

# RJK60S5DPK-M0

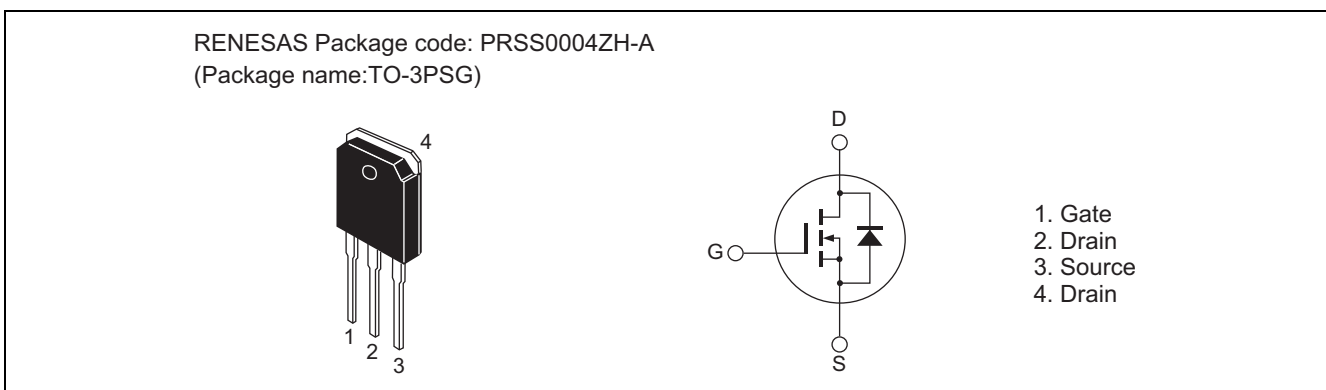
600V - 20A - SJ MOS FET  
High Speed Power Switching

R07DS0245EJ0500  
Rev.5.00  
Jan 23, 2013

## 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



## 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 A
	$T_c = 100^\circ\text{C}$	$I_D$ <sup>Note1</sup>	12.6 A
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>Note2</sup>	5	A
Avalanche energy	$E_{AR}$ <sup>Note2</sup>	1.36	mJ
MOSFET dv/dt ruggedness	dv/dt <sup>Note3</sup>	150	V/ns
Channel dissipation	Pch <sup>Note4</sup>	192.3	W
Channel to case thermal impedance	$\theta_{ch-c}$	0.65	$^\circ\text{C/W}$
Channel temperature	Tch	150	$^\circ\text{C}$
Storage temperature	Tstg	-55 to +150	$^\circ\text{C}$

- Notes: 1. Limited by Tch max.  
2.  $STch = 25^\circ\text{C}$ ,  $Tch \leq 150^\circ\text{C}$   
3. Value at  $T_j = 25^\circ\text{C}$ ,  $V_{DS} \leq 480 \text{ V}$   
4. Value at  $T_c = 25^\circ\text{C}$

