

RJK60S5DPN

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

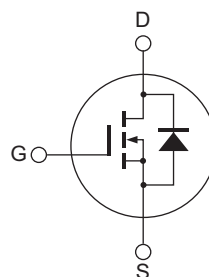
R07DS0952EJ0200
Rev.2.00
Jan 23, 2013

Features

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

Outline

RENESAS Package code: PRSS0004AC-A
(Package name: TO-220AB)



1. Gate
2. Drain
3. Source

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	I_D ^{Note1}	20	A
	I_D ^{Note1}	12.6	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	40	A
Body-drain diode reverse drain current	I_{DR} ^{Note1}	20	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	40	A
Avalanche current	I_{AP} ^{Note2}	5	A
Avalanche energy	E_{AR} ^{Note2}	1.36	mJ
MOSFET dv/dt ruggedness	dv/dt ^{Note3}	150	V/ns
Channel dissipation	P_{ch} ^{Note2}	166.6	W
Channel to case thermal impedance	θ_{ch-c}	0.75	$^\circ\text{C}/\text{W}$
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. $ST_{ch} = 25^\circ\text{C}$, $T_{ch} \leq 150^\circ\text{C}$
 3. Value at $T_j = 25^\circ\text{C}$, $V_{DS} \leq 480$ V
 4. Value at $T_c = 25^\circ\text{C}$

