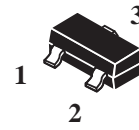
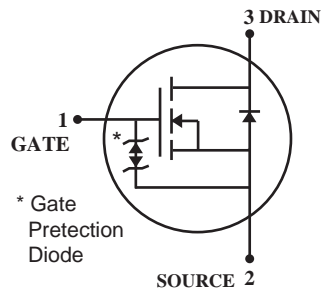


### N-Channel Enhancement Mode Power MOSFET

**(Pb)** Lead(Pb)-Free



**SOT-23**

#### Features:

- \* Low on-resistance.
- \* Fast switching speed.
- \* Low-voltage drive.
- \* Easily designed drive circuits.
- \* Easy to parallel.
- \* Pb-Free package is available.
- \* ESD Protected:2000V

#### Maximum Ratings ( $T_A = 25^\circ\text{C}$ Unless Otherwise Specified)

Parameter		Symbol	Limits	Unit
Drain-source voltage		$V_{DSS}$	60	V
Gate-source voltage		$V_{GSS}$	$\pm 20$	V
Drain current	Continuous	$I_D$	115	mA
	Pulsed	$I_{DP}^{*1}$	0.8	A
Drain reverse current	Continuous	$I_{DR}$	115	mA
	Pulsed	$I_{DRP}^{*1}$	0.8	A
Total power dissipation		$P_D^{*2}$	225	mW
Channel temperature		$T_{ch}$	150	$^\circ\text{C}$
Storage temperature		$T_{stg}$	-55~+150	$^\circ\text{C}$

1.  $P_w \leq 10\mu\text{s}$ , Duty cycle  $\leq 1\%$ .

2. When mounted on a  $1 \times 0.75 \times 0.062$  inch glass epoxy board.

#### Device Marking

2N7002K = RK

## Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Gate-source leakage current V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	I <sub>GSS</sub>	-	-	±10	μA
Drain-source breakdown voltage I <sub>D</sub> =10μA, V <sub>GS</sub> =0V	V <sub>(BR)DSS</sub>	60	-	-	V
Zero gate voltage drain current V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	I <sub>DSS</sub>	-	-	1	μA
Gate threshold voltage V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	V <sub>GS(th)</sub>	1	1.85	2.5	V
Drain-source on-state resistance I <sub>D</sub> =0.5A, V <sub>GS</sub> =10V I <sub>D</sub> =0.05A, V <sub>GS</sub> =5V	R <sub>DS(on)</sub> *	-	-	7.5	Ω
		-	-	7.5	
Forward transfer admittance V <sub>DS</sub> =10V, I <sub>D</sub> =0.2A	Y <sub>fs</sub>  *	80	-	-	mS
Input capacitance V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	C <sub>iss</sub>	-	25	50	pF
Output capacitance V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	C <sub>oss</sub>	-	10	25	pF
Reverse transfer capacitance V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	C <sub>rss</sub>	-	3.0	5.0	pF
Turn-on delay time I <sub>D</sub> =200mA, V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>L</sub> =150Ω, R <sub>GS</sub> =10Ω	t <sub>d(on)</sub> *	-	12	20	ns
Turn-off delay time I <sub>D</sub> =200mA, V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>L</sub> =150Ω, R <sub>GS</sub> =10Ω	t <sub>d(off)</sub> *	-	20	30	ns