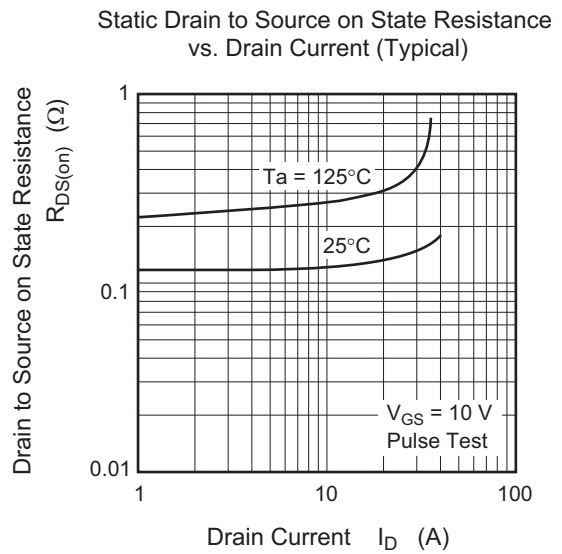
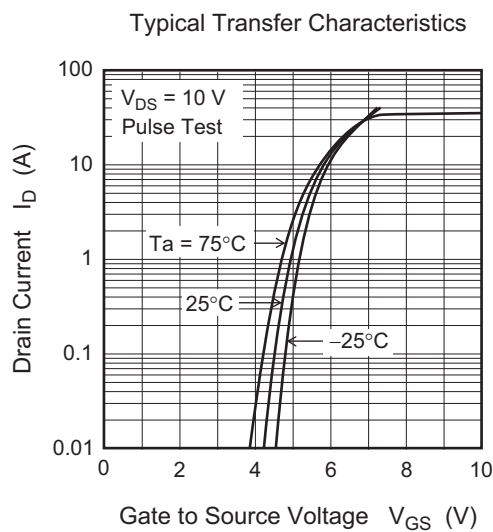
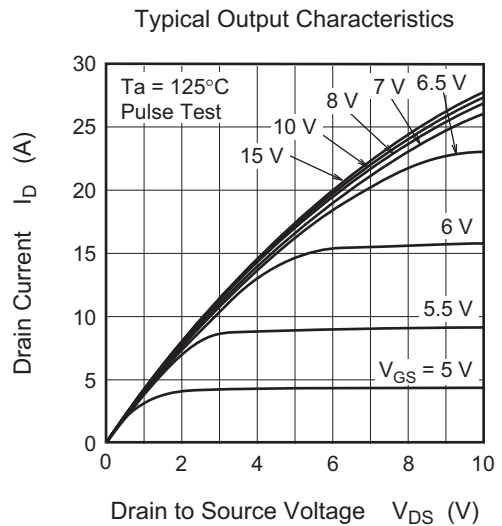
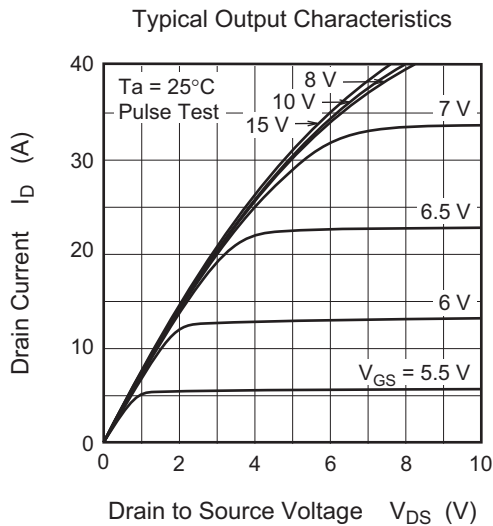
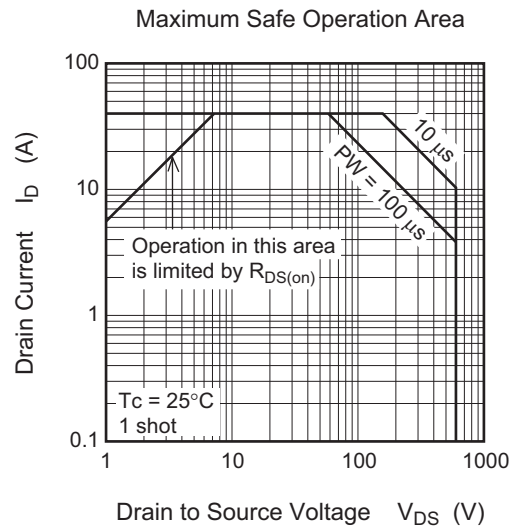
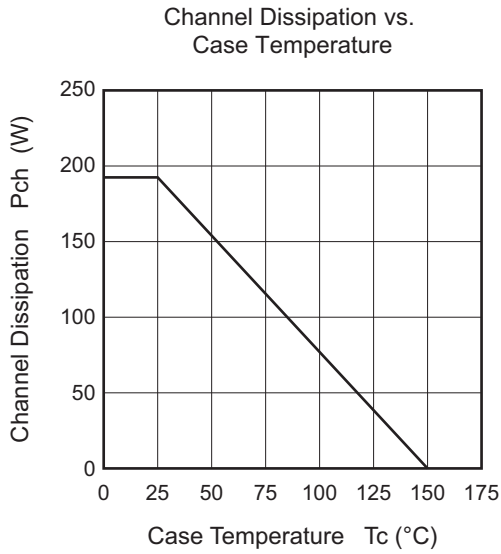
## Electrical Characteristics

