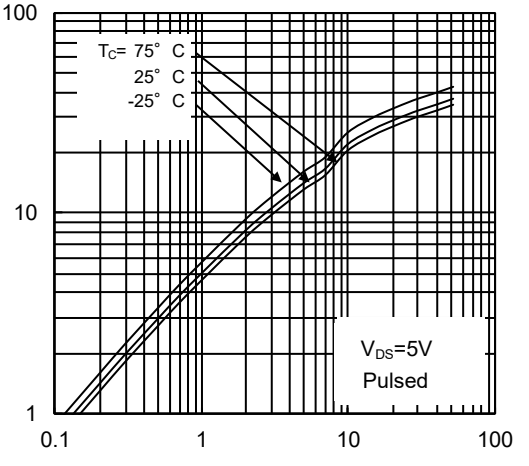
GATE TO SOURCE THRESHOLD VOLTAGE vs. CHANNEL TEMPERATURE



$V_{GS(off)}$ – Gate to Source Cut-off Voltage - V

T_{ch} - Channel Temperature - °C

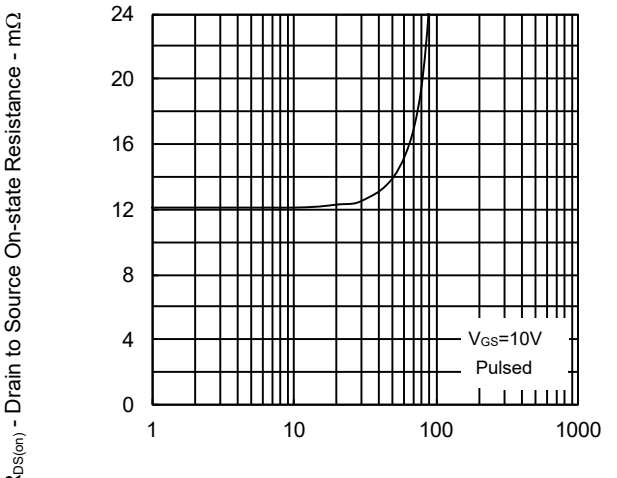
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



| y_{fs} | - Forward Transfer Admittance - S

I_D - Drain Current - A

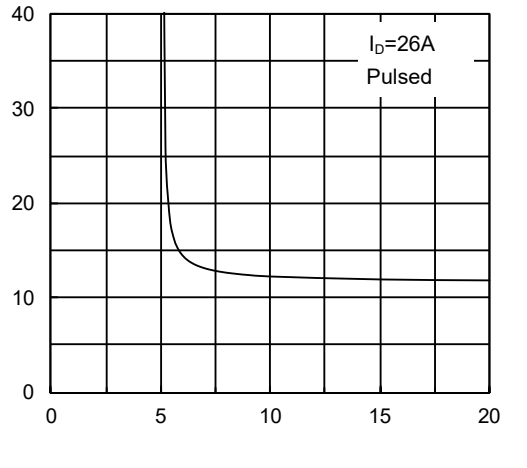
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



$R_{DS(on)}$ - Drain to Source On-state Resistance - mΩ

I_D - Drain Current - A

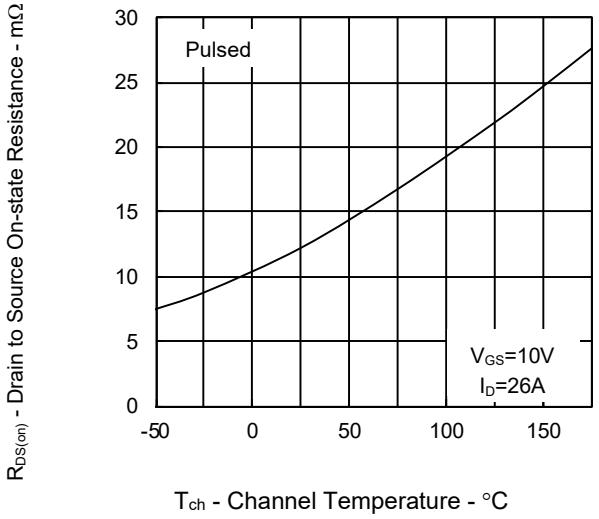
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