\* PW ≤ 300μs, Duty cycle ≤ 1%

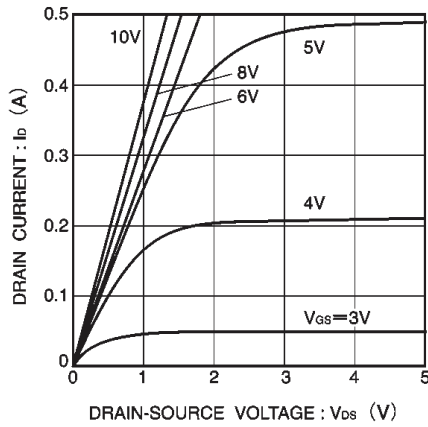


Fig.1 Typical output characteristics

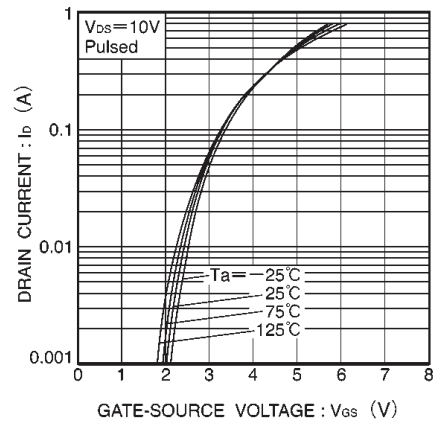


Fig.2 Typical transfer characteristics

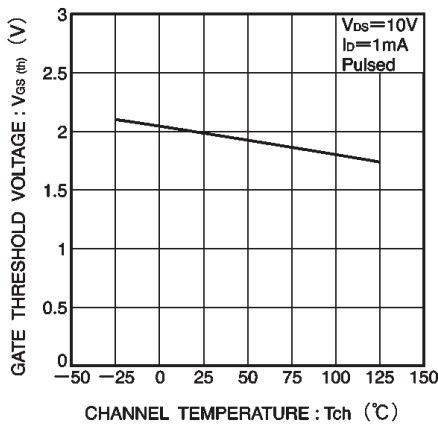


Fig.3 Gate threshold voltage vs. channel temperature

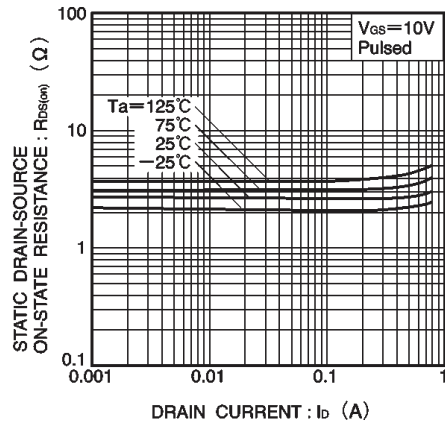


Fig.4 Static drain-source on-state resistance vs. drain current ( I )

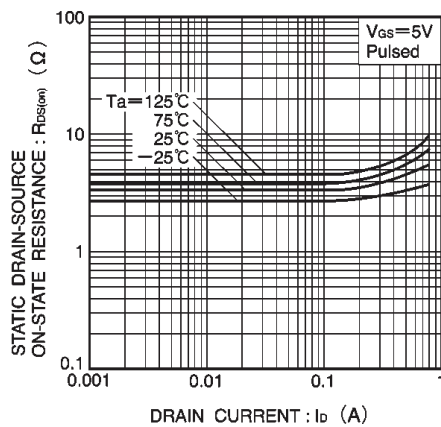


Fig.5 Static drain-source on-state resistance vs. drain current ( I )

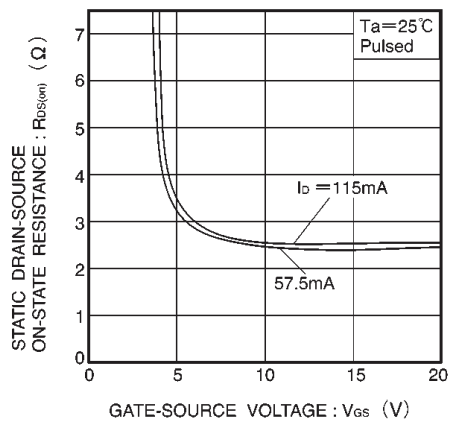


Fig.6 Static drain-source on-state resistance vs. gate-source voltage

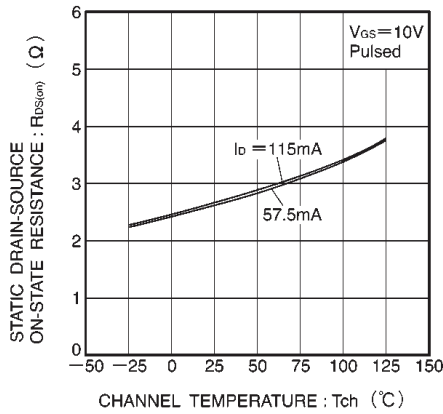


Fig.7 Static drain-source on-state resistance vs. channel temperature

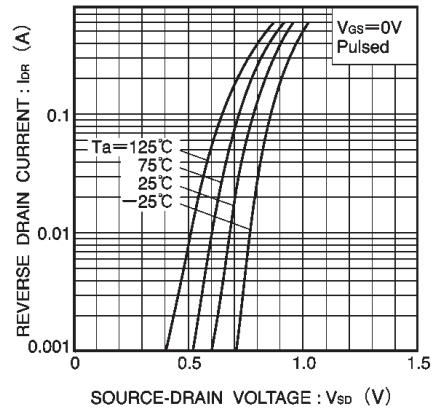


Fig.8 Reverse drain current vs. source-drain voltage (I)

