

# RJK60S5DPQ-E0

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

R07DS0734EJ0100

Rev.1.00

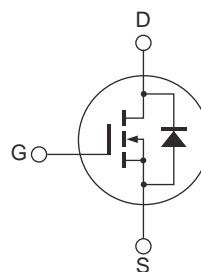
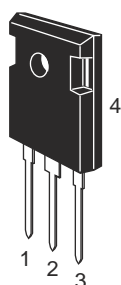
Apr 23, 2012

## Features

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

## Outline

RENESAS Package code: PRSS0003ZE-A  
(Package name: TO-247)



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

## Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	600	V
Gate to source voltage	$V_{GSS}$	+30, -20	V
Drain current	$T_c = 25^\circ\text{C}$	$I_D$ <sup>Note1</sup>	20
	$T_c = 100^\circ\text{C}$	$I_D$ <sup>Note1</sup>	12.6
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	40	A
Body-drain diode reverse drain current	$I_{DR}$ <sup>Note1</sup>	20	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ <sup>Note1</sup>	40	A
Avalanche current	$I_{AP}$ <sup>Note3</sup>	5	A
Avalanche energy	$E_{AR}$ <sup>Note3</sup>	1.36	mJ
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	192.3	W
Channel to case thermal impedance	$\theta_{ch-c}$	0.65	$^\circ\text{C}/\text{W}$
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Notes: 1. Limited by  $T_{ch}$  max.

2. Value at  $T_c = 25^\circ\text{C}$

3.  $ST_{ch} = 25^\circ\text{C}$ ,  $T_{ch} \leq 150^\circ\text{C}$

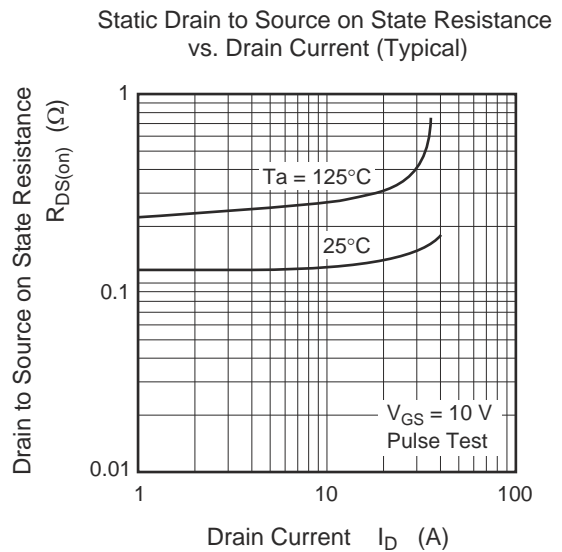
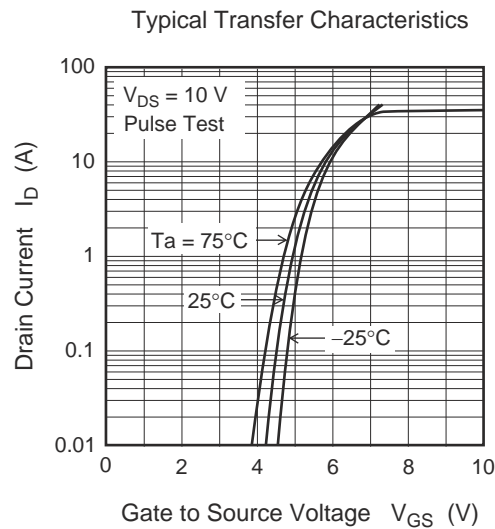
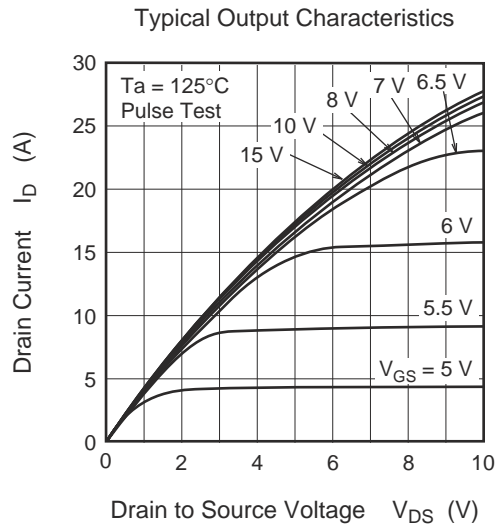
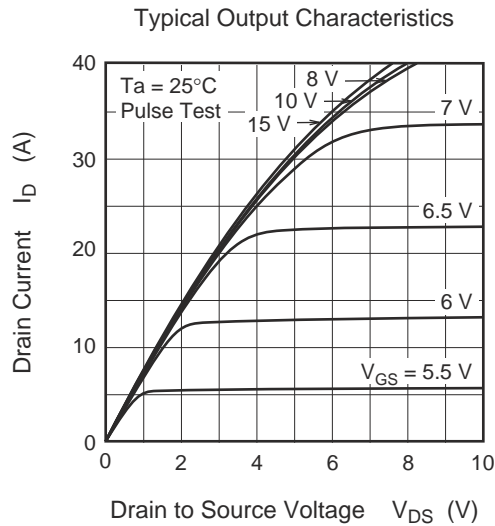
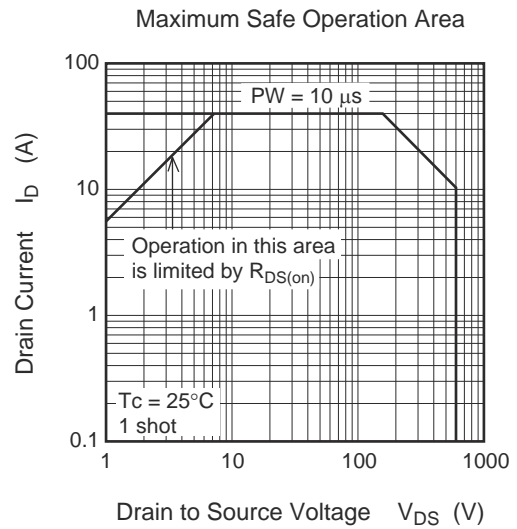
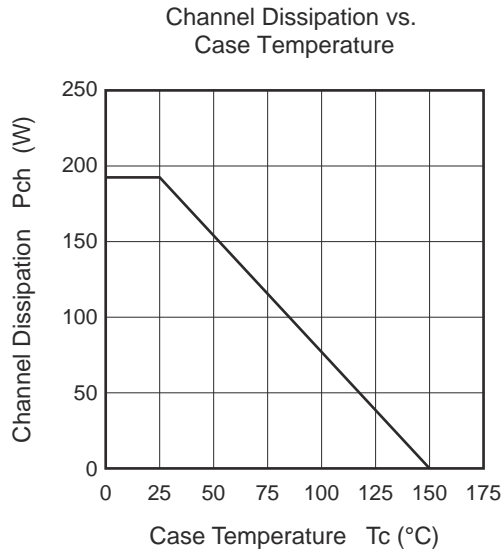
## Electrical Characteristics

