

# RJK60S3DPD

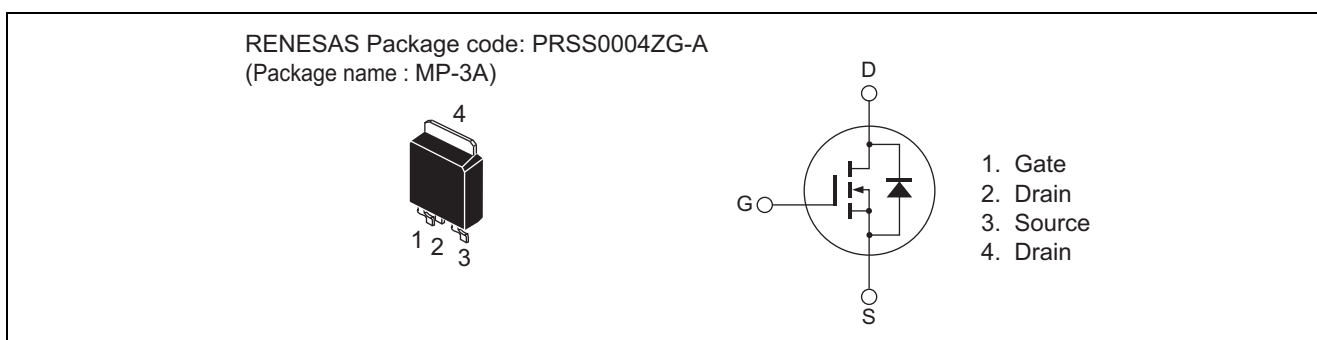
600V - 12A - SJ MOS FET  
High Speed Power Switching

R07DS0731EJ0300  
Rev.3.00  
Oct 12, 2012

## Features

- Superjunction MOSFET
- Low on-resistance  
 $R_{DS(on)} = 0.35 \Omega$  typ. (at  $I_D = 6 A$ ,  $V_{GS} = 10 V$ ,  $T_a = 25^\circ C$ )
- High speed switching  
 $t_f = 21 ns$  typ. (at  $I_D = 6 A$ ,  $V_{GS} = 10 V$ ,  $R_L = 50 \Omega$ ,  $R_g = 10 \Omega$ ,  $T_a = 25^\circ C$ )

## Outline



## 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	$T_c = 25^\circ C$	$I_D$ <sup>Note1,2</sup>	12.0	A
	$T_c = 100^\circ C$	$I_D$ <sup>Note1,2</sup>	7.6	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	24	A	
Body-drain diode reverse drain current	$I_{DR}$ <sup>Note1</sup>	12	A	
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ <sup>Note1</sup>	24	A	
Avalanche current	$I_{AP}$ <sup>Note3</sup>	3	A	
Avalanche energy	$E_{AR}$ <sup>Note3</sup>	0.49	mJ	
Channel dissipation	$P_{ch}$ <sup>Note4</sup>	73.5	W	
Channel to case thermal impedance	$\theta_{ch-c}$	1.7	$^\circ C/W$	
Channel temperature	$T_{ch}$	150	$^\circ C$	
Storage temperature	$T_{stg}$	-55 to +150	$^\circ C$	

- Notes: 1. Limited by  $T_{ch}$  max.  
2. Maximum duty cycle  $D = 0.75$ .  
3.  $ST_{ch} = 25^\circ C$ ,  $T_{ch} \leq 150^\circ C$   
4. Value at  $T_c = 25^\circ C$