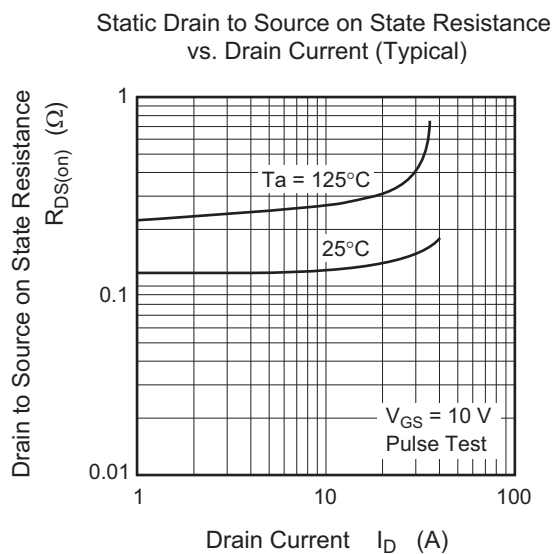
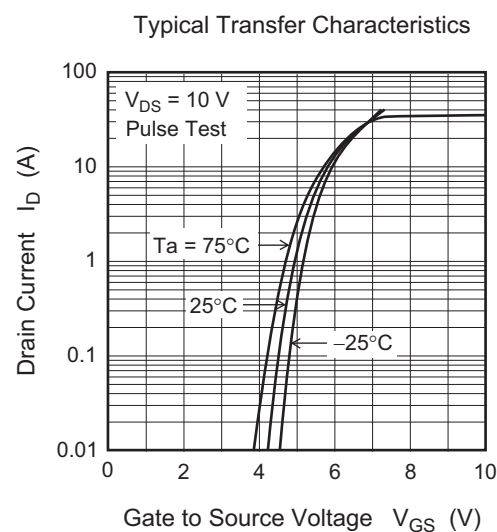
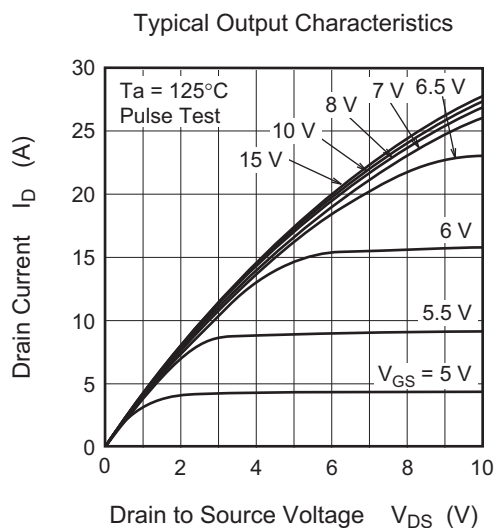
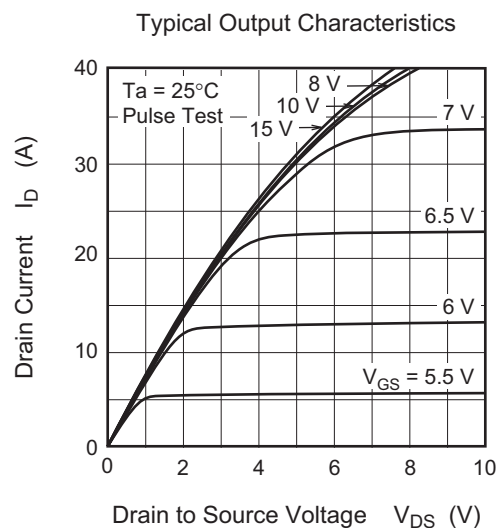
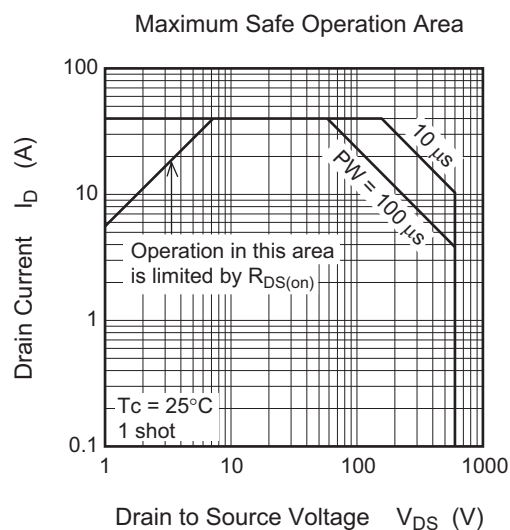
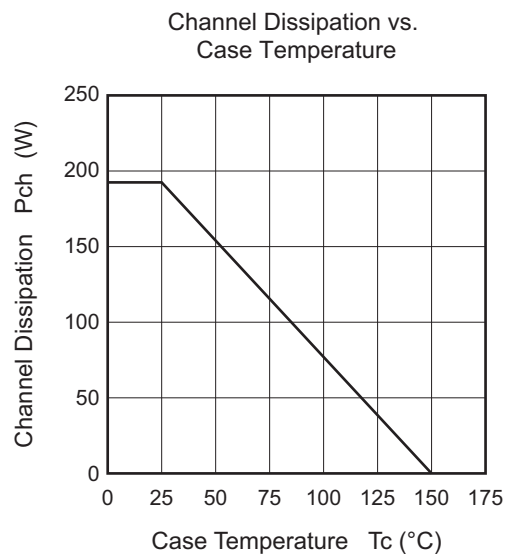
Electrical Characteristics