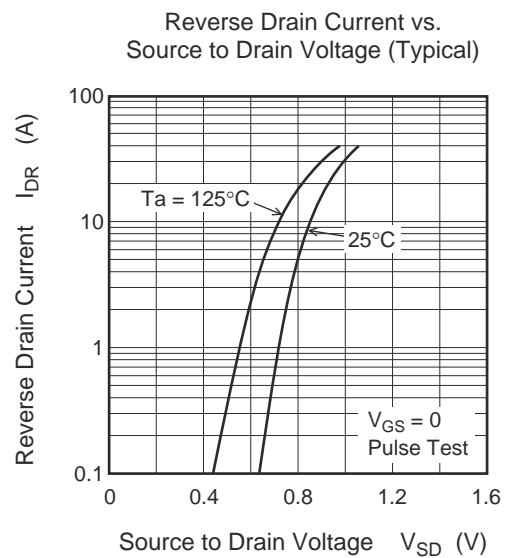
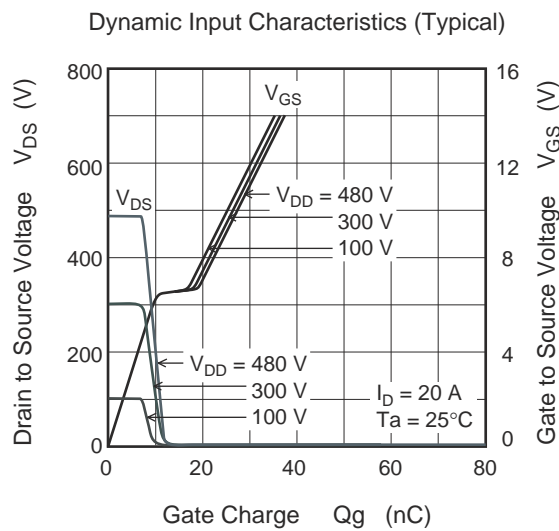
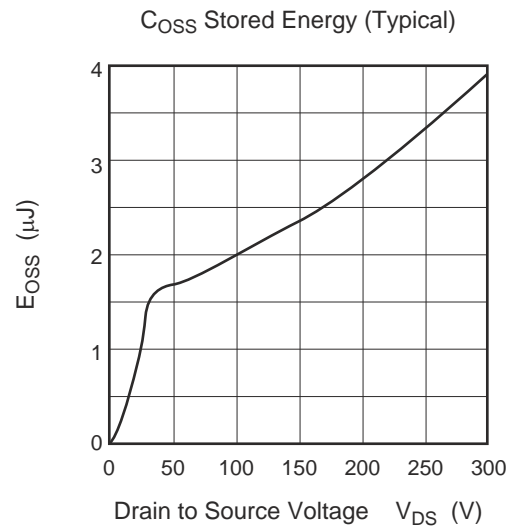
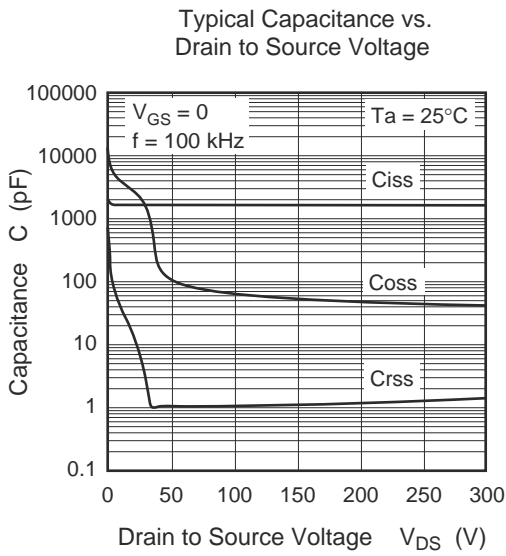
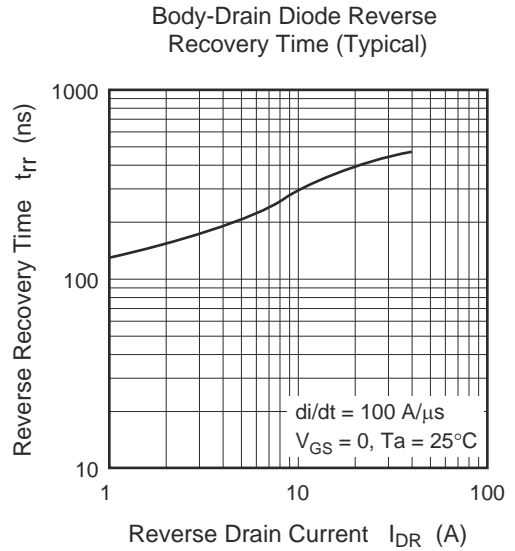
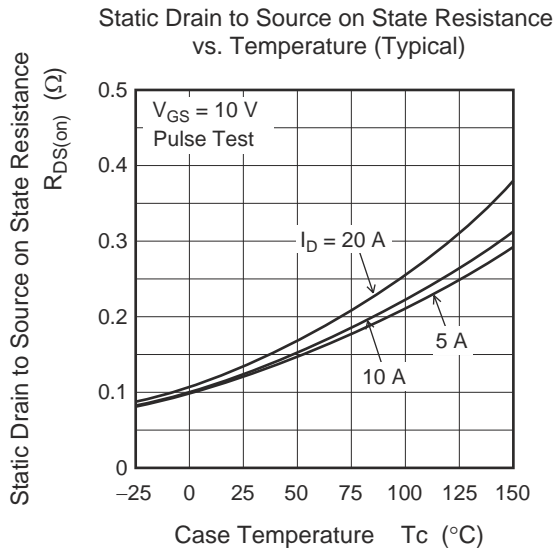
(Ta = 25°C)

