Description

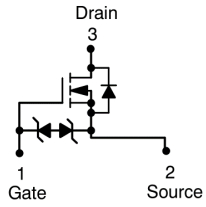
2N7002KN3 is an N-Channel Enhancement Mode Small Signal MOSFET designed for low-power and surface-mount applications. It features RoHS compliance, ESD protection, and low on-resistance, making it suitable for portable electronics and switching circuits.

General Features

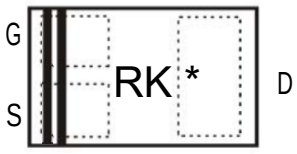
- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- ESD Protected
- Low RDS(on)
- Surface Mount Package

Application

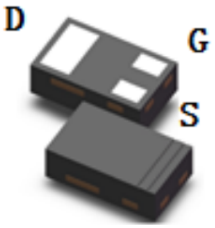
- Low Side Load Switch
- Level Shift Circuits
- DC−DC Converter
- Portable Applications i.e. DSC, PDA, Cell Phone, etc.



Schematic diagram



Marking pin assignment



DFN1006-3L top view

Package Marking and Ordering Information

Device	Package	Quantity
2N7002KN3	DFN1006-3L	10000

Absolute Maximum Ratings (T_A=25°Cunless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain–Source Voltage	VDSS	60	V
Gate-Source Voltage	VGS	±20	V
Drain Current – Steady State TA = 25°C	ID	300	mA
Pulsed Drain Current (tp=10μs)	IDM	0.8	A
Source Current (Body Diode)	IS	300	mA

Typical Characteristics

Parameter	Symbol	Limits	Unit
Power Dissipation (Note 1) – Steady State	PD	250	mW
Junction−to−Ambient(Note 1) – Steady State	RΘJA	500	ºC/W
Lead Temperature for Soldering Purposes (1/8 " from case for 10 s)	TL	260	º C
Junction and Storage temperature	TJ,Tstg	−55~+150	º C
Gate−Source ESD Rating(HBM, Method 3015)	ESD	2000	V

1. Surface−mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces)

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Electrical Characteristics(T_A=25°Cunless otherwise noted)

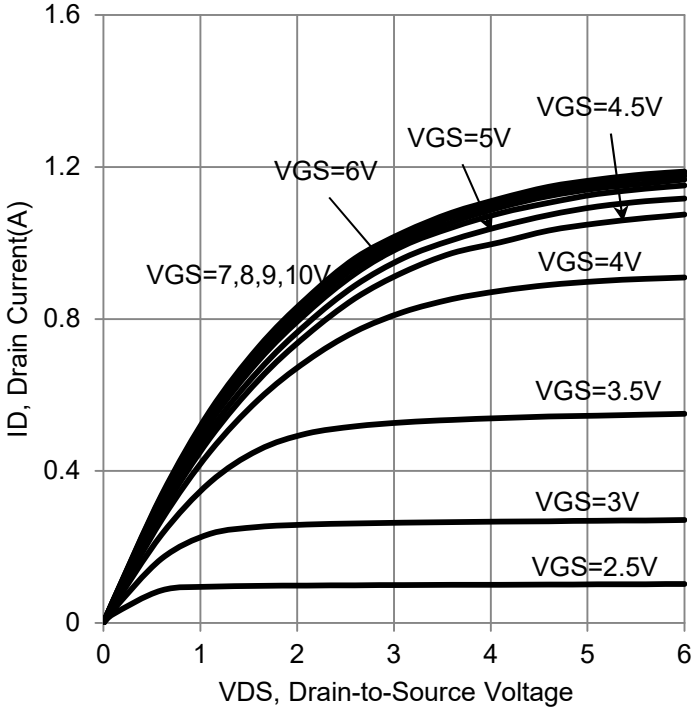
Characteristic		Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain–Source Breakdown Voltage (VGS = 0, ID = 250μA)		VBRDSS	60	-	-	V
Drain−to−Source Breakdown Voltage Temperature Coefficient		VBRDSS/TJ	-	71	-	mV/° C
Zero Gate Voltage Drain Current (VGS = 0, VDS = 60 V,TJ = 25°C) (VGS = 0, VDS = 60 V,TJ = 85°C) (VGS = 0, VDS = 50 V,TJ = 25°C)		IDSS	- -	- -	1.0 30 100	μA μA nA
Gate−to−Source Leakage Current (VDS = 0 V, VGS = ±20 V)		IGSS	-	-	±10	μA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage (VDS = VGS, ID = 250μA)		VGS(th)	1.0	-	2.5	V
Negative Threshold Temperature Coefficient		VGS(TH)/TJ	-	4	-	mV/° C
Drain–Source On–State Resistance (VGS = 10 V, ID = 500 mA) (VGS = 4.5 V, ID = 50 mA)		RDS(on)	- -	1.6 2.1	3 4	Ω
Forward Transconductance (VDS = 5.0 V, ID = 200 mA)		gfs	-	80	-	S
CHARGES AND CAPACITANCES						
Input Capacitance	(VGS = 0 V, f = 1 MHz,VDS = 25 V)	Ciss	-	32.8	-	pF
Output Capacitance		Coss	-	5.4	-	
Reverse Transfer Capacitance		Crss	-	2.9	-	
Total Gate Charge	(VGS = 4.5 V, VDS = 10 V,ID = 200 mA)	QG(TOT)	-	0.7	-	nC
Threshold Gate Charge		QG(TH)	-	0.1	-	
Gate−to−Source Charge		QGS	-	0.3	-	
Gate−to−Drain Charge		QGD	-	0.1	-	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	(VGS = 10 V, VDD = 10 V,ID = 500 mA)	td(on)	-	9.9	-	ns
Rise Time		tr	-	5	-	
Turn-Off Delay Time		td(off)	-	39.4	-	
Fall Time		tf	-	17.9	-	
DRAIN−SOURCE DIODE CHARACTERISTICS						
Diode Forward On–Voltage	TJ = 25°C	VSD	-	-	1.4	V
(IS = 115 mA, VGS = 0 V)	TJ = 85°C		-	0.7	-	