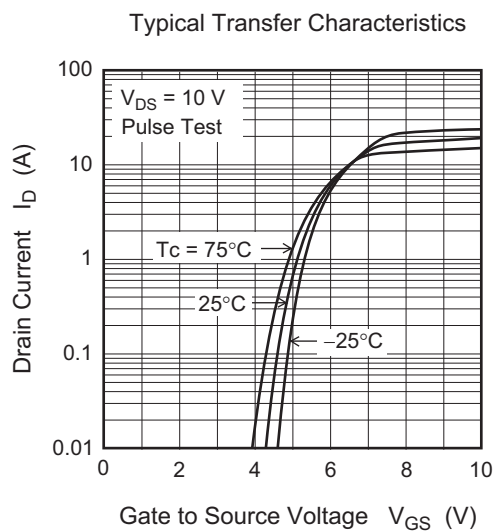
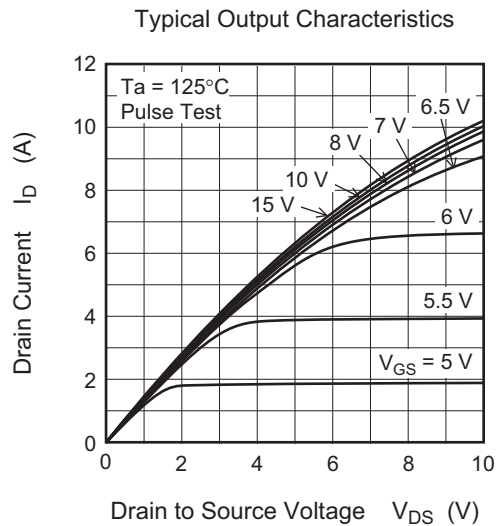
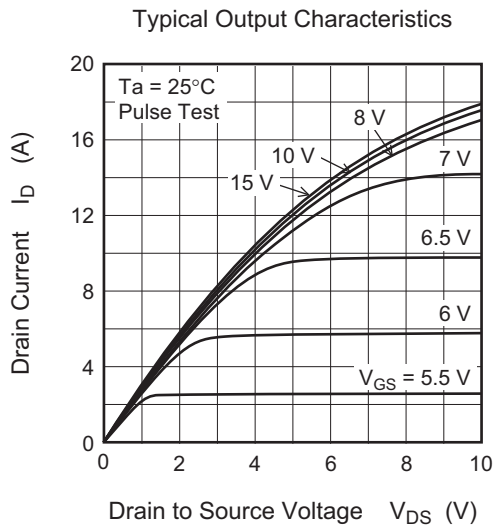
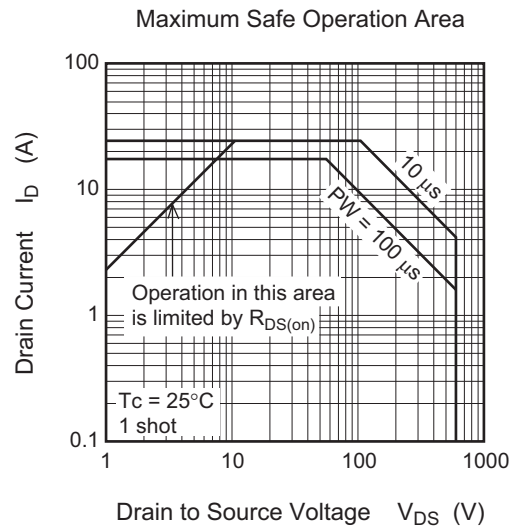
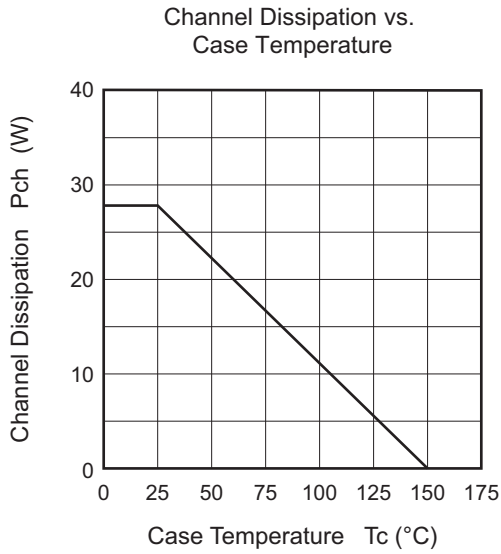
## Electrical Characteristics

(Ta = 25°C)