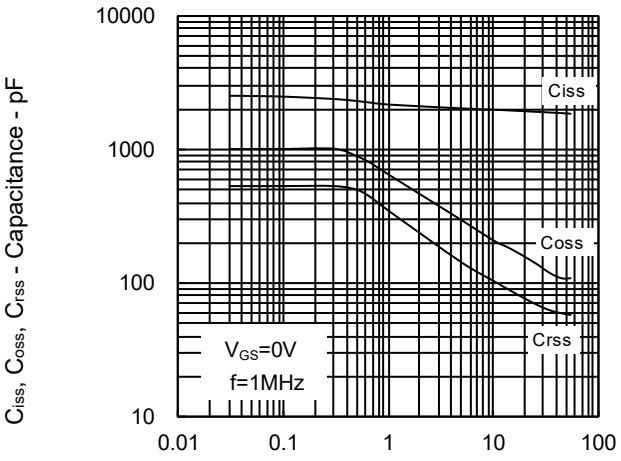
$R_{DS(on)}$ - Drain to Source On-state Resistance - mΩ

V_{GS} - Gate to Source Voltage – V

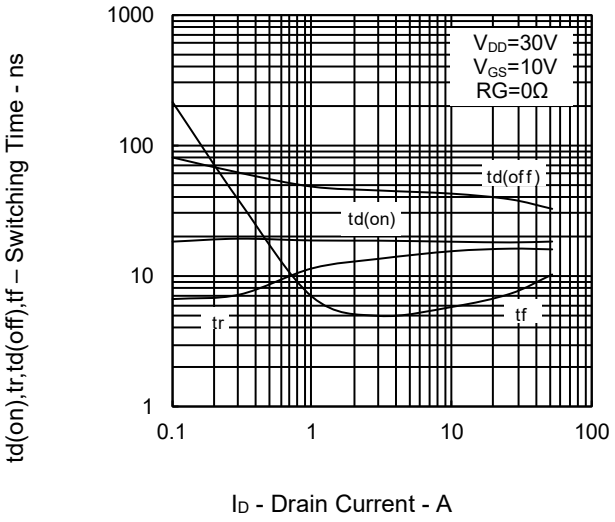
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



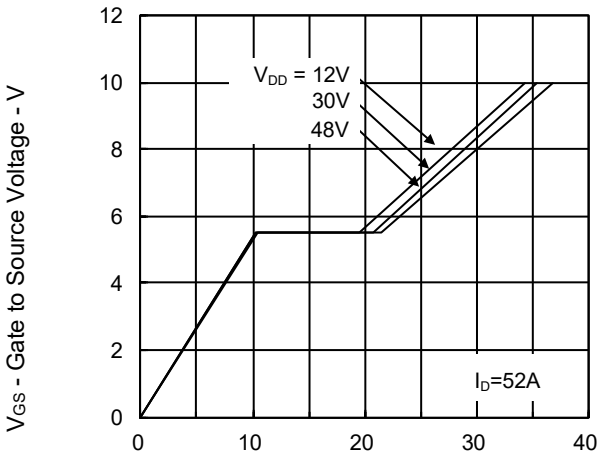
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



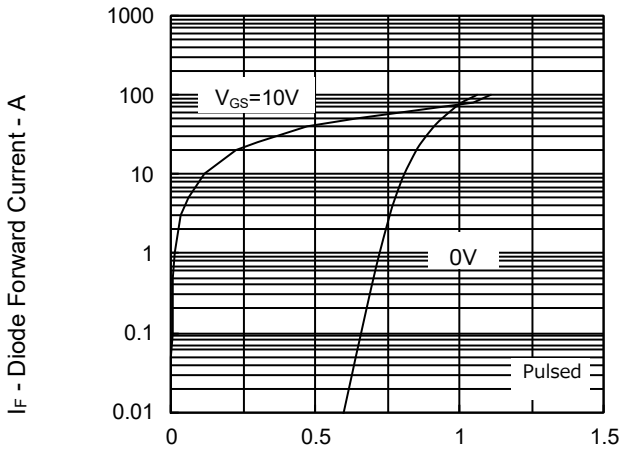
SWITCHING CHARACTERISTICS



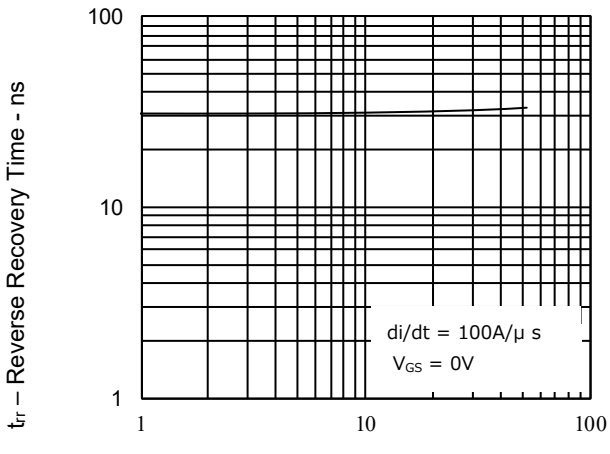
DYNAMIC INPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