2.Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%.

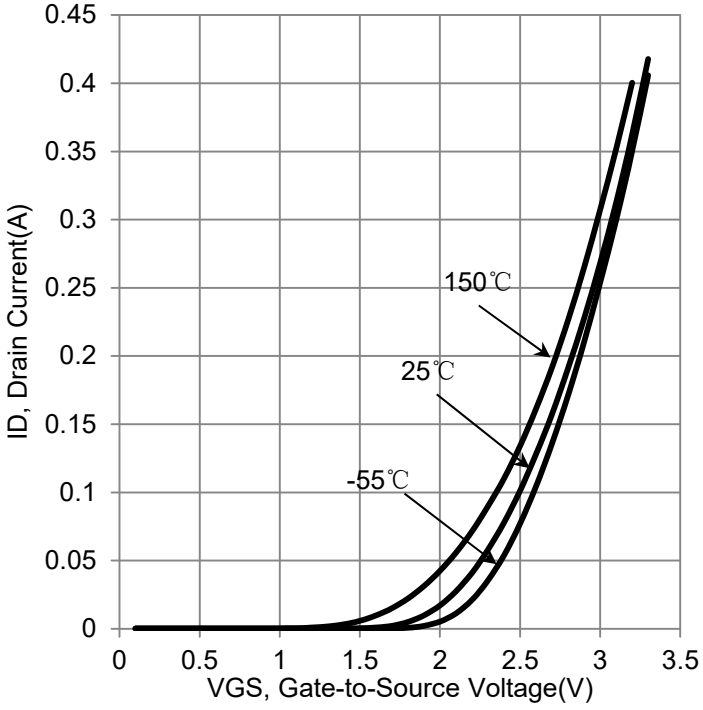
3. Switching characteristics are independent of operating junction temperatures

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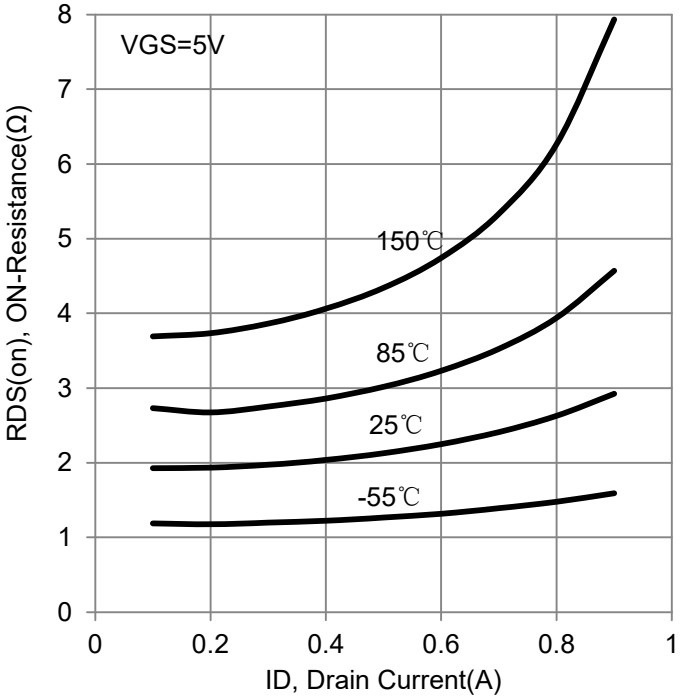
ELECTRICAL CHARACTERISTICS CURVES



