Micro Commercial Components

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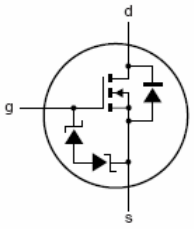
2N7002K

N-Channel MOSFET

Features



- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- High density cell design for low $R_{DS(ON)}$
- Voltage controlled small signal switch
- Rugged and reliable
- ESD Protected up to 2KV (HBM)
- Marking : 72K
- Halogen free available upon request by adding suffix "-HF"

Maximum Ratings @ 25°C Unless Otherwise Specified

Symbol	Rating	Rating	Unit
V_{DS}	Drain-source Voltage	60	V
V_{GS}	Gate-source Voltage	±20	V
I_D	Drain Current	340	mA
P_D	Total Power Dissipation	350	mW
T_J	Operating Junction Temperature	-55 to +150	℃
T_{STG}	Storage Temperature	-55 to +150	℃
RthJA	Thermal Resistance fromJunction to Ambient	357	℃/W

Electrical Characteristics @ 25°C Unless Otherwise Specified

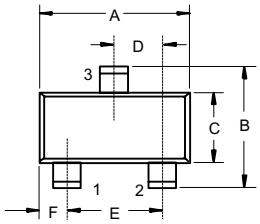
Symbol	Parameter	Min	Typ	Max	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage (V_{GS}=0Vdc, I_D=10μAdc)	60	---	---	Vdc
$V_{GS(th)}$	Gate-Threshold Voltage (V_{DS}=V_{GS}, I_D=1mAdc)	1.0	---	---	Vdc
I_{GSS}	Gate-body Leakage (V_{DS} =0Vdc, V_{GS} =±10Vdc) (V_{DS} =0Vdc, V_{GS} =±5Vdc)	--- ---	--- ---	±200 ±100	nAdc nAdc
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} =48Vdc, V_{GS} =0Vdc)	---	---	1	uAdc
$r_{DS(on)}$	Drain-Source On-Resistance (V_{GS}=4.5Vdc, I_D=200mAdc) (V_{GS}=10Vdc, I_D=500mAdc)	--- ---	--- ---	5.3 5.0	Ω
V_{SD}	Diode Forward Voltage (V_{GS}=0Vdc, I_S=300mAdc)	---	---	1.5	Vdc
Qr	Recovered charge (V_{GS}=0V, Is=300mA,V_R=25V,) (dI_s/dt=-100A/μS)	---	30	---	nC
C_{iss}	Input Capacitance	---	---	40	pF
C_{OSS}	Output Capacitance	---	---	30	
C_{rSS}	Reverse Transfer Capacitance	---	---	10	

(V_{DS}=10Vdc, V_{GS} =0Vdc f=1MHz)

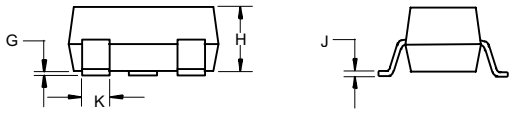
Switching

$t_{d(on)}$	Turn-on Time	V_{DD}=50 V, R_L=250Ω, R_{GS}=50Ω,V_{GS}=10 V, R_G=50Ω	---	---	10	ns
$t_{d(off)}$	Turn-off Time		---	---	15	
t_{rr}	Reverse recovery time	V_{GS}=0V, Is=300mA, V_R=25V, dI_s/dt=-100A/μS	---	30	---	