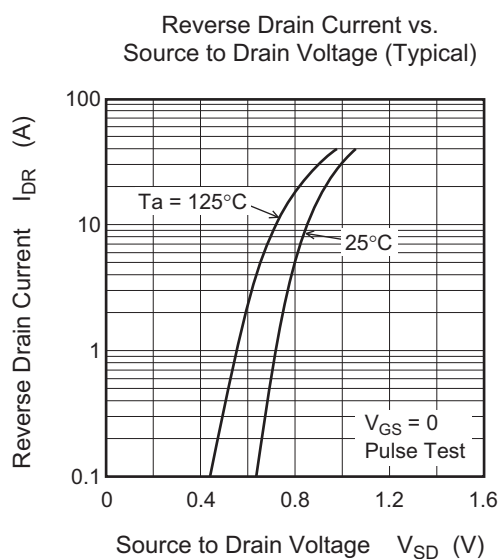
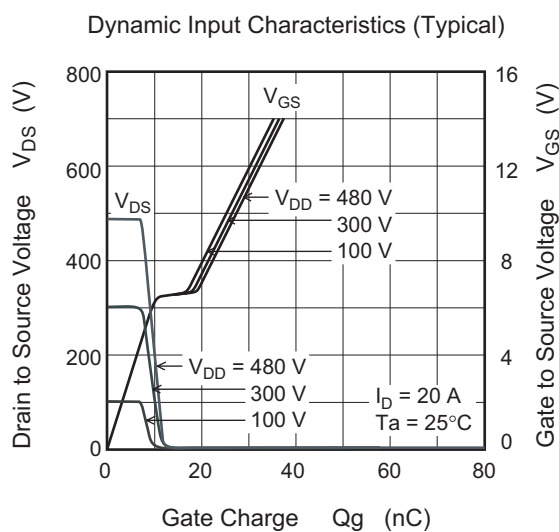
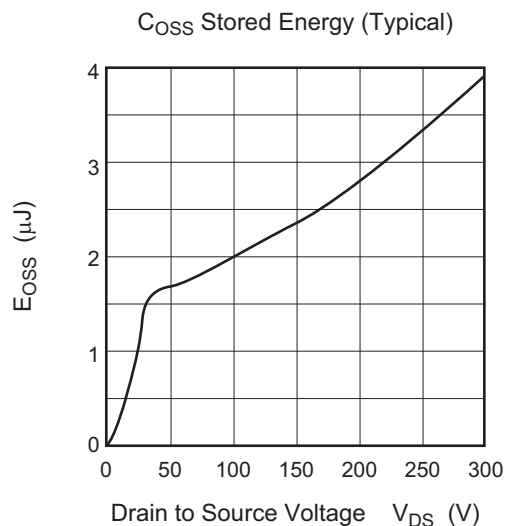
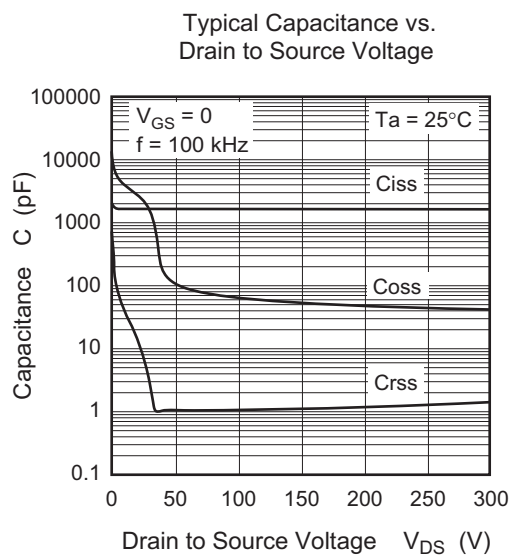
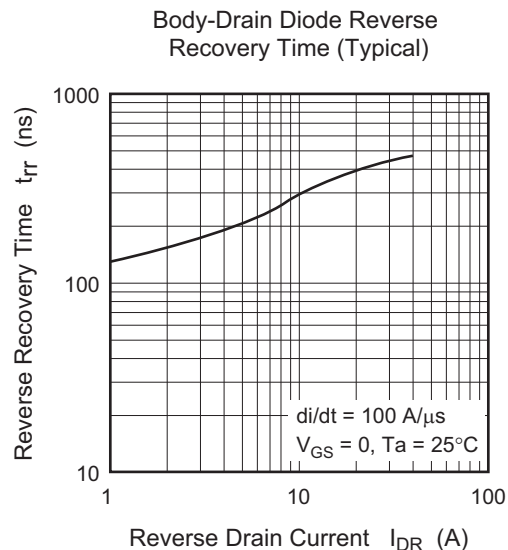
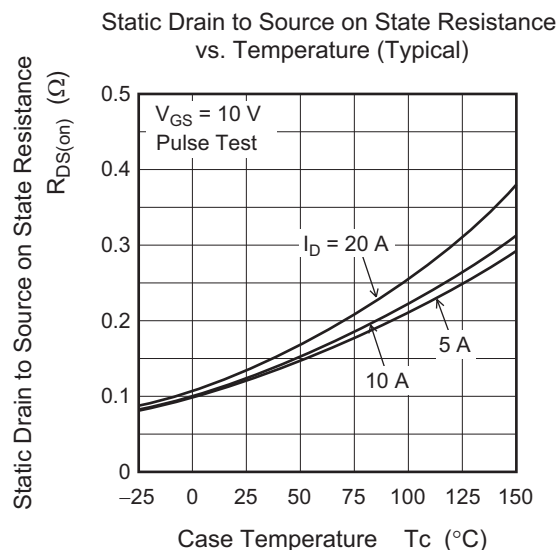
(Ta = 25°C)

