



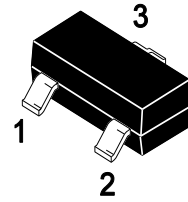
# PJM7002KNSA

## N-Enhancement Field Effect Transistor

### Features

- Fast switching
- Low gate charge and  $R_{DS(ON)}$
- Low reverse transfer capacitances
- ESD protected(HBM) up to 2KV

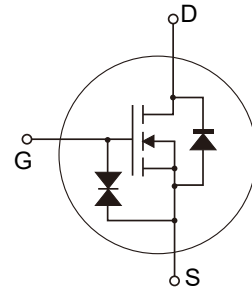
SOT-23



1. Gate 2. Source 3. Drain  
Marking: K72

### Applications

- PWM applications
- Load switch
- Power management



### Absolute Maximum Ratings

( $T_C=25^{\circ}C$ , unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	0.3	A
Power Dissipation	$P_D$	0.35	W
Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-55 to 150	$^{\circ}C$
<b>Thermal Characteristics</b>			
Parameter	Symbol	Typ.	Units
Maximum Junction-to-Ambient	$R_{\theta JA}$	357	$^{\circ}C/W$



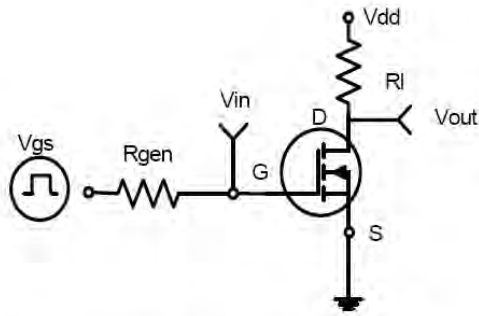
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
<b>Static Parameters</b>						
$V_{DSS}$	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	--	--	V
$I_{DSS}$	Drain to Source Leakage Current	$V_{DS}=60, V_{GS}=0V$	--	--	1	$\mu A$
$I_{GSS}$	Gate to Source Forward Leakage	$V_{DS} = 0V, V_{GS} = \pm 20V$	--	--	$\pm 10$	$\mu A$
$R_{DS(ON)}$	Drain-to-Source On-Resistance <sup>Note1</sup>	$V_{GS}=10V, I_D=0.5A$	--	1.9	3	$\Omega$
		$V_{GS}=4.5V, I_D=0.3A$	--	2.2	4	$\Omega$
$V_{GS(TH)}$	Gate Threshold Voltage <sup>Note1</sup>	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	2.5	V
$g_{FS}$	Forward Transconductance <sup>Note1</sup>	$V_{DS}=10V, I_D=0.2A$	0.1	5	--	S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{GS} = 0V, V_{DS}=15V$ $f=1.0MHz$	--	20	--	pF
$C_{oss}$	Output Capacitance		--	12	--	
$C_{rss}$	Reverse Transfer Capacitance		--	4.4	--	
<b>Switching Characteristics</b>						
$t_{d(ON)}$	Turn-on Delay Time	$I_D = 0.2A, V_{DD} = 15V$ $V_{GS}=10V,$ $R_G = 3\Omega$	--	10	--	ns
$t_r$	Rise Time		--	45	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	15	--	
$t_f$	Fall Time		--	10	--	
$Q_g$	Total Gate Charge	$I_D = 0.3A, V_{DD}=15V, V_{GS}=10V$	--	1.7	--	nC
$Q_{gs}$	Gate to Source Charge		--	0.9	--	
$Q_{gd}$	Gate to Drain (" Miller ")Charge		--	1.3	--	
<b>Source-Drain Diode Characteristics</b>						
$I_{SD}$	Continuous Source Current (Body Diode)		--	--	0.3	A
$I_{SM}$	Maximum Pulsed Current (Body Diode)		--	--	0.9	A
$V_{SD}$	Diode Forward Voltage	$I_S=0.3A, V_{GS}=0V$	--	--	1.5	V

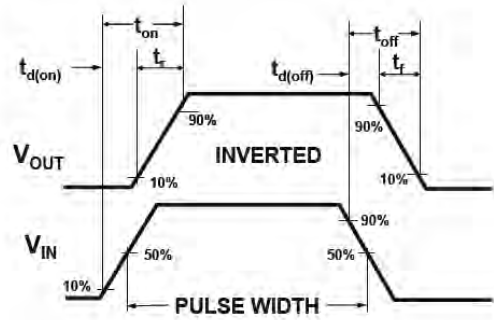
Note: 1. Pulse Test: Pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ .