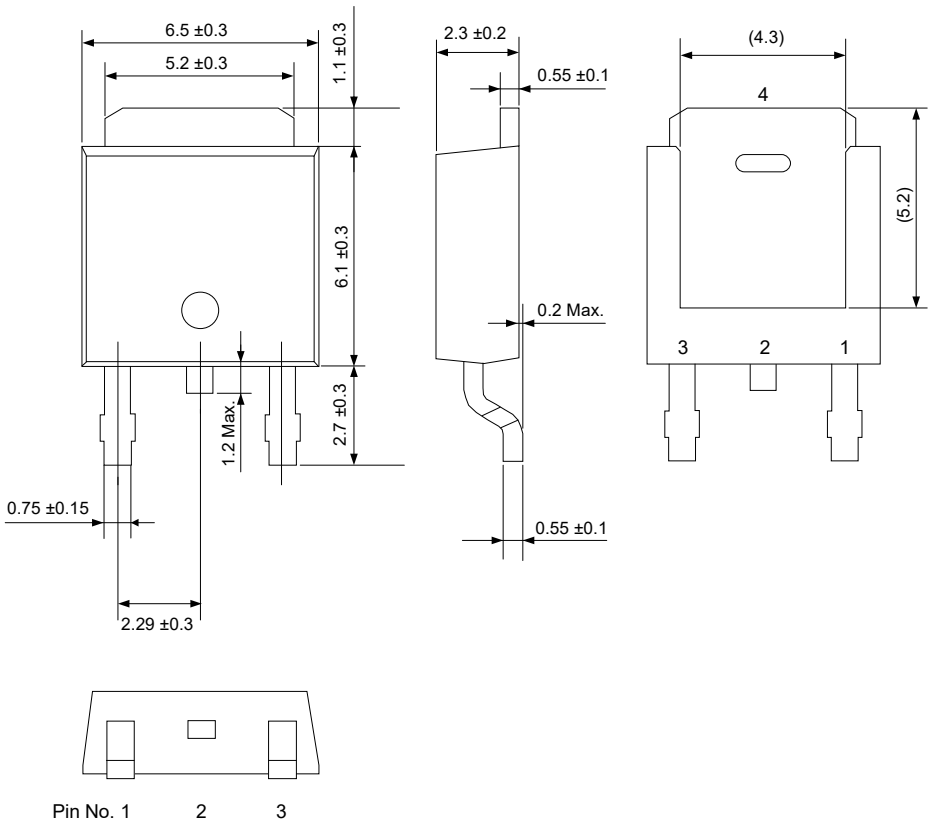
REVERSE RECOVERY TIME vs. DRAIN CURRENT



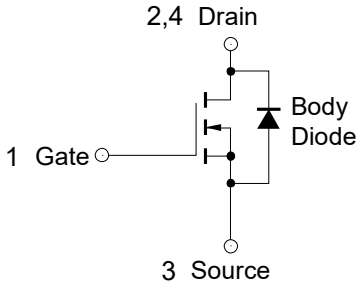
Package Drawings (Unit: mm)

Package Name	JEITA Package Code	JEDEC Code	RENESAS Code	Previous Code	MASS (Typ) [g]
TO-252	—	TO-252	PRSS0004ZK-A	TO-252A	0.32

Unit: mm



Equivalent Circuit



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6. 使用瑞萨电子产品时，请参阅最新产品信息（数据表、使用说明书、应用指南、可靠性手册中的“半导体元件处理和使用一般注意事项”等），并确保使用条件在瑞萨电子指定的最大额定值、电源工作电压范围、散热特性、安装条件等范围内使用。对于在上述指定范围之外使用瑞萨电子产品而产生的任何故障、失效或事故，瑞萨电子概不承担任何责任。
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8. 关于环境保护方面的详细内容，例如每种瑞萨电子产品的环境兼容性等，请与瑞萨电子的营业部门联系。用户负责仔细并充分查阅对管制物质的使用或含量进行管理的所有适用法律法规（包括但不限于《欧盟RoHS指令》），并在使用瑞萨电子产品时遵守所有适用法律法规。对于因用户未遵守相应法律法规而导致的损害或损失，瑞萨电子概不承担任何责任。
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(Rev.4.0-1 November 2017)

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