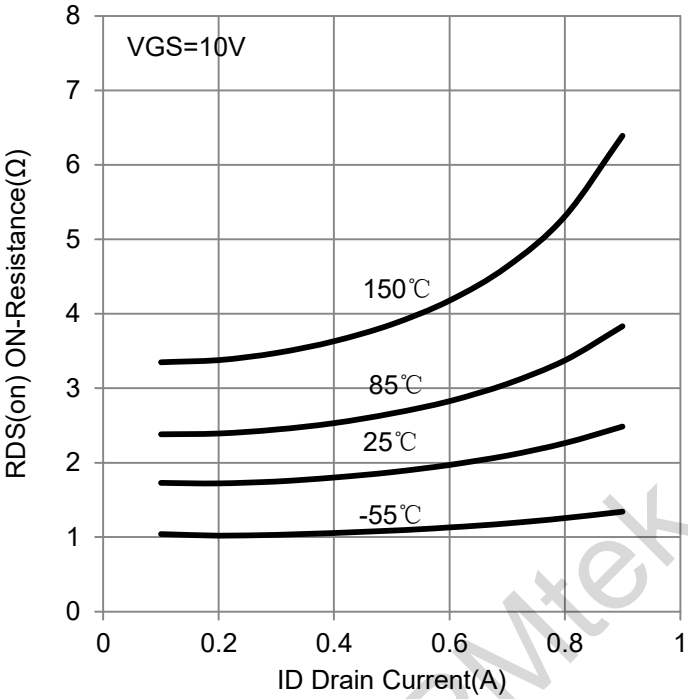
On-Region Characteristics



Transfer Characteristics

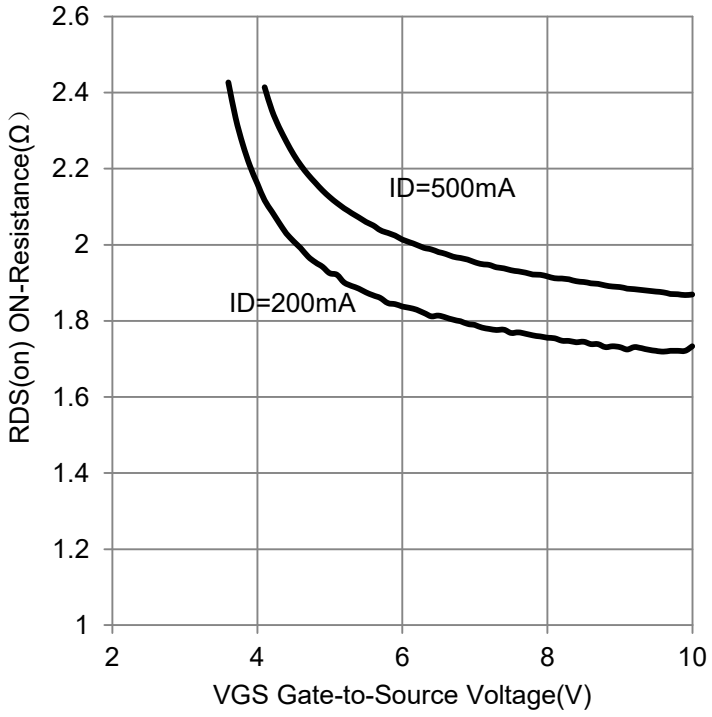


RDS(on) vs. ID

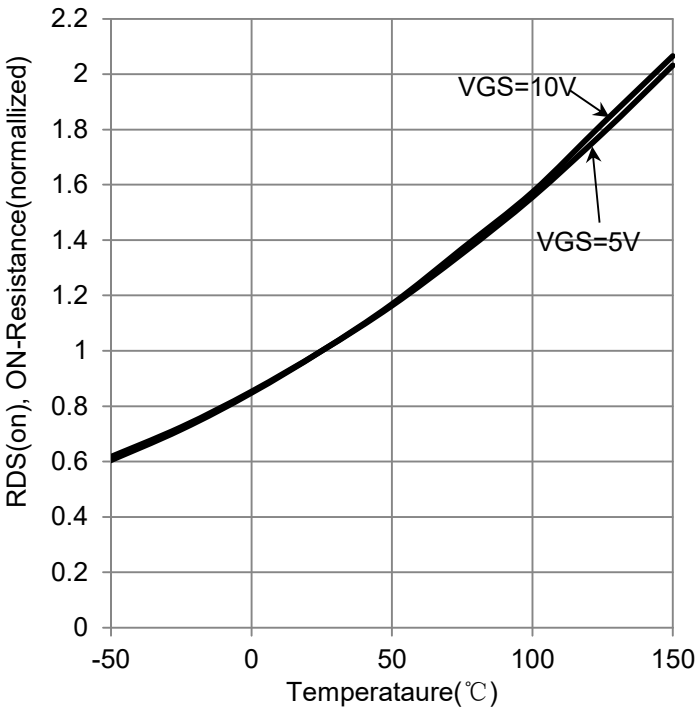