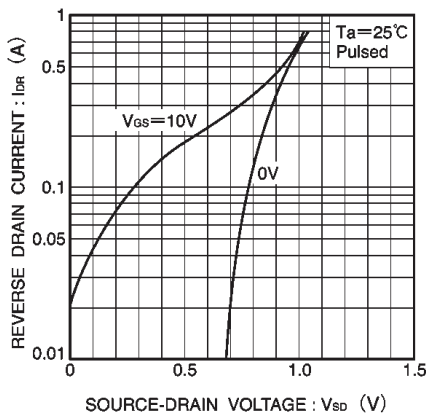


Fig.9 Reverse drain current vs. source-drain voltage (II)

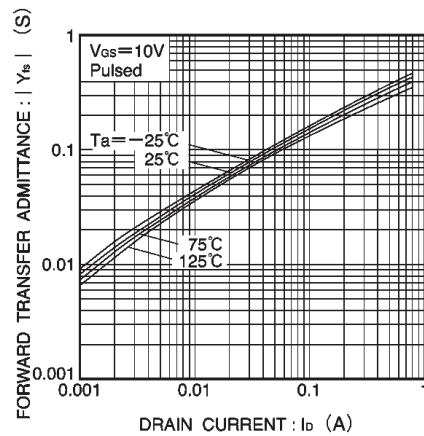


Fig.10 Forward transfer admittance vs. drain current

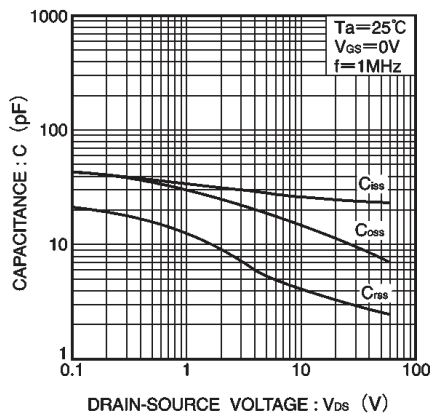


Fig.11 Typical capacitance vs. drain-source voltage

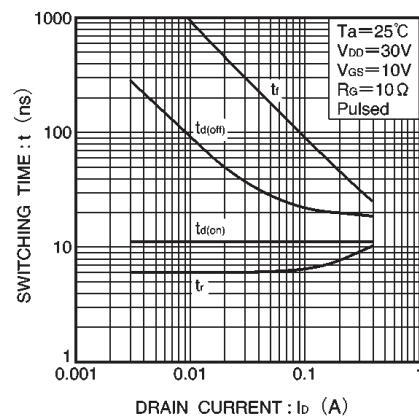


Fig.12 Switching characteristics (See Figures 13 and 14 for the measurement circuit and resultant waveforms)

## Switching characteristics measurement circuit

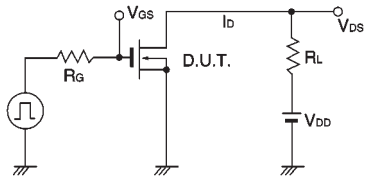


Fig.13 Switching time measurement circuit

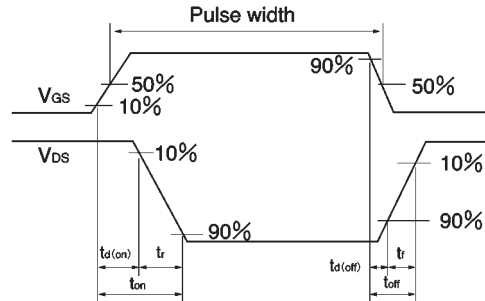
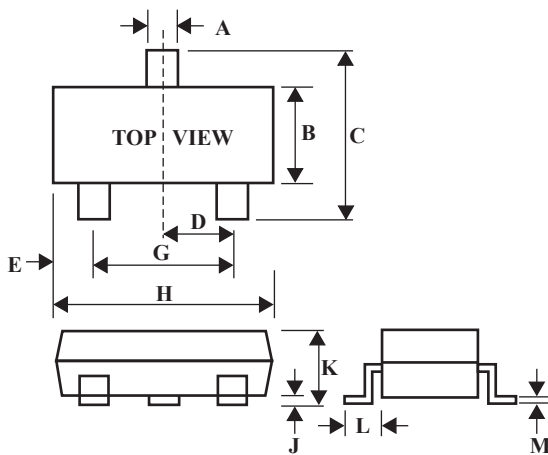


Fig.14 Switching time waveforms

## SOT-23 Outline Dimension



SOT-23		
Dim	Min	Max
A	0.35	0.51
B	1.19	1.40
C	2.10	3.00
D	0.85	1.05
E	0.46	1.00
G	1.70	2.10
H	2.70	3.10
J	0.01	0.13
K	0.89	1.10
L	0.30	0.61
M	0.076	0.25