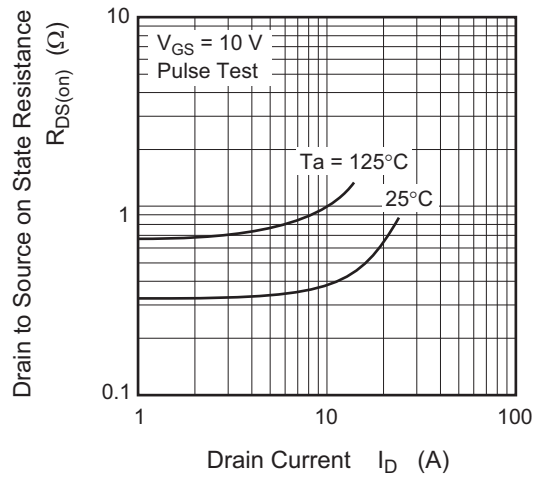
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	mA	$V_{DS} = 600 \text{ V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = +30\text{V}$ , $-20 \text{ V}$ , $V_{DS} = 0$
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	$R_{DS(on)}$	—	0.35	0.44	$\Omega$	$I_D = 6 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note5</sup>
	$R_{DS(on)}$	—	0.87	—	$\Omega$	Ta = 150°C $I_D = 6 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note5</sup>
Gate resistance	Rg	—	2.5	—	$\Omega$	f = 1 MHz $V_{DS} = 25 \text{ V}$ , $V_{GS} = 0$
Input capacitance	Ciss	—	720	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	Coss	—	980	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	3.7	—	pF	f = 100 kHz
Turn-on delay time	$t_{d(on)}$	—	13	—	ns	$I_D = 6 \text{ A}$
Rise time	$t_r$	—	18	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	25	—	ns	$R_L = 50 \Omega$
Fall time	$t_f$	—	18	—	ns	$R_g = 10 \Omega$ <sup>Note5</sup>
Total gate charge	Qg	—	13.6	—	nC	$V_{DD} = 480 \text{ V}$
Gate to source charge	Qgs	—	4.8	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Qgd	—	3.9	—	nC	$I_D = 12 \text{ A}$ <sup>Note5</sup>
Body-drain diode forward voltage	$V_{DF}$	—	1.0	1.6	V	$I_F = 12 \text{ A}$ , $V_{GS} = 0$ <sup>Note5</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	320	—	ns	$I_F = 12 \text{ A}$
Body-drain diode reverse recovery current	$I_{rr}$	—	20	—	A	$V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ <sup>Note5</sup>
Body-drain diode reverse recovery charge	Q <sub>rr</sub>	—	3.7	—	$\mu\text{C}$	