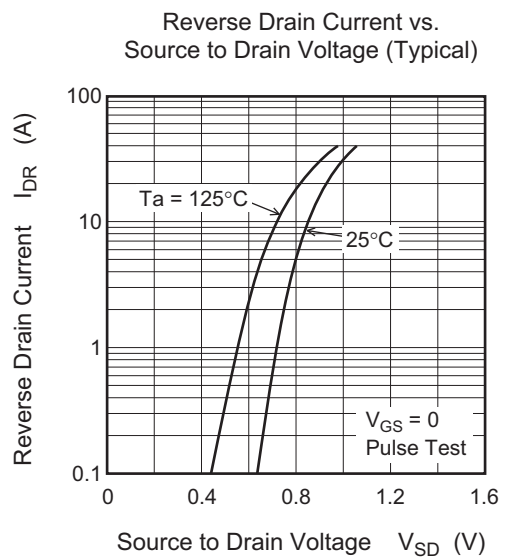
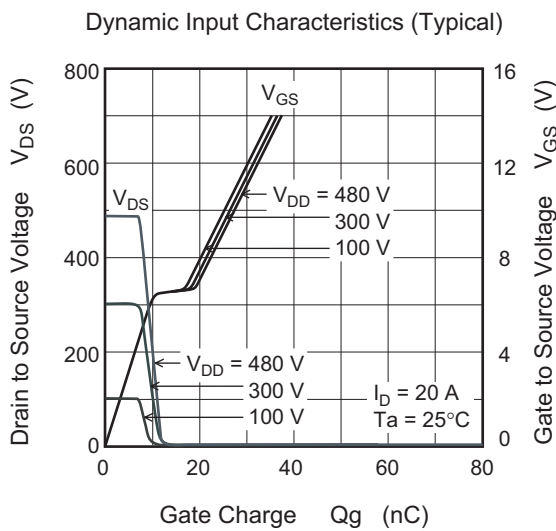
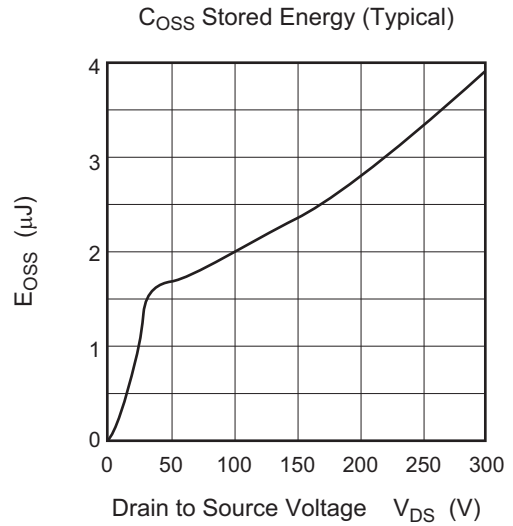
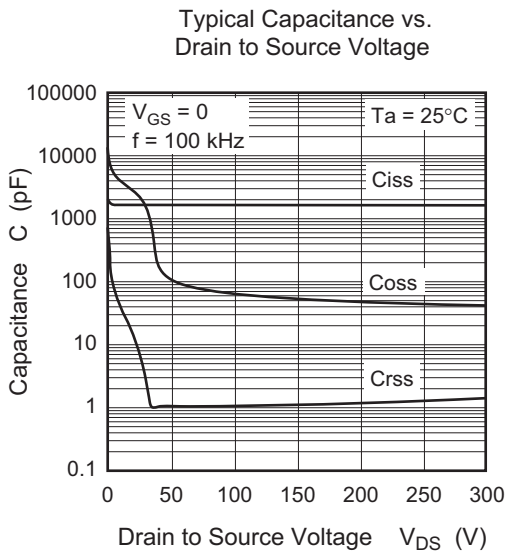
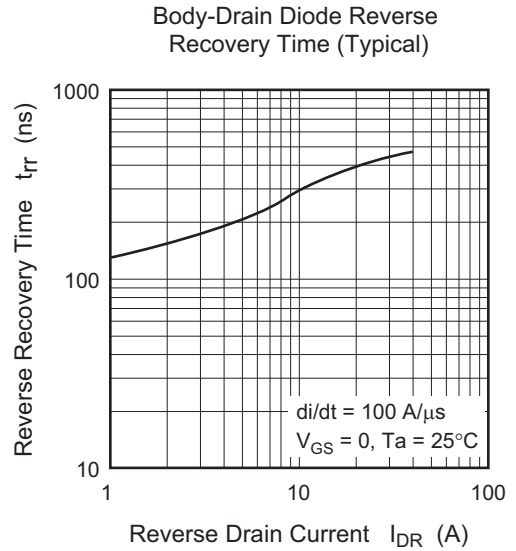
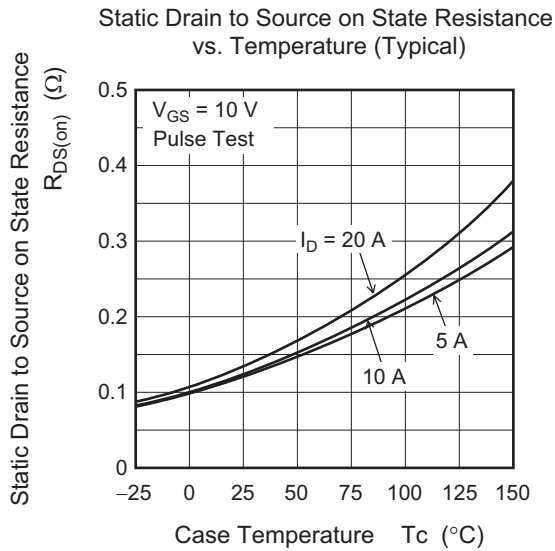
(Ta = 25°C)

