YEA SHIN TECHNOLOGY CO., LTD

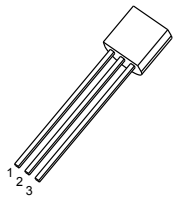
2N7002K

N-Channel Enhancement MOSFET

VDS= 60V, ID= 0.34A

TO-92

1. SOURCE
2. GATE
3. DRAIN



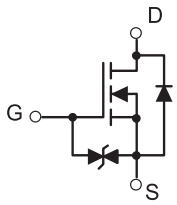
Features

- High density cell design for Low $R_{DS(on)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability
- ESD protected

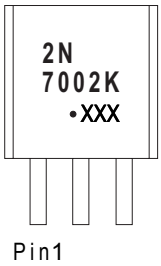
Applications

- Load Switch for Portable Devices
- DC/DC Converter

Equivalent circuit



MARKING



2N7002K= Device code
Solid dot = Green molding compound device, if none, the normal device
XXX= Code

ORDERING INFORMATION

Part Number	Package	Packing Method	Pack Quantity
2N7002K	TO-92	Bulk	1000pcs/Bag
2N7002K-TA	TO-92	Tape	2000pcs/Box

MOSFET MAXIMUM RATINGS (T_a = 25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source voltage	60	V
V_{GS}	Gate-Source voltage	±20	V
I_D	Drain Current	340	mA
P_D	Power Dissipation	0.625	W
T_J	Junction Temperature	150	℃
T_{stg}	Storage Temperature	-55~+150	℃
$R_{\theta JA}$	Thermal Resistance fromJunction to Ambient	200	℃/W

DEVICE CHARACTERISTICS

2N7002K

Electrical Characteristics **(T_A=25 ℃, unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0V, I_D =250μA	60			V
Gate Threshold Voltage*	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =1mA	1	1.3	2.5	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =48V,V_{GS} = 0V			1	μA
Gate –Source leakage current	I_{GSS1}	V_{GS} =±20V, V_{DS} = 0V			±10	μA
	I_{GSS2}	V_{GS} =±10V, V_{DS} = 0V			±200	nA
	I_{GSS3}	V_{GS} =±5V, V_{DS} = 0V			±100	nA
Drain-Source On-Resistance*	$R_{DS(on)}$	V_{GS} = 4.5V, I_D =200mA		1.1	5.3	Ω
		V_{GS} =10V,I_D =500mA		0.9	5	Ω
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=300mA			1.5	V
Recovered charge	Q_r	V_{GS}=0V,I_S=300mA,V_R=25V, dI_S/d_t=-100A/μS		30		nC
Dynamic Characteristics**						
Input Capacitance	C_{iss}	V_{DS} =10V,V_{GS} =0V,f =1MHz			40	pF
Output Capacitance	C_{oss}				30	pF
Reverse Transfer Capacitance	C_{rss}				10	pF
Switching Characteristics**						
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=10V,V_{DD}=50V,R_G=50Ω, R_{GS}=50Ω, R_L=250Ω			10	ns
Turn-Off Delay Time	$t_{d(off)}$				15	ns
Reverse recovery Time	t_{rr}	V_{GS}=0V,I_S=300mA,V_R=25V, dI_S/d_t=-100A/μS		30		ns
GATE-SOURCE ZENER DIODE						
Gate-Source Breakdown Voltage	BV_{GSO}	I_{gs}=±1mA (Open Drain)	±21.5		±30	V

Notes :

*Pulse Test : Pulse Width ≤300μs, Duty Cycle ≤2%.