SOT-23

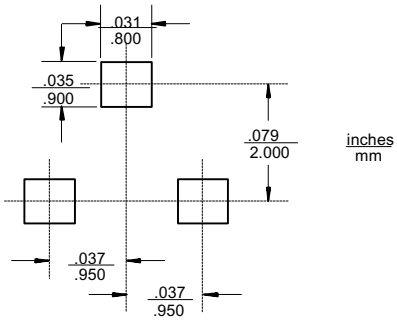


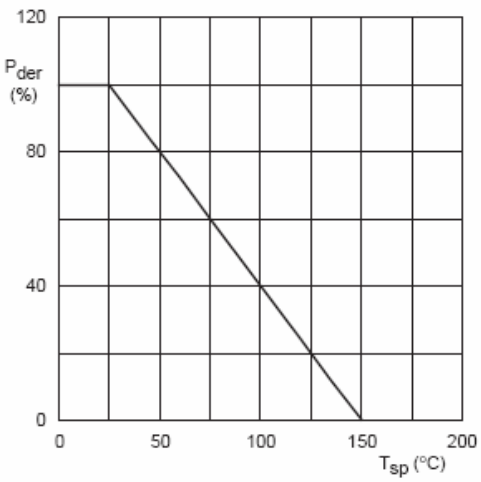
1.GATE
2. SOURCE
3. DRAIN



DIMENSIONS					
	INCHES		MM		
DIM	MIN	MAX	MIN	MAX	NOTE
A	.110	.120	2.80	3.04	
B	.083	.104	2.10	2.64	
C	.047	.055	1.20	1.40	
D	.035	.041	.89	1.03	
E	.070	.081	1.78	2.05	
F	.018	.024	.45	.60	
G	.0005	.0039	.013	.100	
H	.035	.044	.89	1.12	
J	.003	.007	.085	.180	
K	.015	.020	.37	.51	

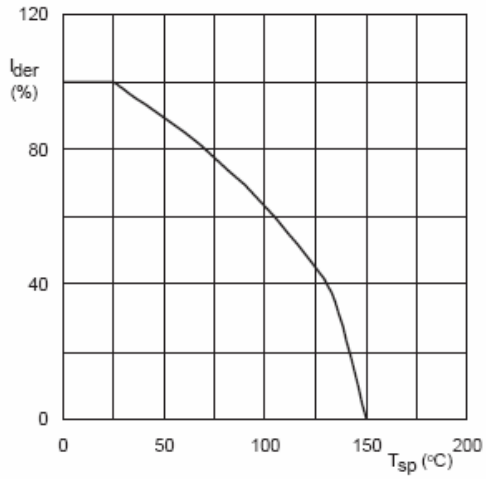
Suggested Solder Pad Layout





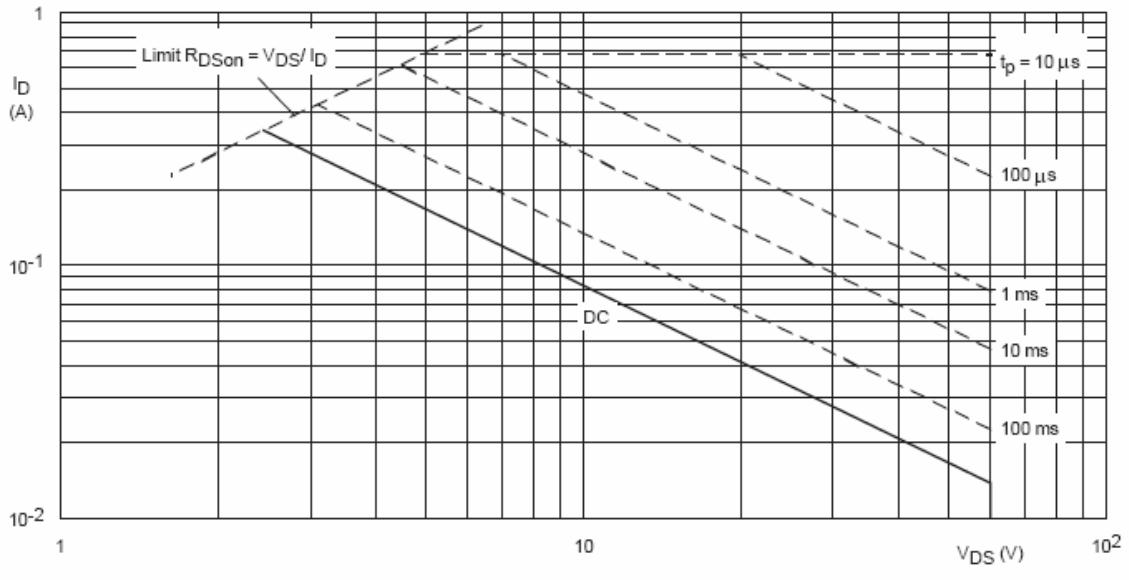
$$P_{der} = \frac{P_{tot}}{P_{tot(25°C)}} \times 100\%$$