RDS(on) vs. ID

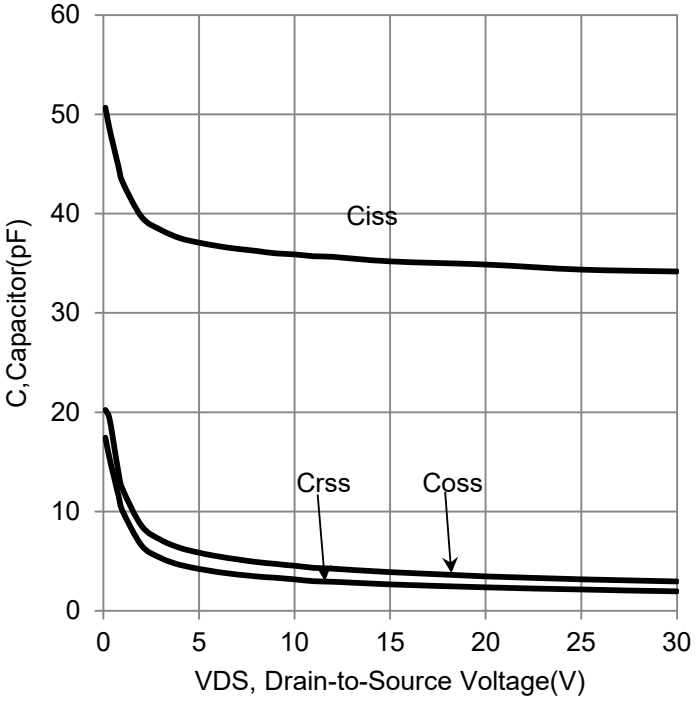
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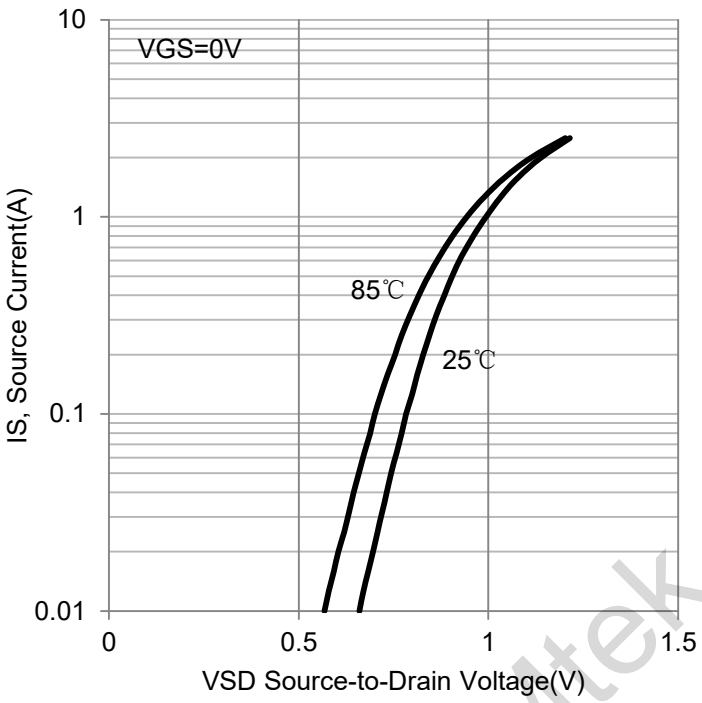
RDS(on) vs. VGS