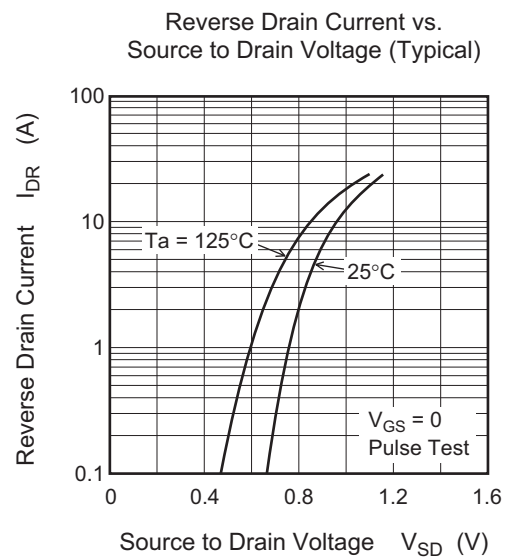
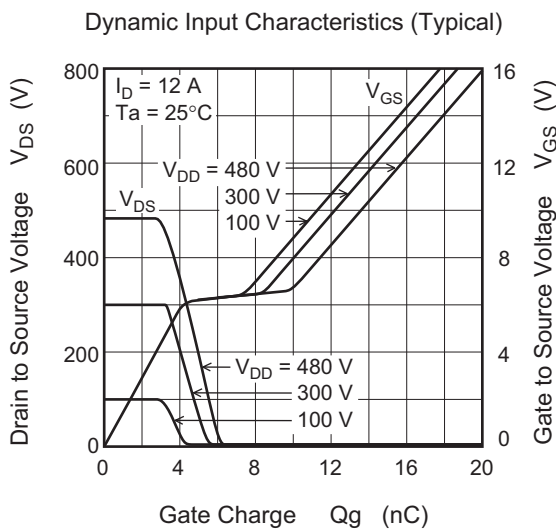
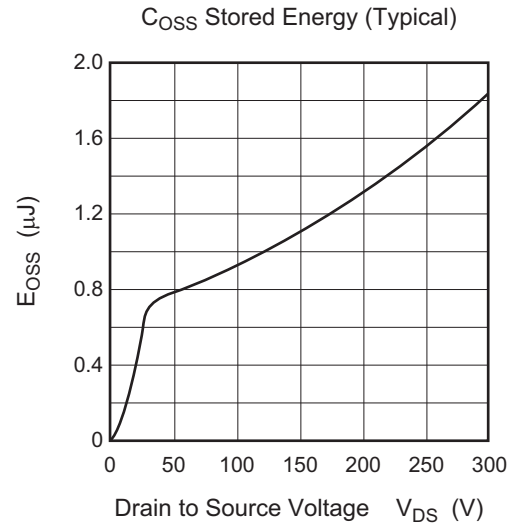
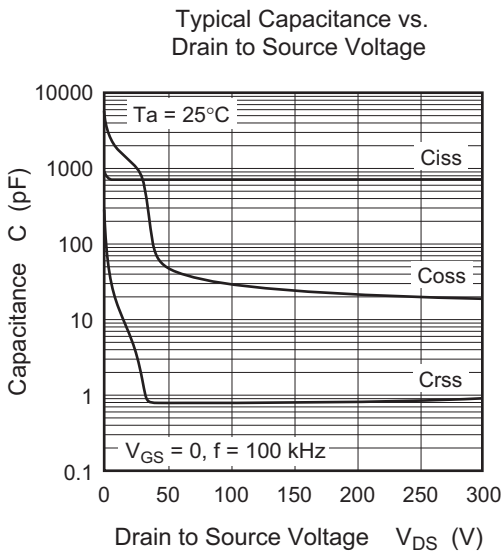
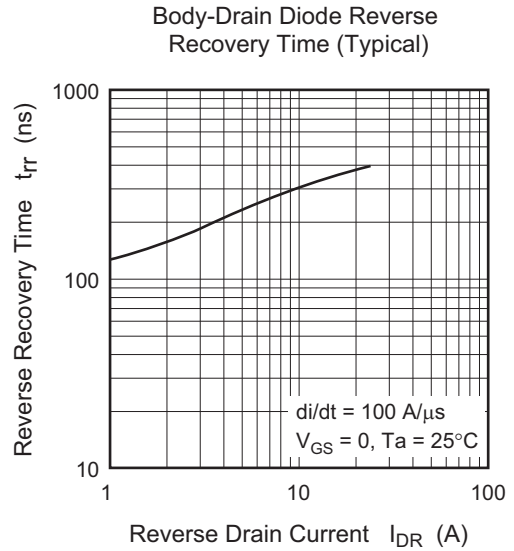
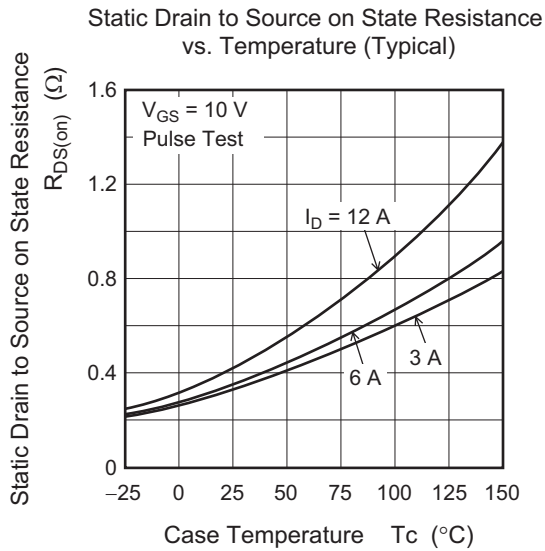
Notes: 5. Pulse test