Fig 1. Normalized total power dissipation as a function of solder point temperature.



$$I_{der} = \frac{I_D}{I_{D(25°C)}} \times 100\%$$

Fig 2. Normalized continuous drain current as a function of solder point temperature.



T_{sp} = 25 °C; I_{DM} is single pulse; V_{GS} = 10 V

Fig 3. Safe operating area; continuous and peak drain currents as a function of drain-source voltage.

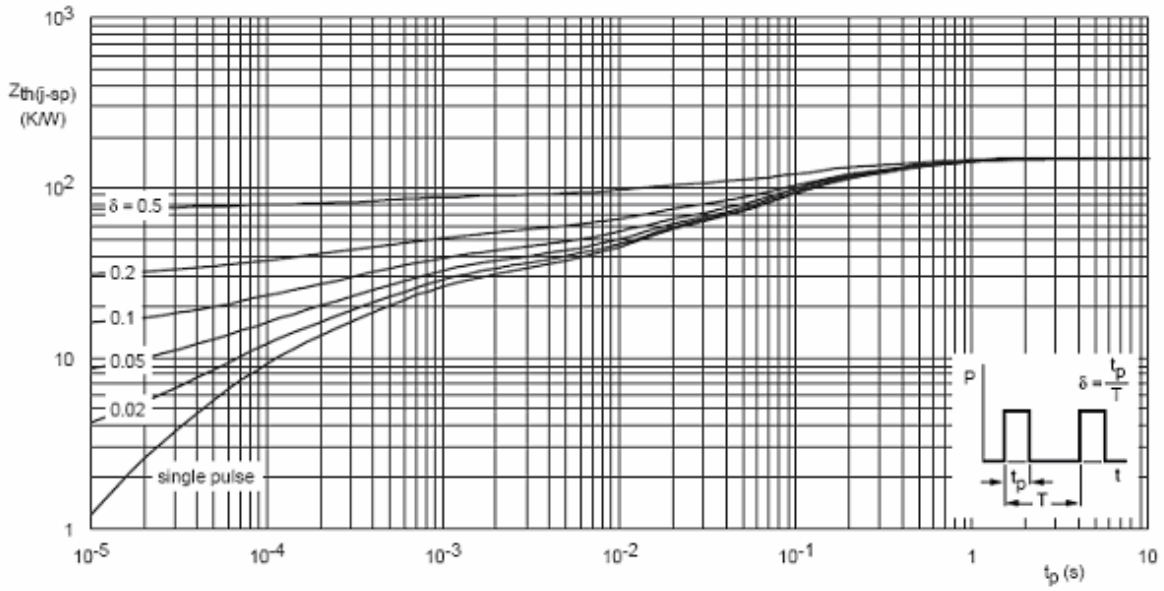
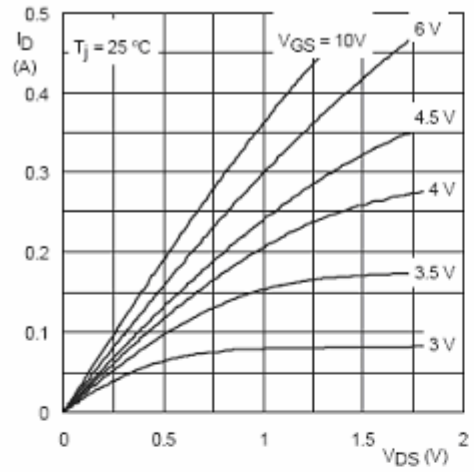
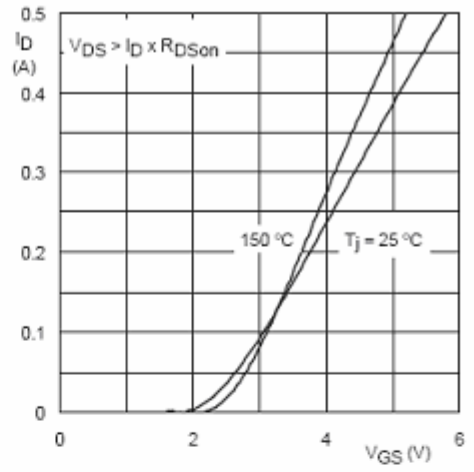