RDS(on) vs. Temperature

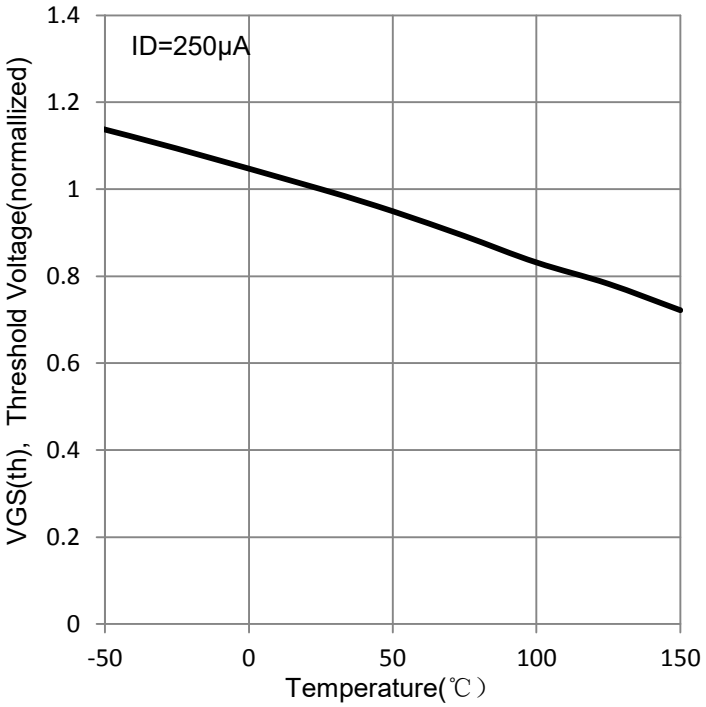


Capacitor vs.VDS



IS vs.VSD

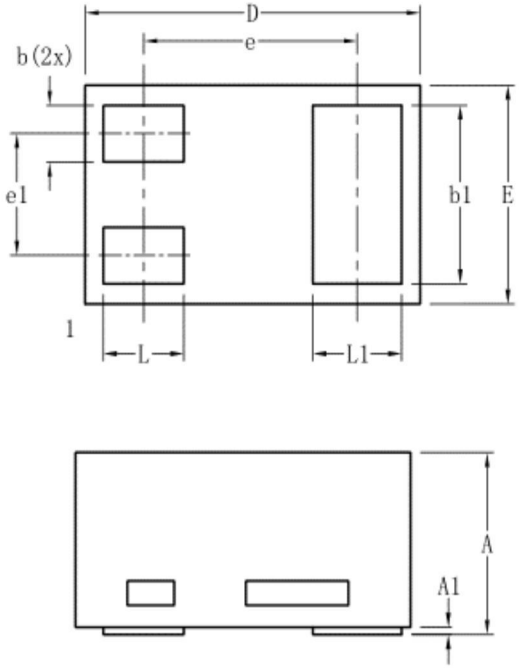
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VGS(th) vs. Temperature

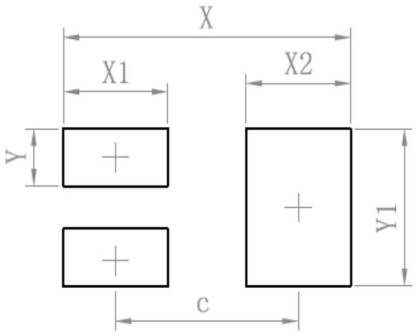
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DFN1006-3L Package Outline Dimensions



DFN1006-3			
DIM	MIN	TYP	MAX
D	1.05	1.00	0.95
E	0.65	0.60	0.50
e	-	0.64	-
e1	-	0.34	-
L	0.19	0.24	0.29
L1	0.22	0.27	0.32
b	0.10	0.15	0.20
b1	0.44	0.49	0.54
A	0.43	0.48	0.53
A1	0	-	0.05
All Dimensions in mm			

DFN1006-3L Suggested Pad Layout



Dimensions	(mm)
c	0.70
X	1.10
X1	0.40
X2	0.40
Y	0.20
Y1	0.55

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