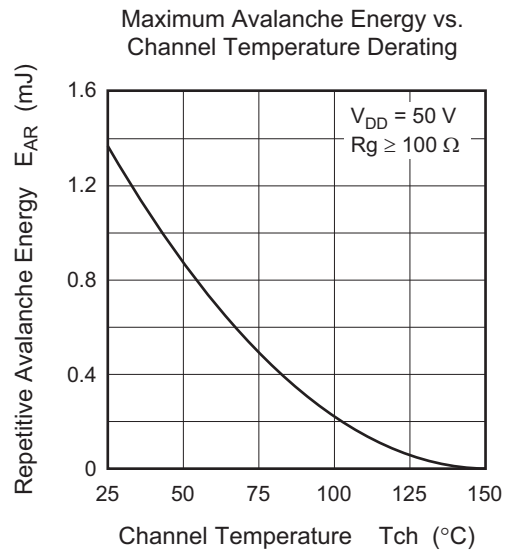
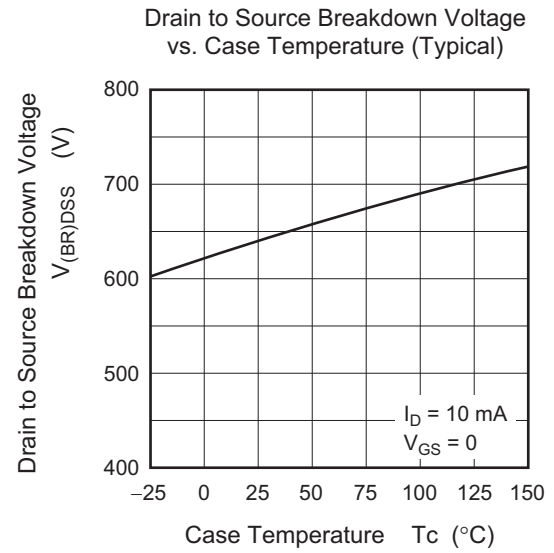
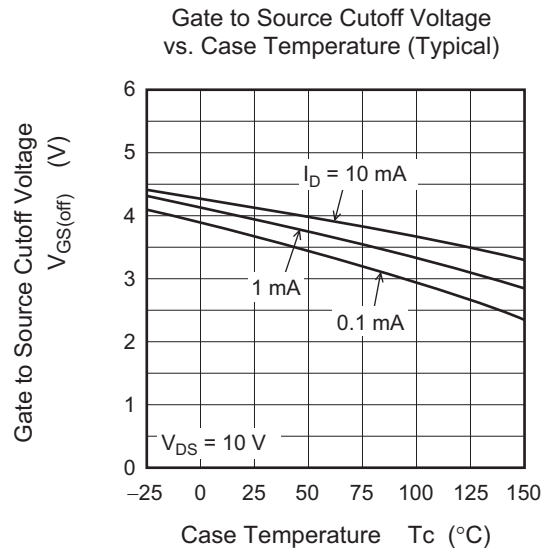
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	mA	$V_{DS} = 600 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = +30\text{V}$, -20 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	Ω	$I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note5}
	$R_{DS(on)}$	—	0.375	—	Ω	Ta = 150°C $I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note5}
Gate resistance	Rg	—	2.5	—	Ω	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	$I_D = 10 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 30 \Omega$ $R_g = 10 \Omega$ ^{Note5}
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	$I_D = 20 \text{ A}$ ^{Note4}
Body-drain diode forward voltage	V_{DF}	—	0.96	1.60	V	$I_F = 20 \text{ A}$, $V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	400	—	ns	$I_F = 20 \text{ A}$ $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ ^{Note5}
Body-drain diode reverse recovery current	I_{rr}	—	25	—	A	
Body-drain diode reverse recovery charge	Q_{rr}	—	5.6	—	μC	