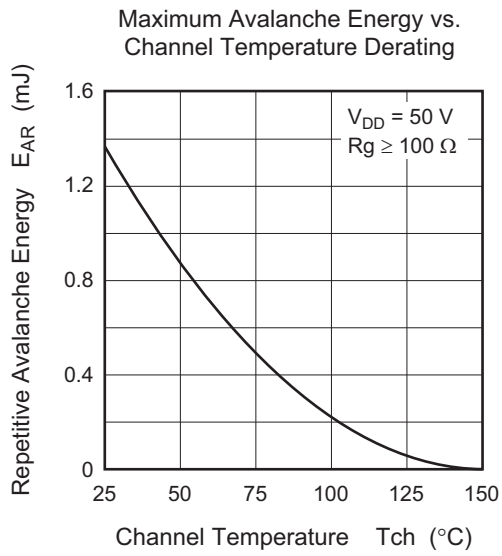
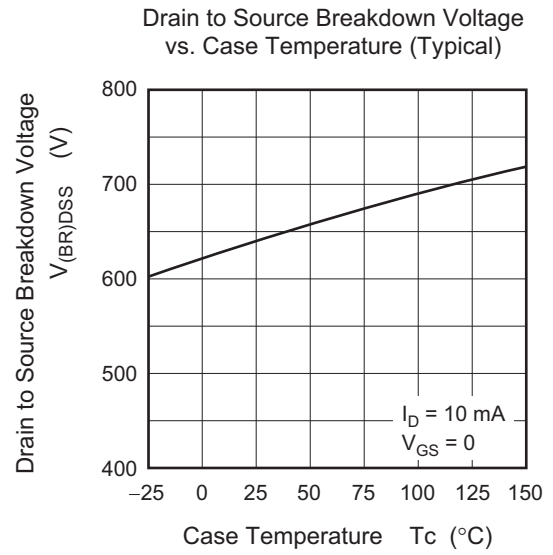
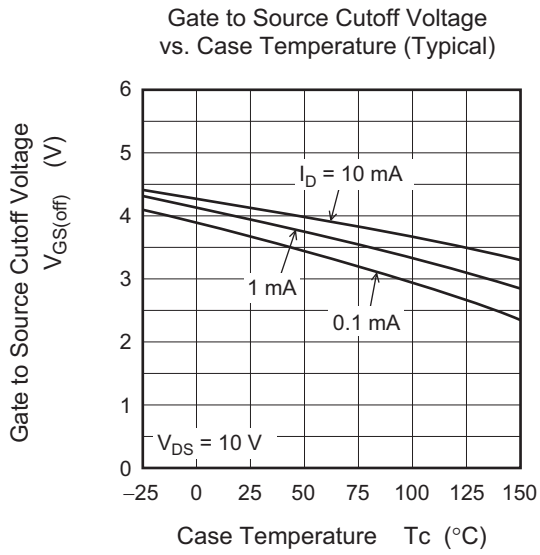
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	mA	$V_{DS} = 600 \text{ V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = +30\text{V}$ , $-20 \text{ V}$ , $V_{DS} = 0$
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>Note5</sup>
	$R_{DS(on)}$	—	0.375	—	$\Omega$	Ta = 150°C $I_D = 10 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note5</sup>
Gate resistance	Rg	—	2.5	—	$\Omega$	f = 1 MHz $V_{DS} = 25 \text{ V}$ , $V_{GS} = 0$
Input capacitance	Ciss	—	1600	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	Coss	—	2160	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	8.2	—	pF	f = 100kHz
Turn-on delay time	$t_{d(on)}$	—	23	—	ns	$I_D = 10 \text{ A}$
Rise time	$t_r$	—	25	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	49	—	ns	$R_L = 30 \Omega$
Fall time	$t_f$	—	23	—	ns	$R_g = 10 \Omega$ <sup>Note5</sup>
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>Note5</sup>
Body-drain diode forward voltage	$V_{DF}$	—	0.96	1.60	V	$I_F = 20 \text{ A}$ , $V_{GS} = 0$ <sup>Note5</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	400	—	ns	$I_F = 20 \text{ A}$
Body-drain diode reverse recovery current	$I_{rr}$	—	25	—	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>	—	5.6	—	$\mu\text{C}$	