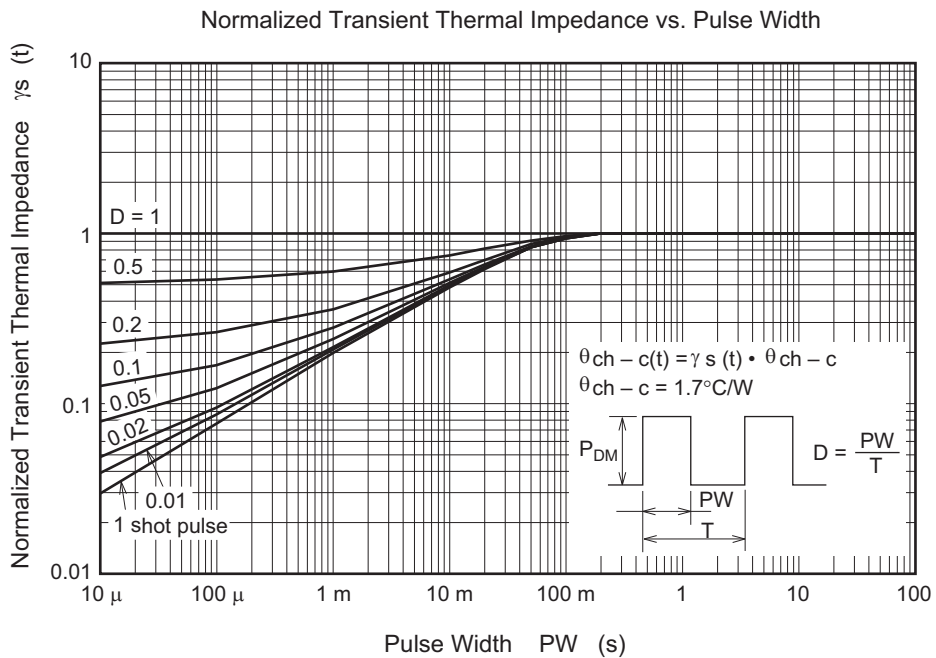
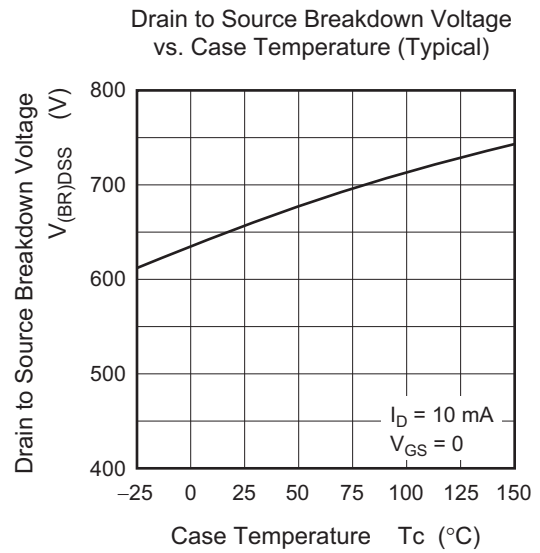
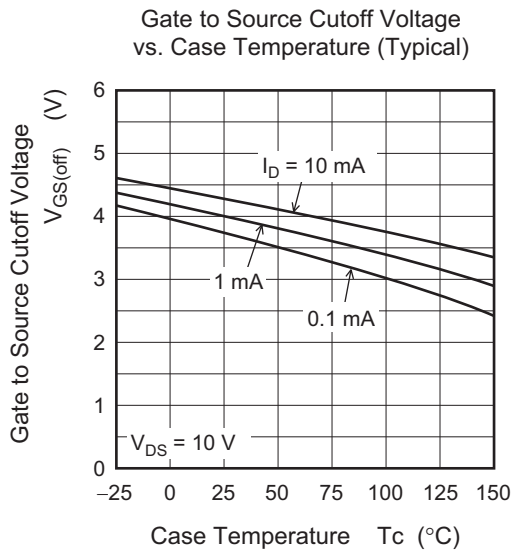
Main Characteristics