Fig 4. Transient thermal impedance from junction to solder point as a function of pulse duration.



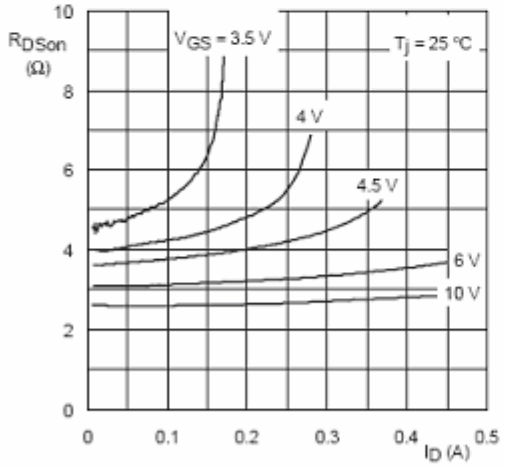
T_j = 25 °C

Fig 5. Output characteristics: drain current as a function of drain-source voltage; typical values.



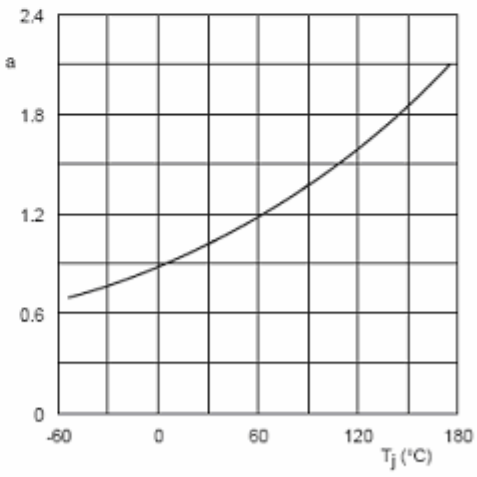
T_j = 25 °C and 150 °C; $V_{DS} > I_D \times R_{DSon}$

Fig 6. Transfer characteristics: drain current as a function of gate-source voltage; typical values.



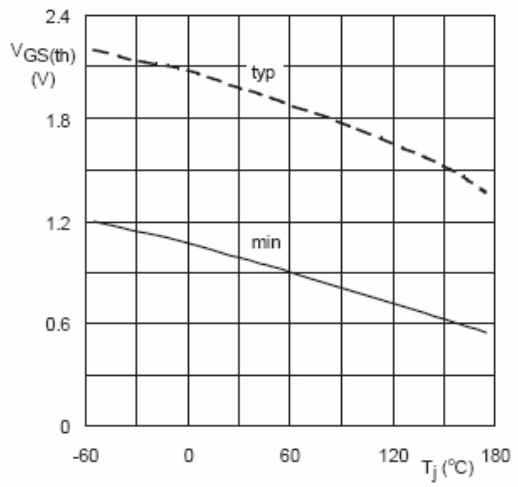
T_j = 25 °C

Fig 7. Drain-source on-state resistance as a function of drain current; typical values.