Notes: 5. Pulse test

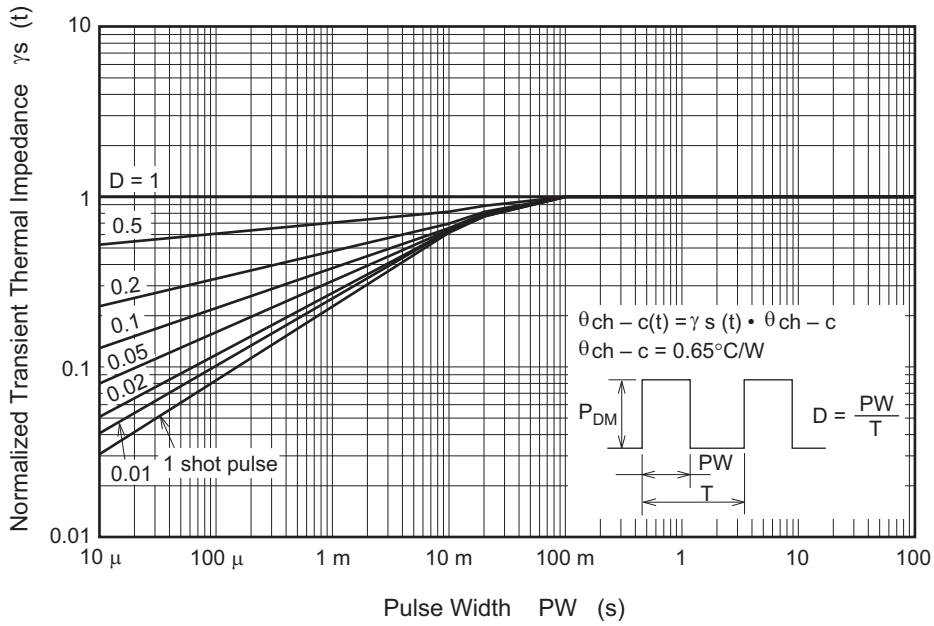
Main Characteristics



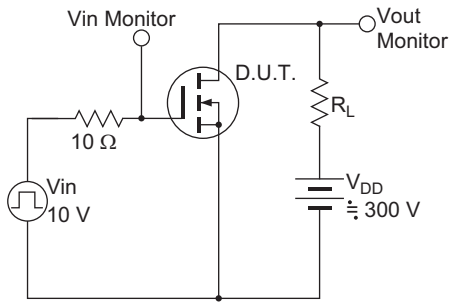




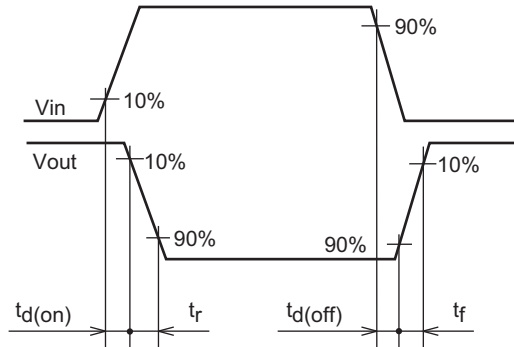
Normalized Transient Thermal Impedance vs. Pulse Width