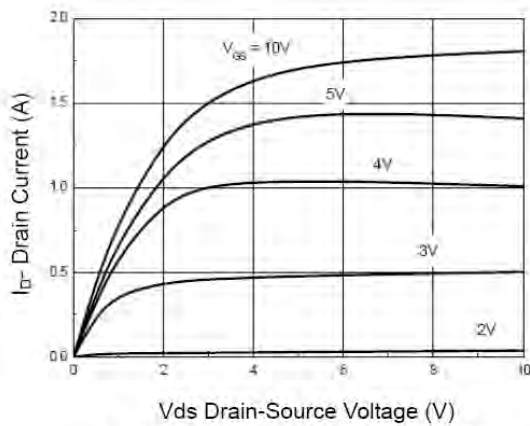
**Typical Characteristic Curves**



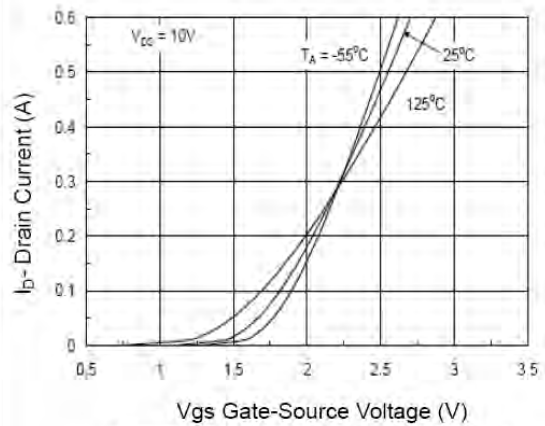
**Figure 1: Switching Test Circuit**



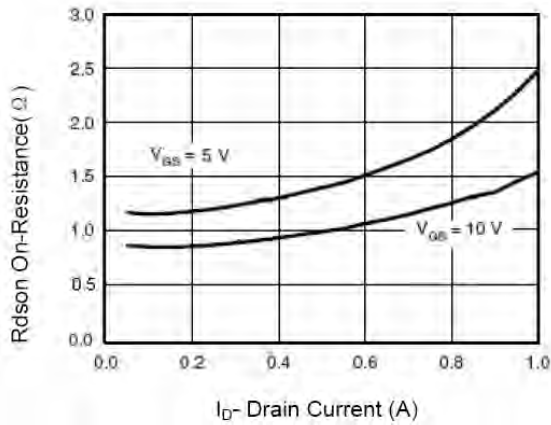
**Figure 2: Switching Waveforms**



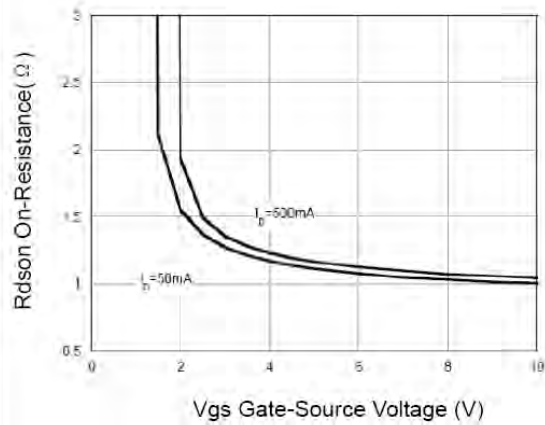
**Figure 3 Output Characteristics**



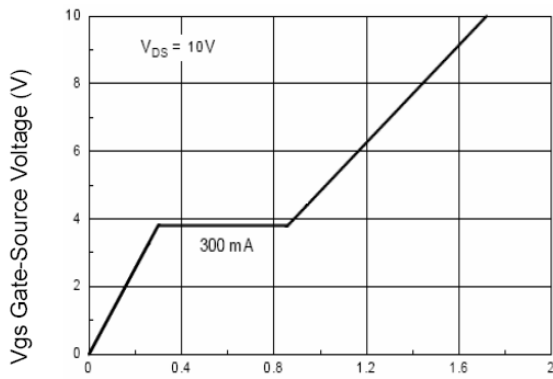
**Figure 4 Transfer Characteristics**



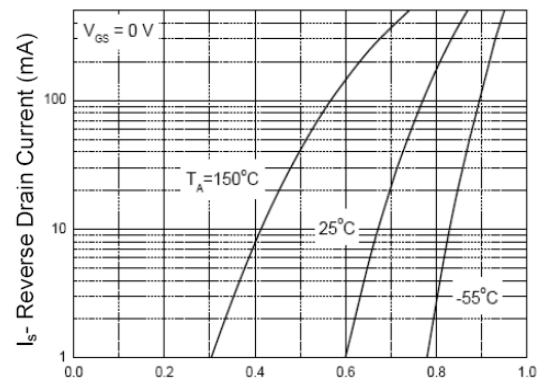