**These parameters have no way to verify.

DEVICE CHARACTERISTICS

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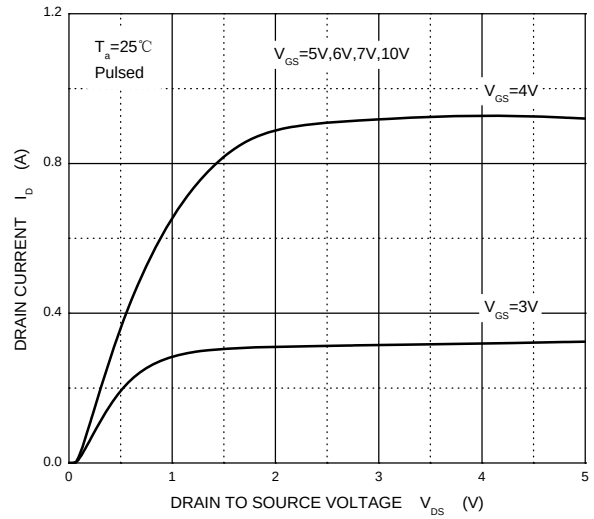
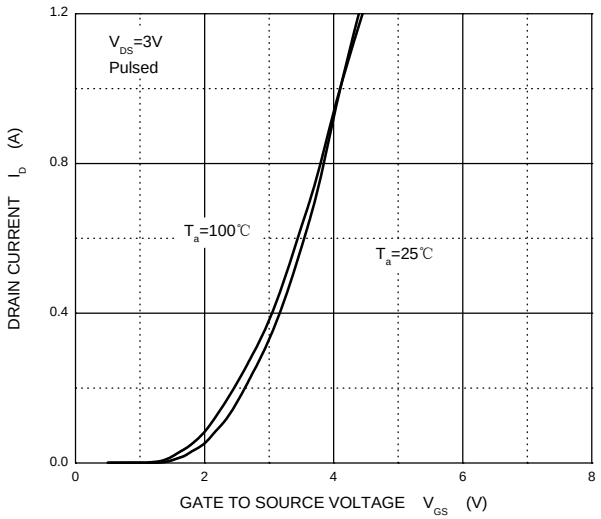
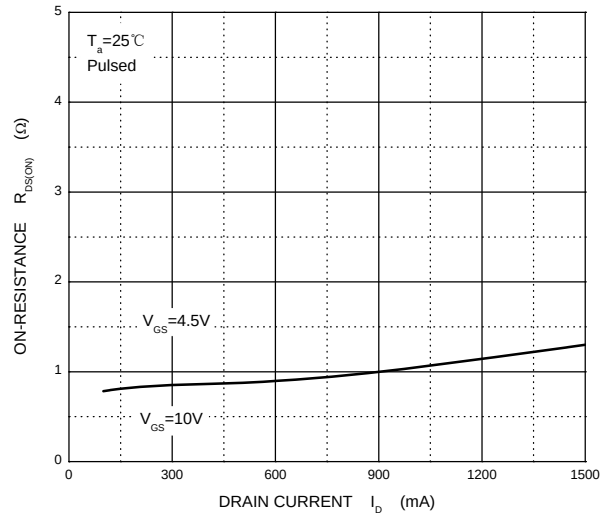
Output Characteristics