Notes: 5. Pulse test

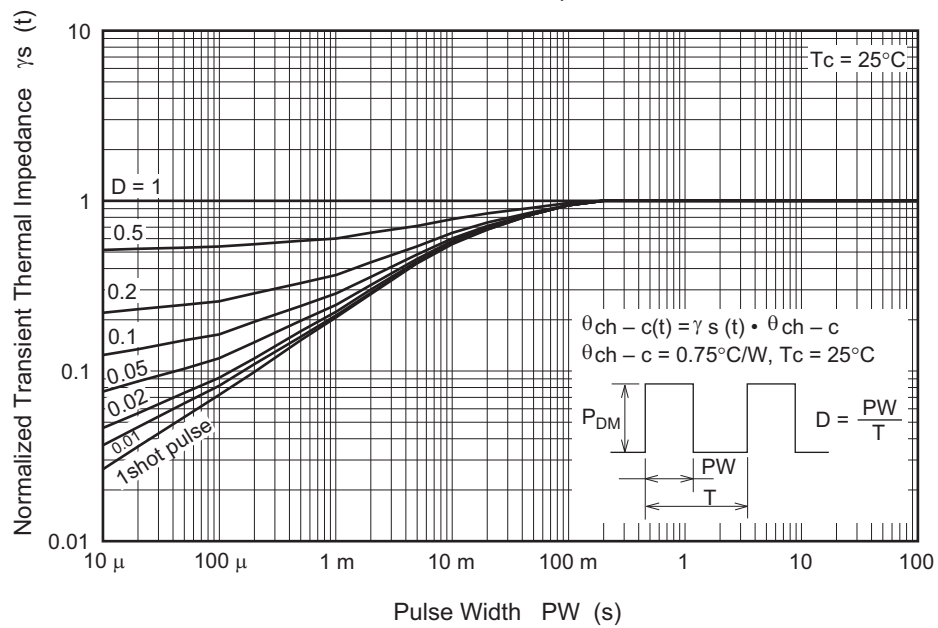
Main Characteristics



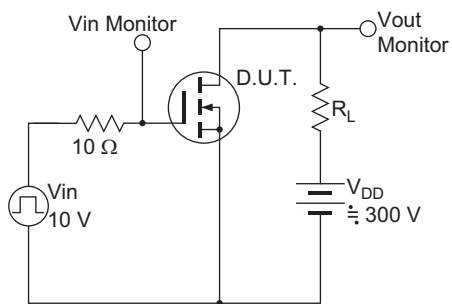




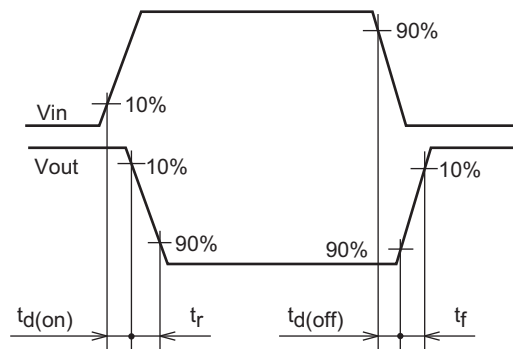
Normalized Transient Thermal Impedance vs. Pulse Width