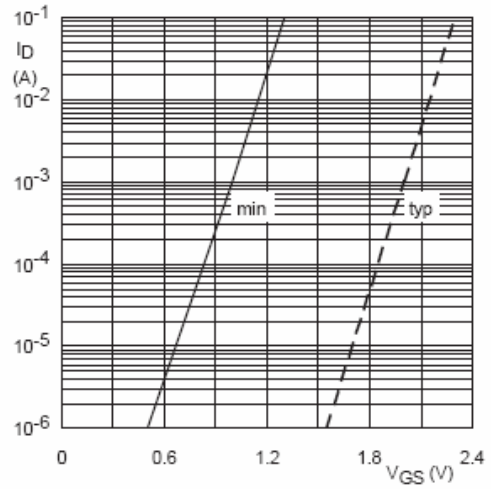
$$a = \frac{R_{DSon}}{R_{DSon(25°C)}}$$

Fig 8. Normalized drain-source on-state resistance factor as a function of junction temperature.



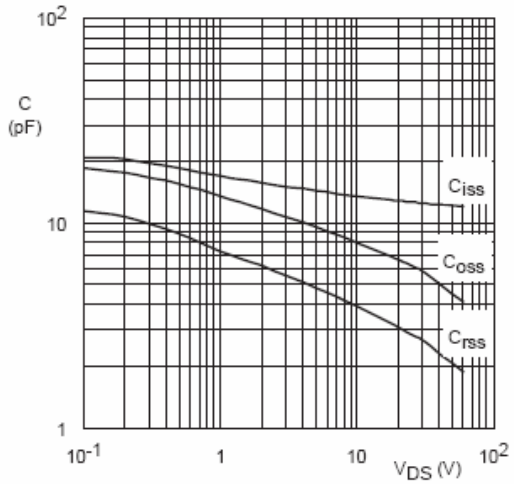
I_D = 1 mA; V_{DS} = V_{GS}

Fig 9. Gate-source threshold voltage as a function of junction temperature.



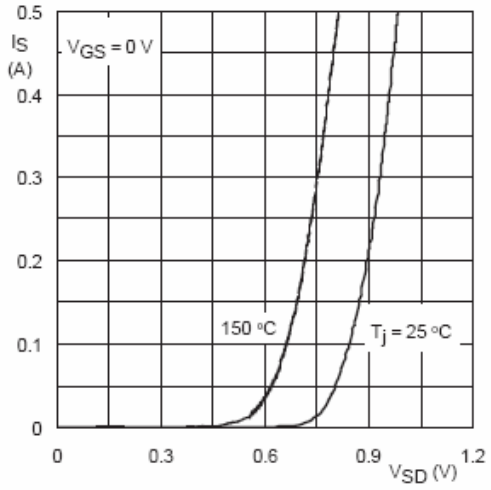
T_j = 25 °C; V_{DS} = 5 V

Fig 10. Sub-threshold drain current as a function of gate-source voltage.



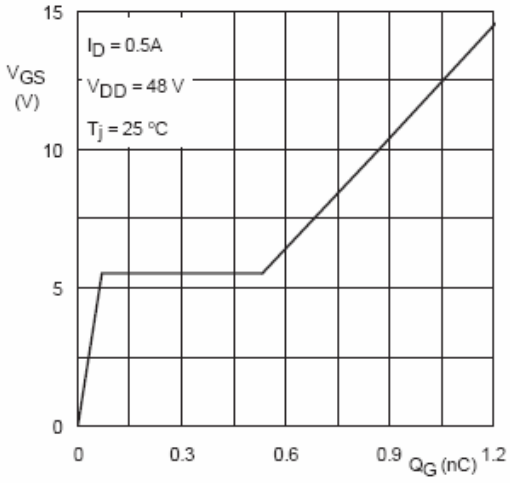
V_{GS} = 0 V; f = 1 MHz

Fig 11. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values.



T_j = 25 °C and 150 °C; V_{GS} = 0 V

Fig 12. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values.



I_D = 0.5 A; V_{DD} = 48 V

Fig 13. Gate-source voltage as a function of gate charge; typical values.

Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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