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	$R_{DS(on)}$	—	0.150	0.178	$\Omega$	$I_D = 10 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	0.375	—	$\Omega$	Ta = 150°C $I_D = 10 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
Gate resistance	Rg	—	2.5	—	$\Omega$	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 $\Omega$ <sup>Note4</sup>
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	$I_D = 20 \text{ A}$ <sup>Note4</sup>
Body-drain diode forward voltage	$V_{DF}$	—	0.96	1.60	V	$I_F = 20 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	400	—	ns	$I_F = 20 \text{ A}$ $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{S}$ <sup>Note4</sup>
Body-drain diode reverse recovery current	$I_{rr}$	—	25	—	A	
Body-drain diode reverse recovery charge	$Q_{rr}$	—	5.6	—	$\mu\text{C}$	

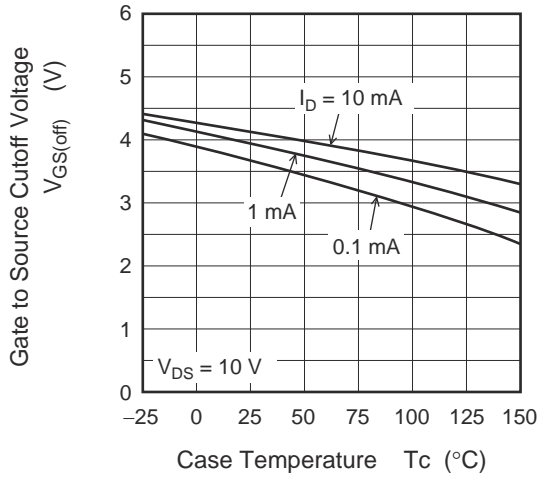
Notes: 4. Pulse test

Main Characteristics

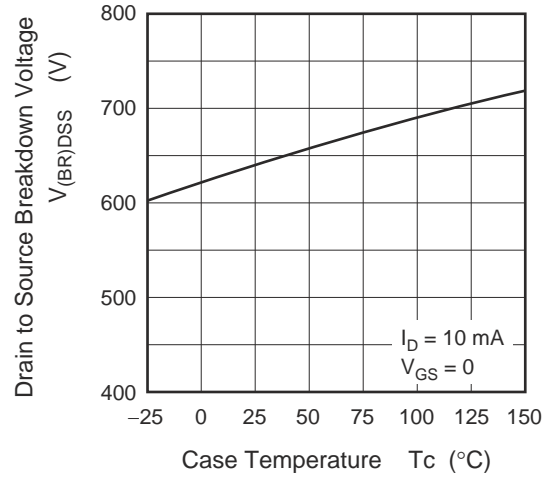




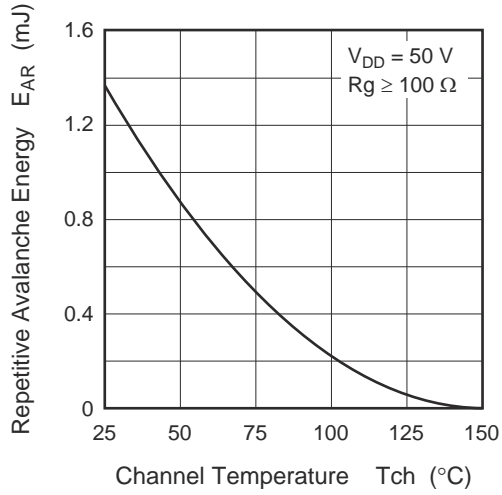
Gate to Source Cutoff Voltage vs. Case Temperature (Typical)



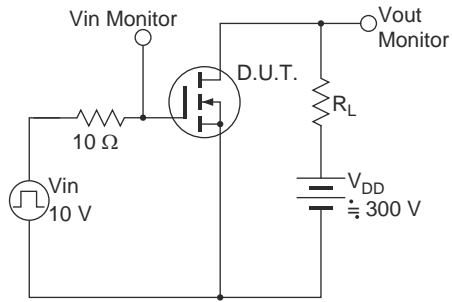
Drain to Source Breakdown Voltage vs. Case Temperature (Typical)



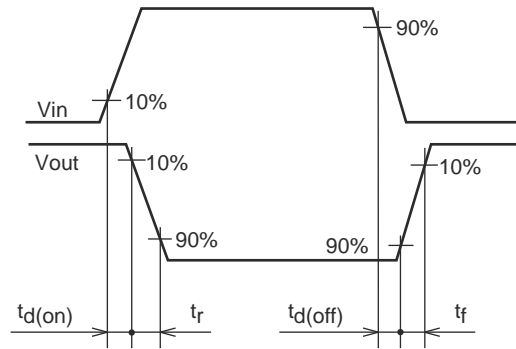
Maximum Avalanche Energy vs. Channel Temperature Derating