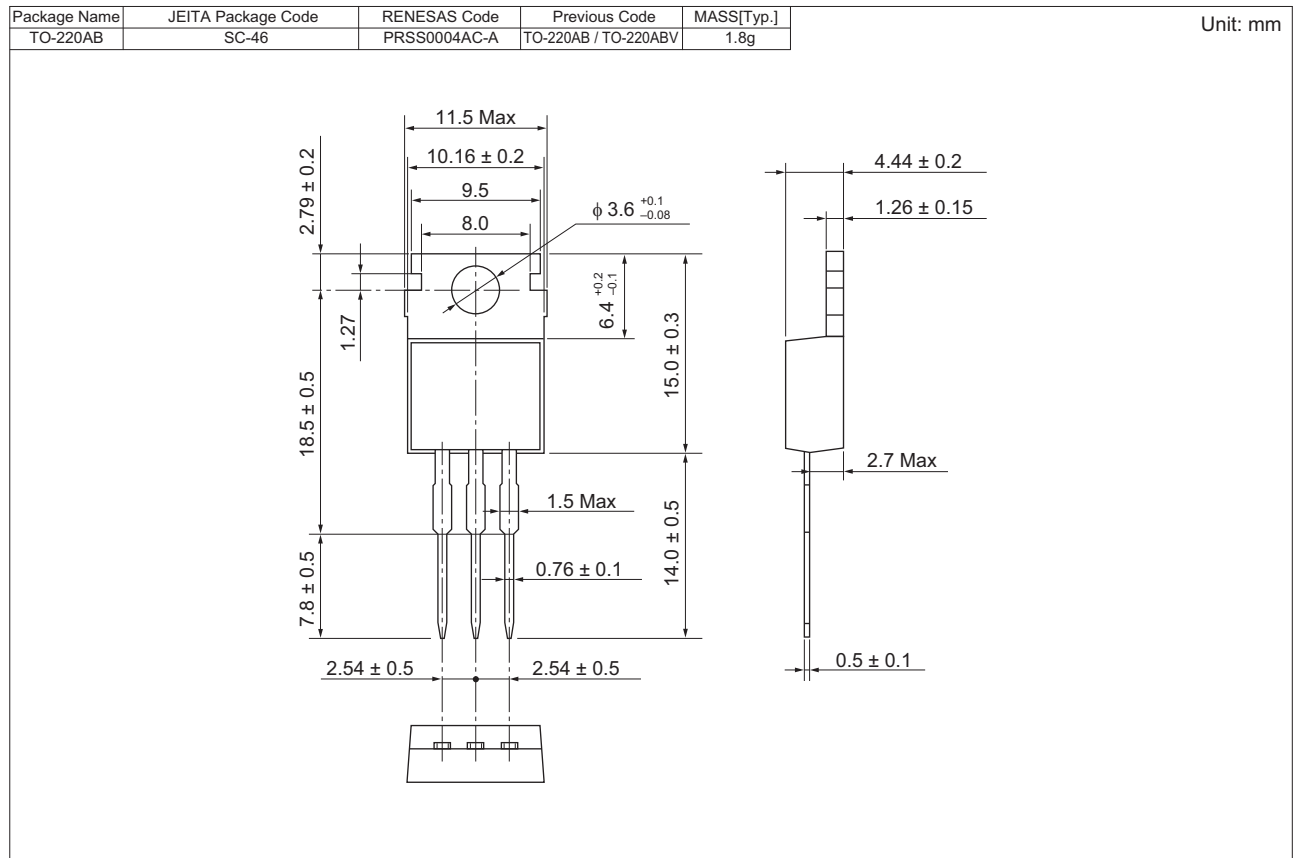
Switching Time Test Circuit



Waveform



Package Dimension



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK60S5DPN-00#T2	50 pcs	Tube

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