



FEATURES

- We declare that the material of product compliance with
- RoHS requirements and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.
- ESD Protected
- Low $R_{DS(on)}$
- Surface Mount Package

DFN1006-3



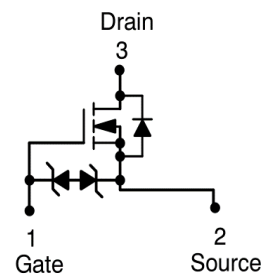
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APPLICATIONS

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



DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
2N7002KN3		10000/Tape&Reel

MAXIMUM RATINGS($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Steady State $T_A = 25^\circ\text{C}$	I_D	300	mA
Pulsed Drain Current ($t_p=10\mu\text{s}$)	I_{DM}	0.8	A
Source Current (Body Diode)	I_S	300	mA



THERMAL CHARACTERISTICS

Parameter	Symbol	Limits	Unit
Power Dissipation (Note 1) – Steady State	P_D	250	mW
Junction-to-Ambient(Note 1) – Steady State	$R_{\theta JA}$	500	°C/W
Lead Temperature for Soldering Purposes (1/8 " from case for 10 s)	T_L	260	°C
Junction and Storage temperature	T_J, T_{stg}	-55~ +150	°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)



ELECTRICAL CHARACTERISTICS (Ta= 25°C)

OFF CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
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)	IDSS	-	-	1.0	μA
(VGS = 0, VDS = 60 V, TJ = 85°C)		-	-	30	μA
(VGS = 0, VDS = 50 V, TJ = 25°C)		-	-	100	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)	RDS(on)	-	1.6	3	Ω
(VGS = 4.5 V, ID = 50 mA)		-	2.1	4	
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

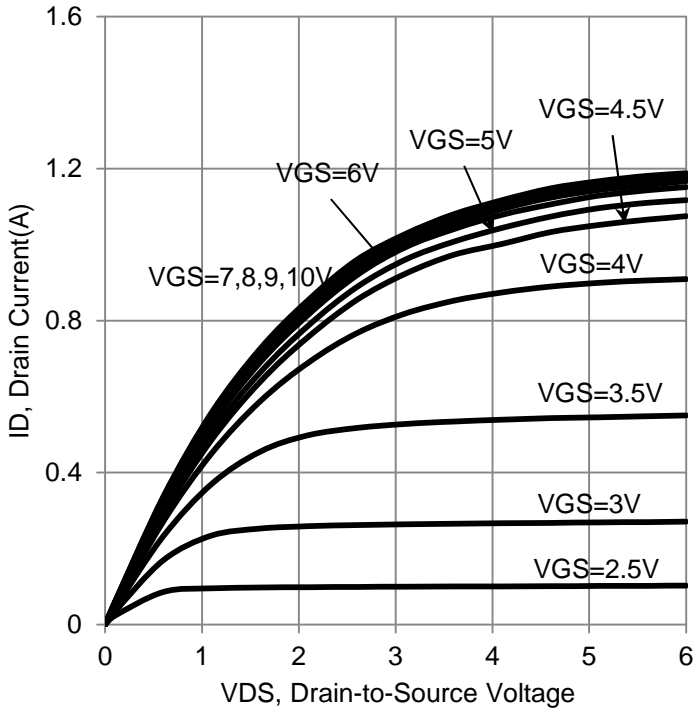
Diode Forward On-Voltage (IS = 115 mA, VGS = 0 V)	TJ = 25°C	VSD	-	-	1.4	V
	TJ = 85°C		-	0.7	-	