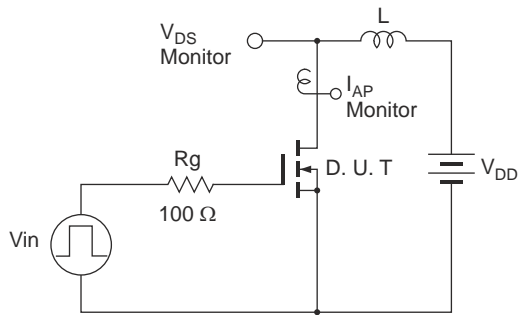
Switching Time Test Circuit



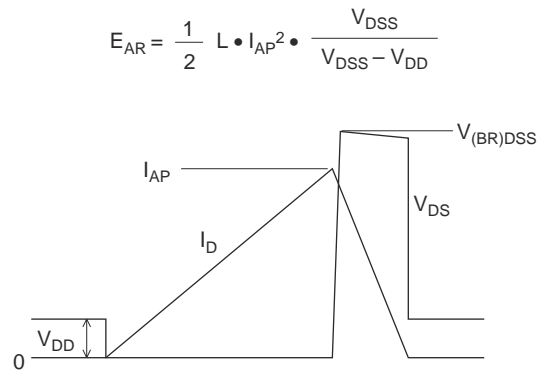
Waveform



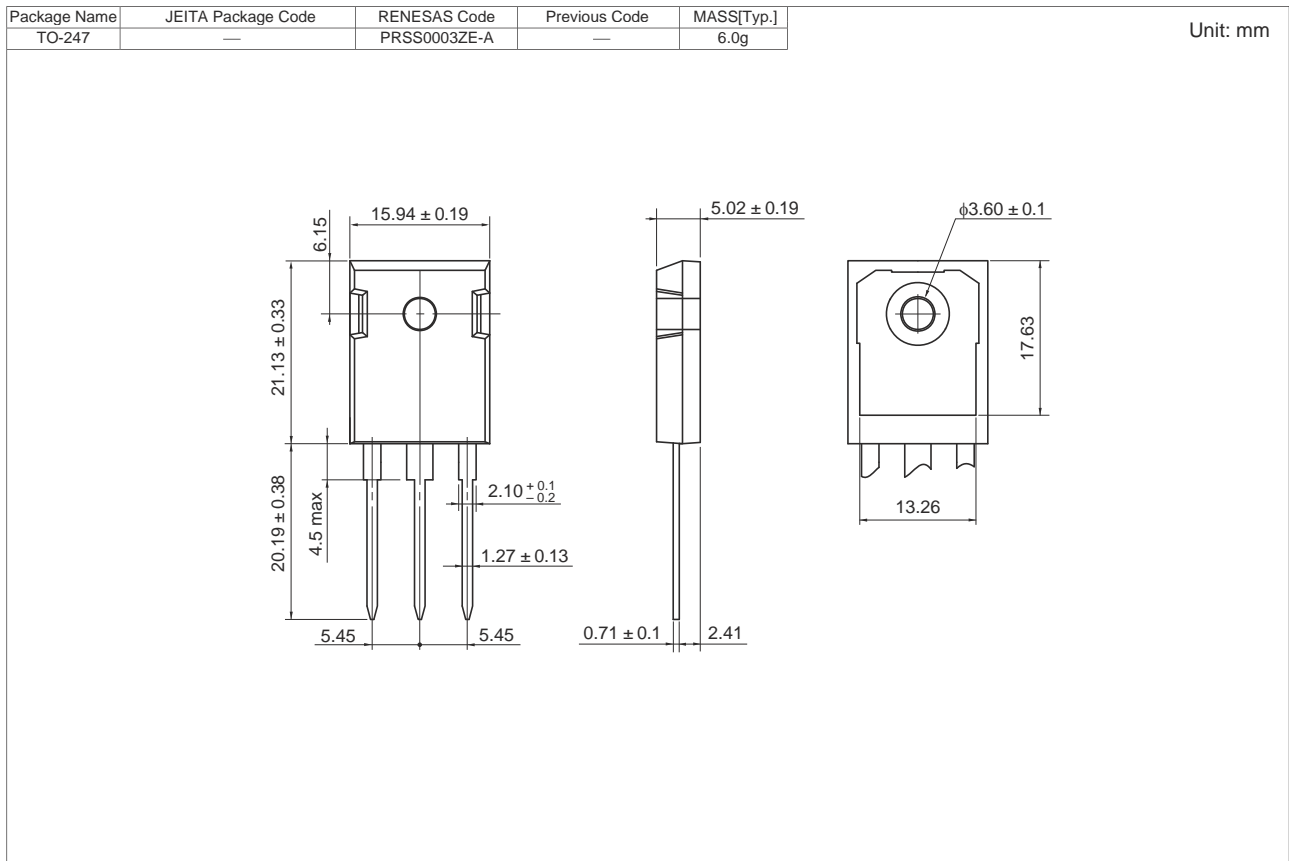
Avalanche Test Circuit



Avalanche Waveform



### Package Dimension



### Ordering Information

Orderable Part No.	Quantity	Shipping Container
RJK60S5DPQ-E0#T2	240 pcs	Box (Tube)

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