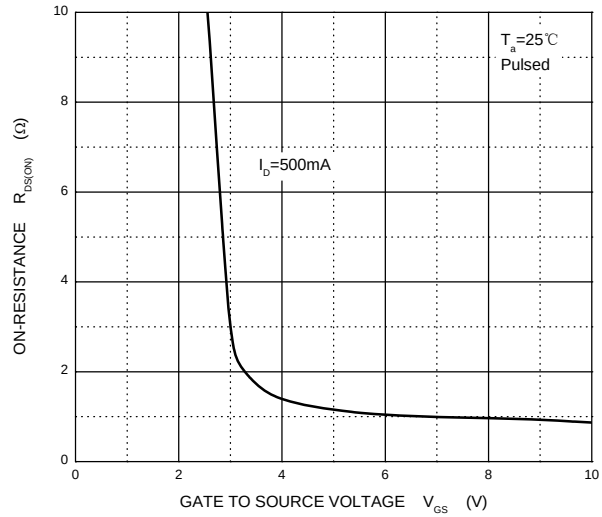
Transfer Characteristics



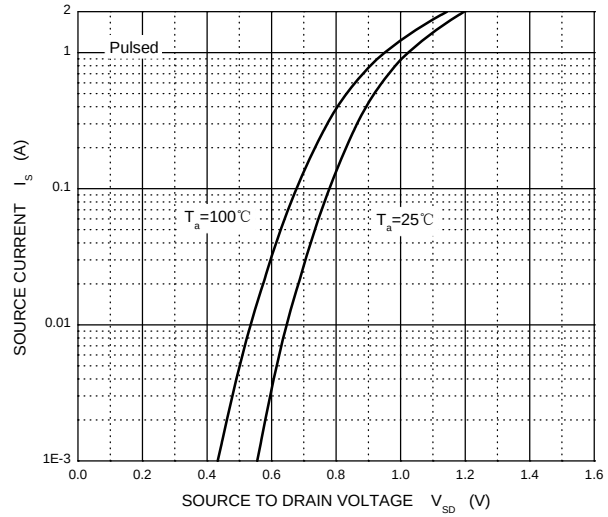
$R_{DS(ON)}$ — I_D



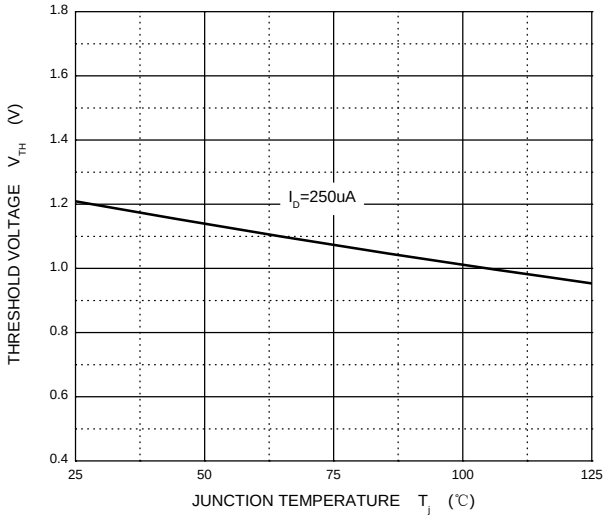
$R_{DS(ON)}$ — V_{GS}



I_S — V_{SD}



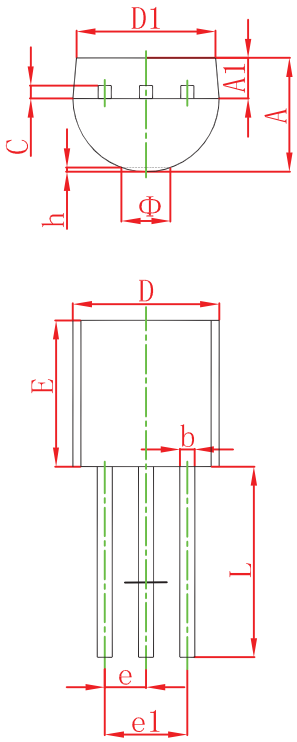
Threshold Voltage



PACKAGE OUTLINE & DIMENSIONS

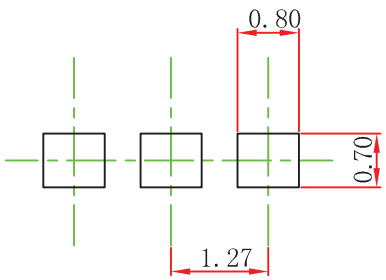
2N7002K

TO-92 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

TO-92 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