**Figure 5 Drain-Source On-Resistance**



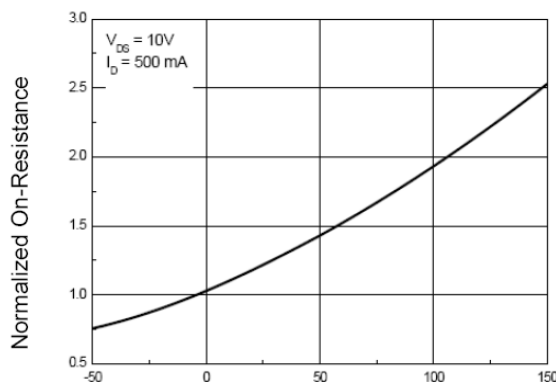
**Figure 6 Rdson vs Vgs**



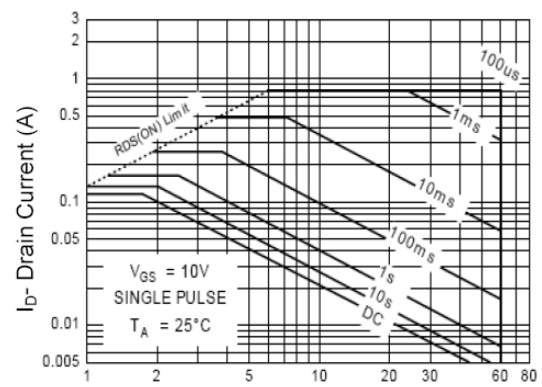
**Figure 7 Gate Charge**



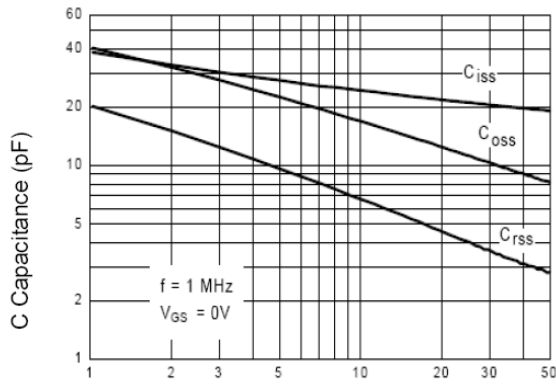
**Figure 8 Source-Drain Diode Forward**



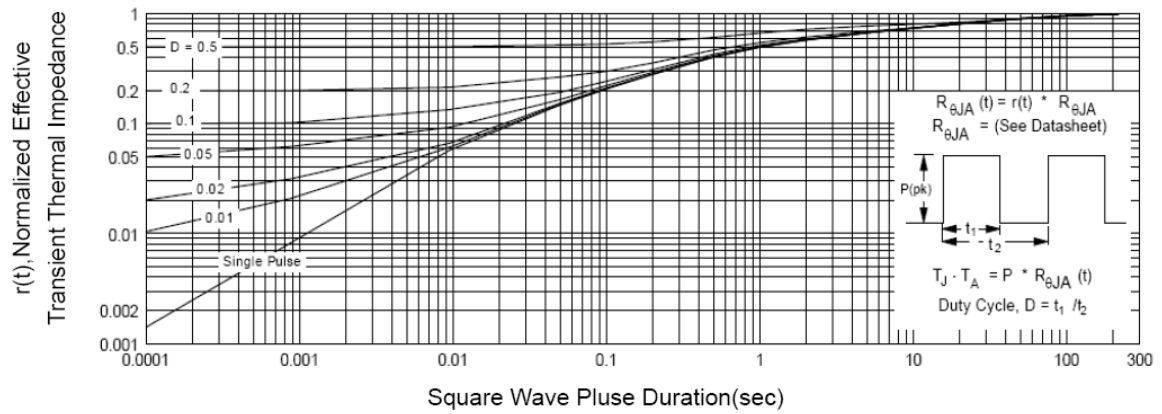
**Figure 9 Drain-Source On-Resistance**



**Figure 10 Safe Operation Area**



**Figure 11 Capacitance vs Vds**

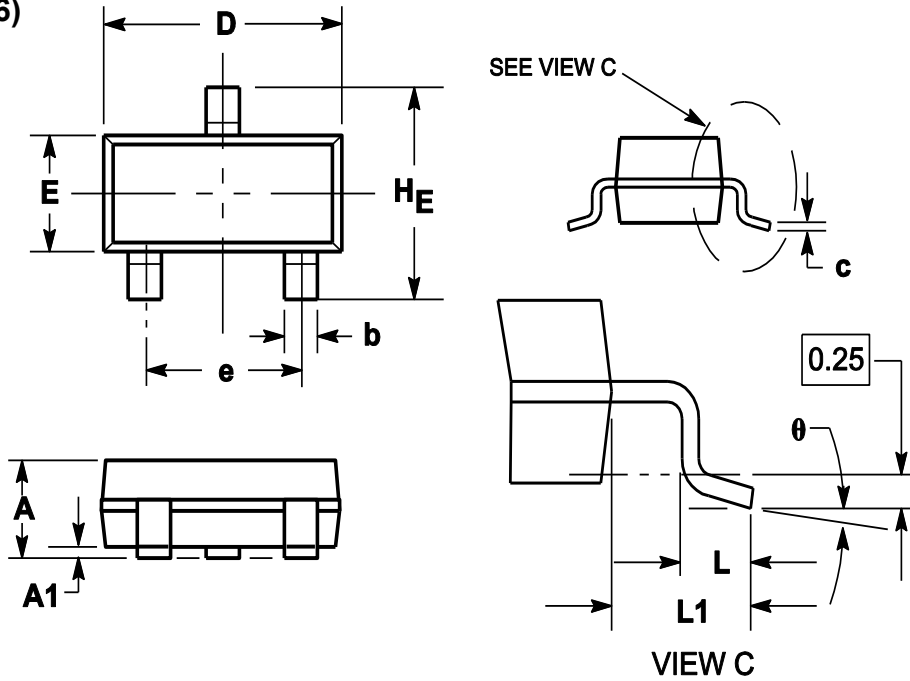


**Figure 12 Normalized Maximum Transient Thermal Impedance**

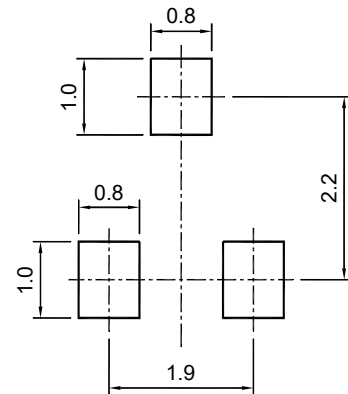


**Package Outline**

**SOT-23 (TO-236)**



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.900	1.025	1.150
A1	0.000	0.050	0.100
b	0.300	0.400	0.500
c	0.080	0.115	0.150
D	2.800	2.900	3.000
E	1.200	1.300	1.400
HE	2.250	2.400	2.550
e	1.800	1.900	2.000
L1	0.550REF		
L	0.300		0.500
θ	0°		8°