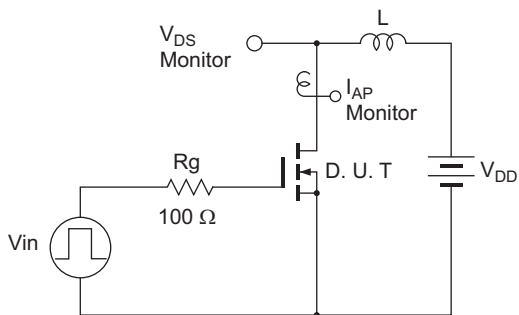
Switching Time Test Circuit



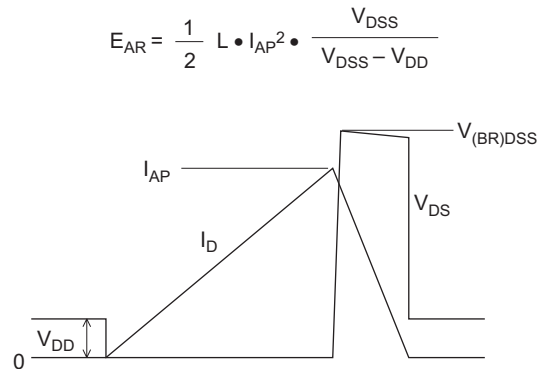
Waveform



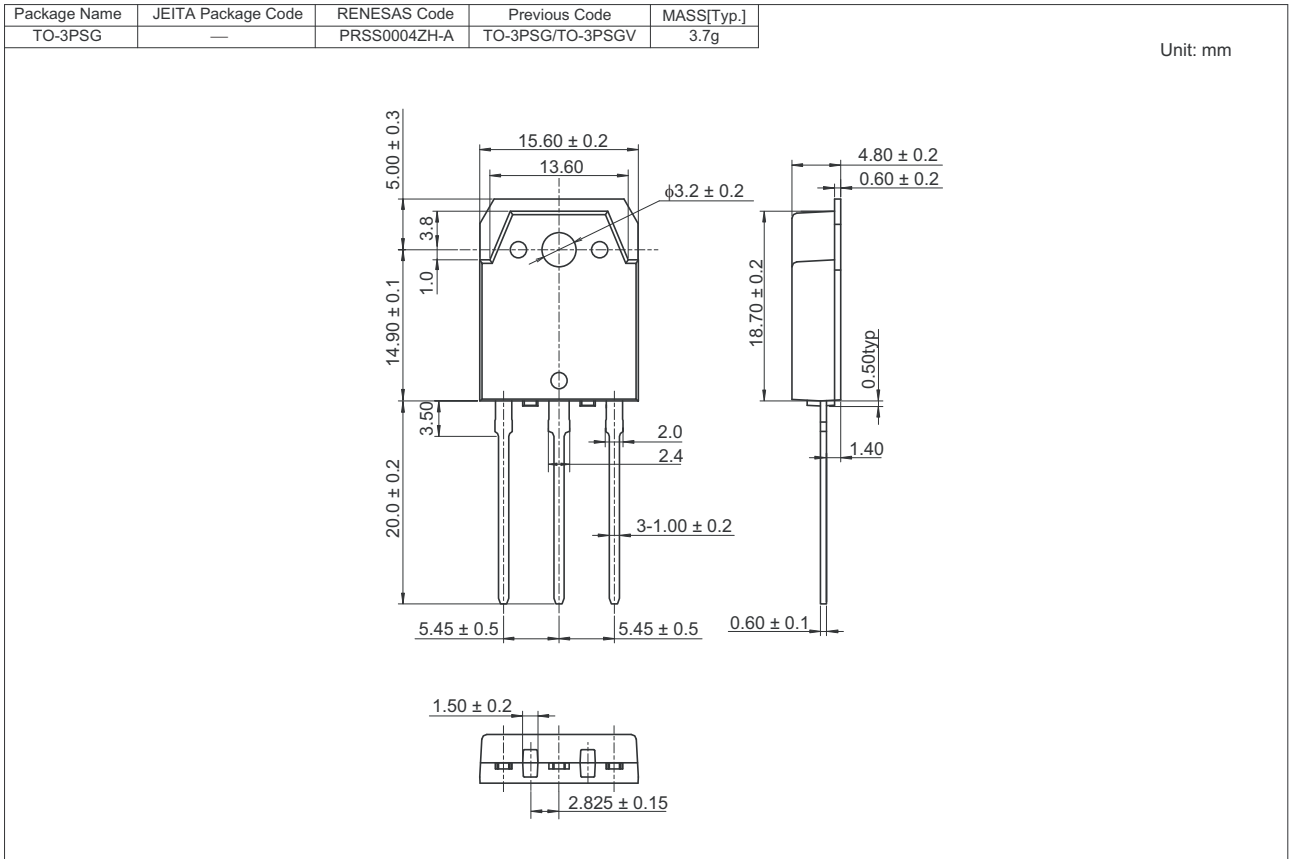
Avalanche Test Circuit



Avalanche Waveform



Package Dimension



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK60S5DPK-M0#T0	30 pcs	Tube

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