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

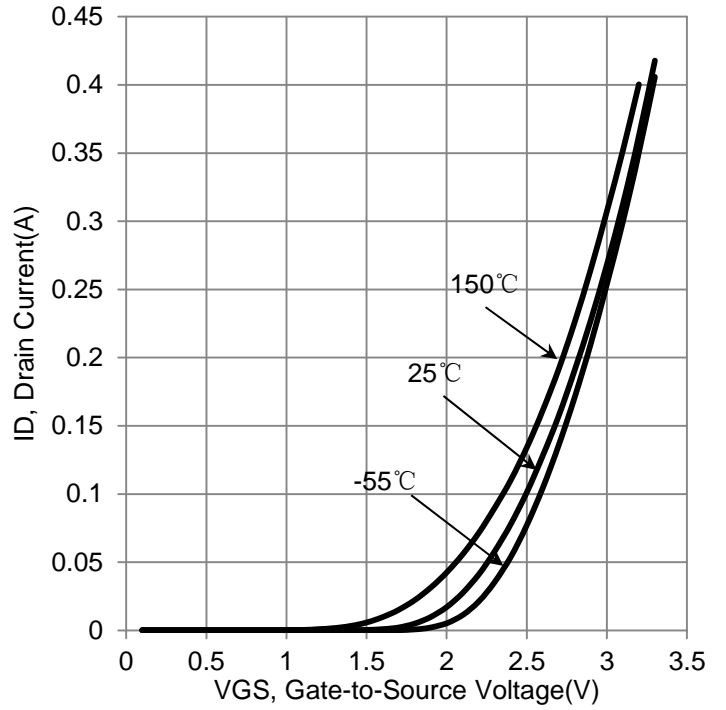
3. Switching characteristics are independent of operating junction temperatures