SOT-23 (TO-236)  
**Recommended soldering pad**

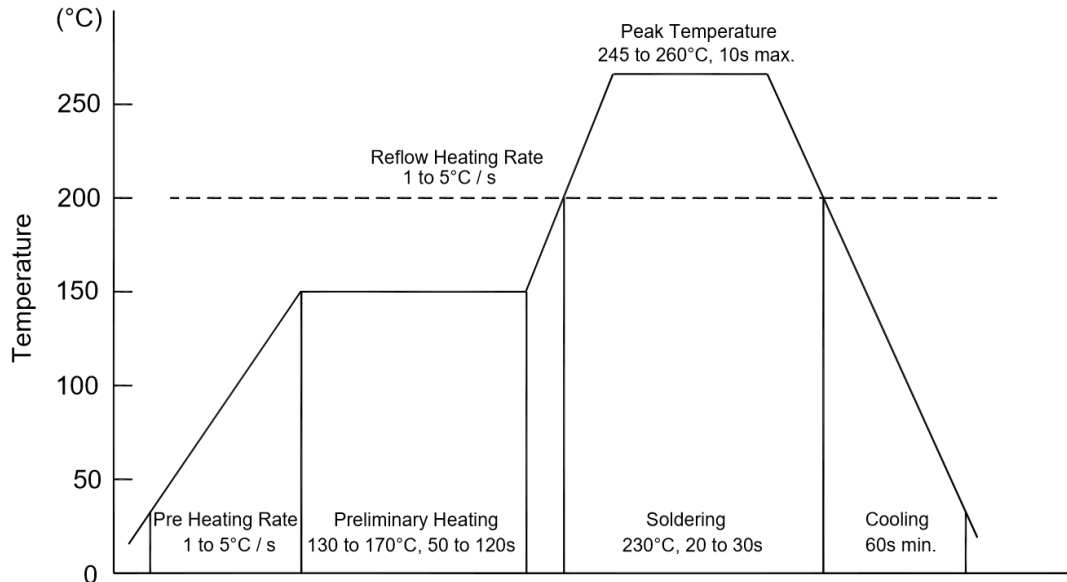
**Ordering information**

Device	Package	Shipping
PJM7002KNSA	SOT-23	3000/Reel&Tape(7inch)



## Conditions of Soldering and Storage

### ◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245 °C. If peak temperature is below 245 °C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

### ◆ Conditions of hand soldering

- Temperature: 370 °C
- Time: 3s max.
- Times: one time

### ◆ Storage conditions

- **Temperature**  
5 to 40 °C
- **Humidity**  
30 to 80% RH
- **Recommended period**  
One year after manufacturing



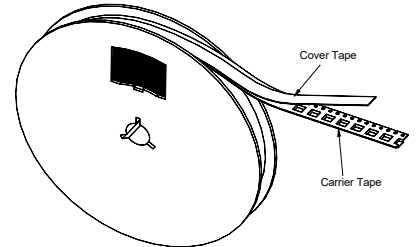
### Package Specifications

◆ The method of packaging

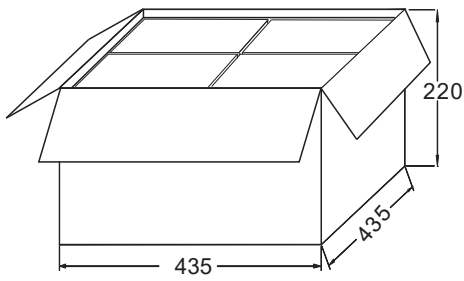
SOT-23 (TO-236)



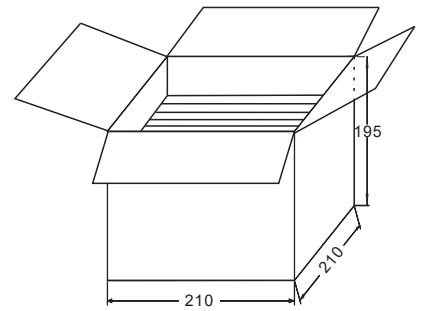
3,000 pcs per reel



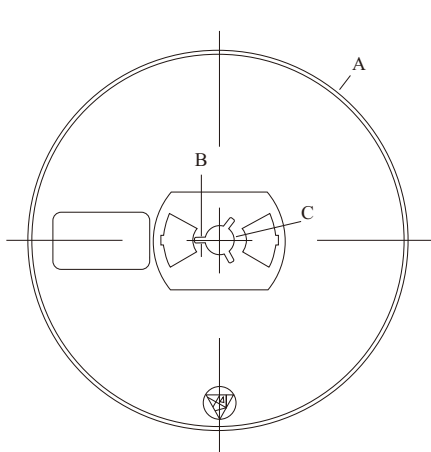
30,000 pcs per box  
10 reels per box



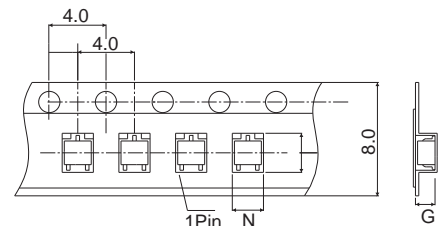
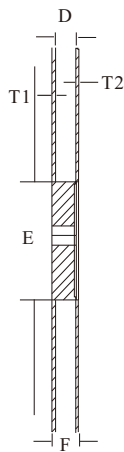
120,000 pcs per carton  
4 boxes per carton



◆ Embossed tape and reel data



Reel (7")



Tape (8mm)

Symbol	Value (unit: mm)
A	Ø 177.8±1
B	2.7±0.2
C	Ø 13.5±0.2
E	Ø 54.5±0.2
F	12.3±0.3
D	9.6+2/-0.3
T1	1.0±0.2
T2	1.2±0.2
N	3.15±0.1
G	1.25±0.1