PACKAGE OUTLINE & DIMENSIONS

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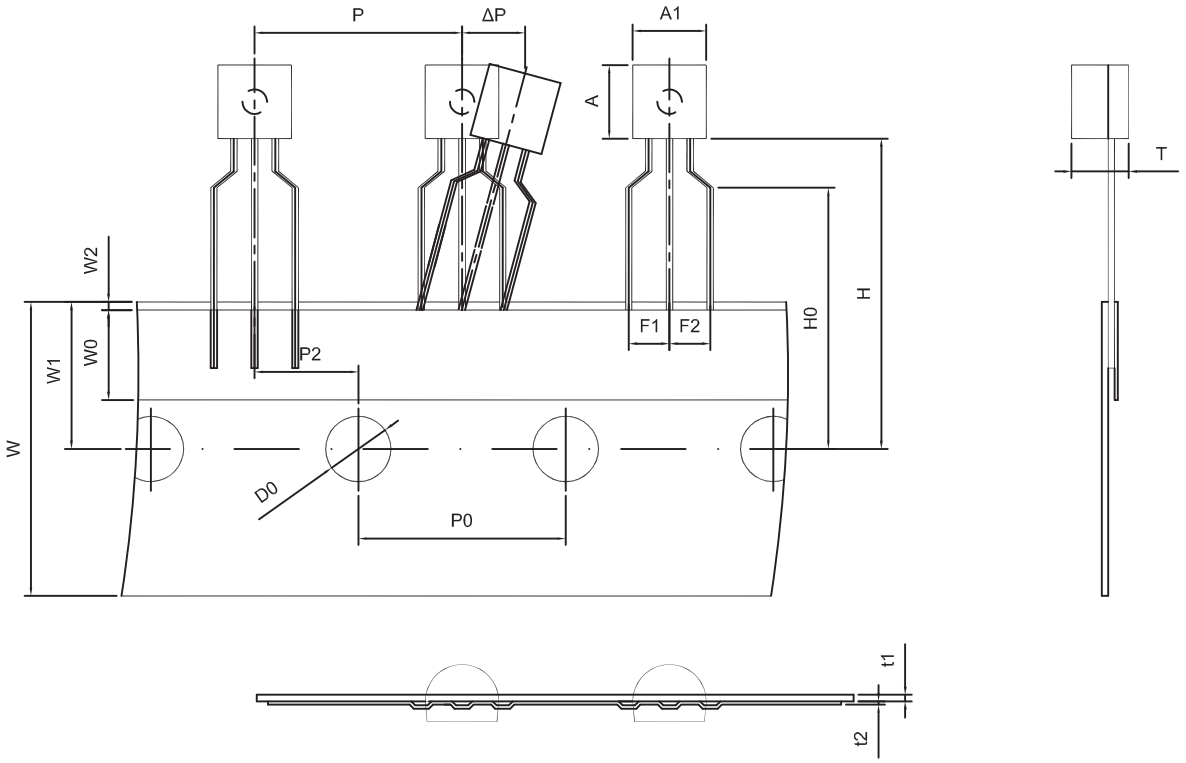
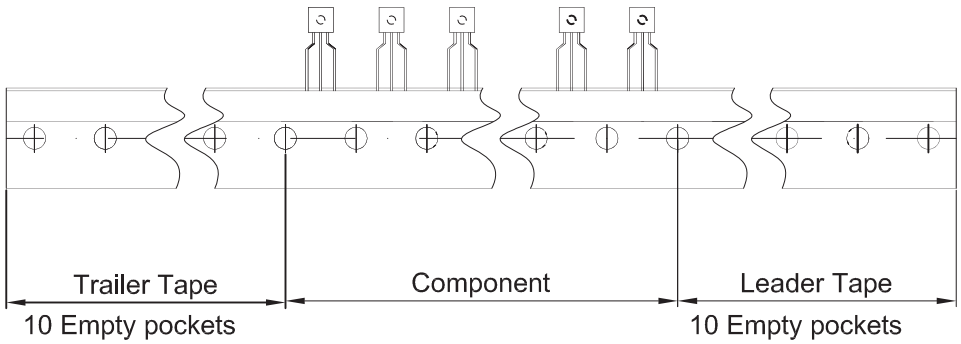
TO-92 PACKAGE TAPEING DIMENSION



Dimiensions are in millimeter								
A1	A	T	P	P0	P2	F1	F2	W
4.5	4.5	3.5	12.7	12.7	6.35	2.5	2.5	18.0
W0	W1	W2	H	H0	D0	t1	t2	ΔP
6.0	9.0	1.0 MAX.	19.0	16.0	4.0	0.4	0.2	0



Package	Box	Box Size(mm)	Carton	Carton Size(mm)
TO-92	2000 pcs	333×162×43	20,000 pcs	350×340×250