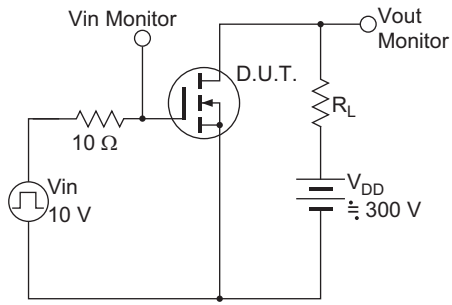
Static Drain to Source on State Resistance vs. Drain Current (Typical)



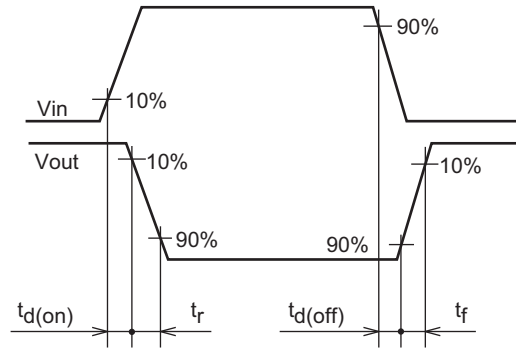




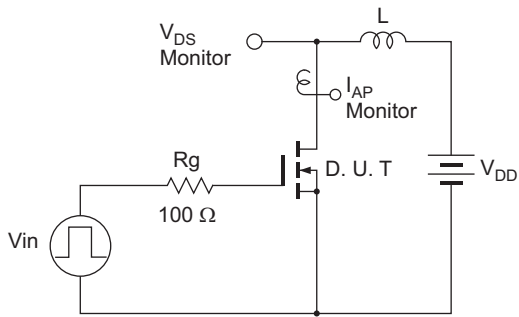
Switching Time Test Circuit



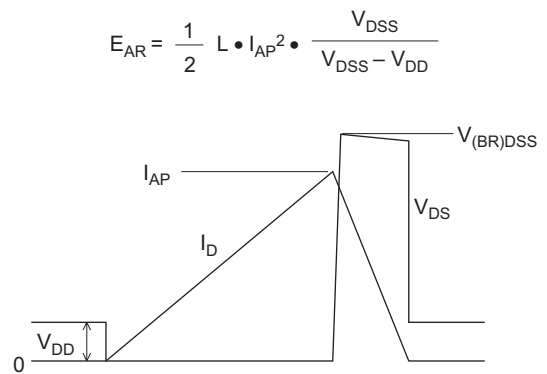
Waveform



Avalanche Test Circuit



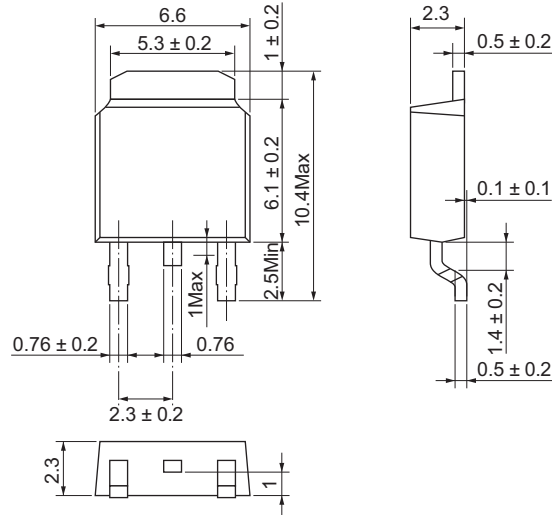
Avalanche Waveform



### Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
MP-3A	SC-63	PRSS0004ZG-A	TMP3	0.32g

Unit: mm



### Ordering Information

Orderable Part No.	Quantity	Shipping Container
RJK60S3DPD-00#J2	3000 pcs	Taping

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