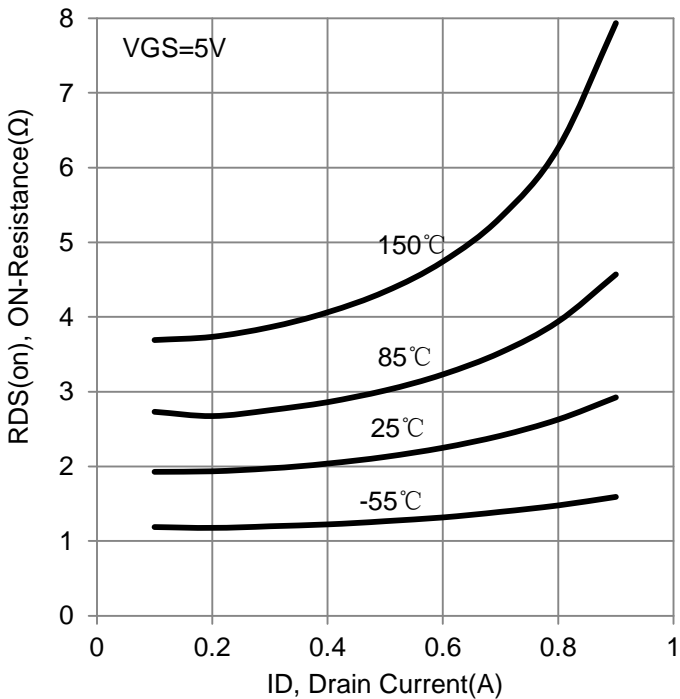
ELECTRICAL CHARACTERISTICS CURVES



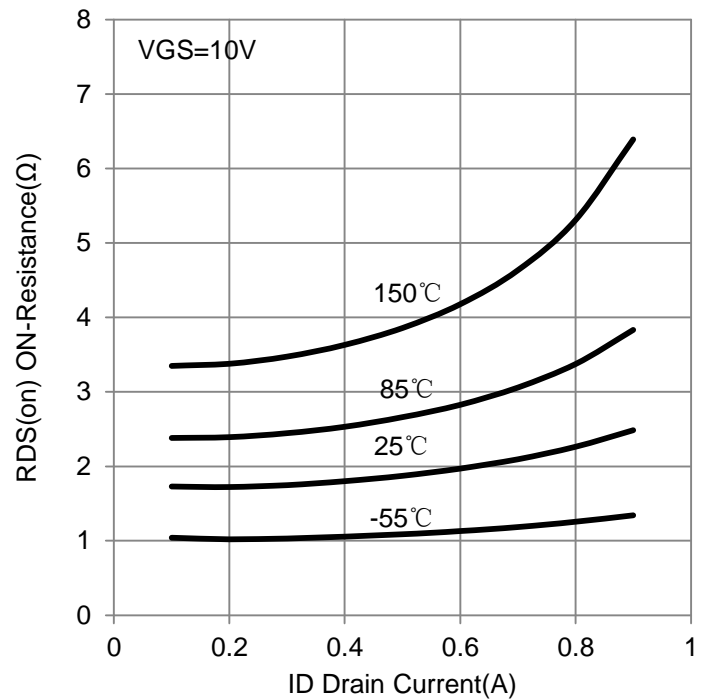
On-Region Characteristics



Transfer Characteristics

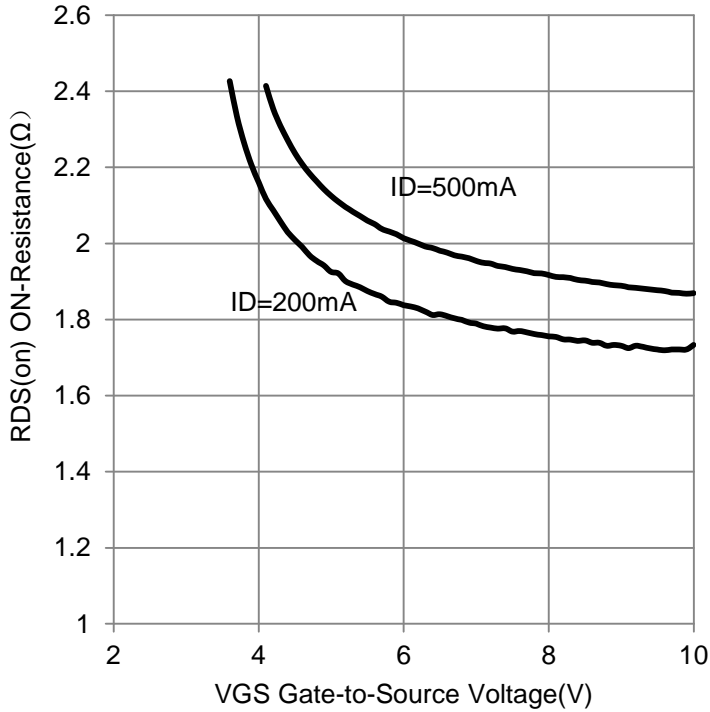


RDS(on) vs. ID

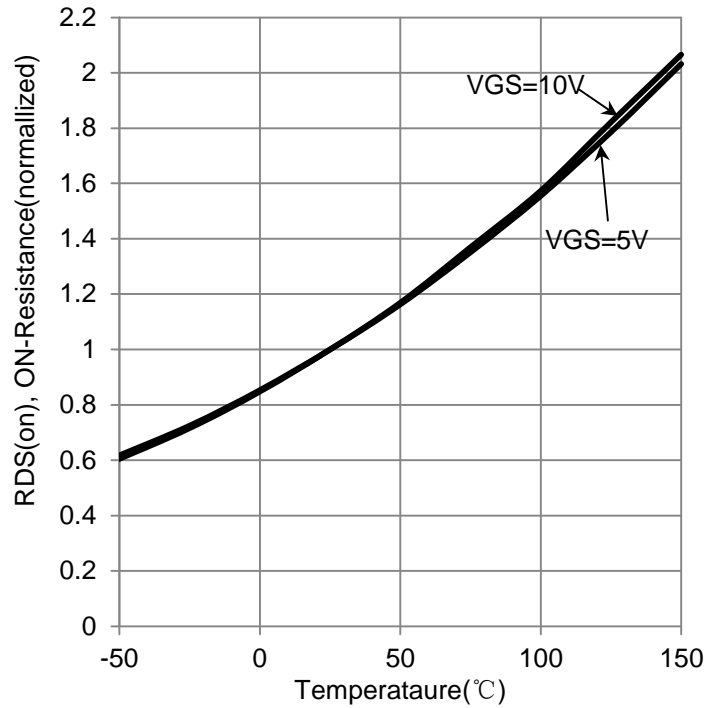


RDS(on) vs. ID

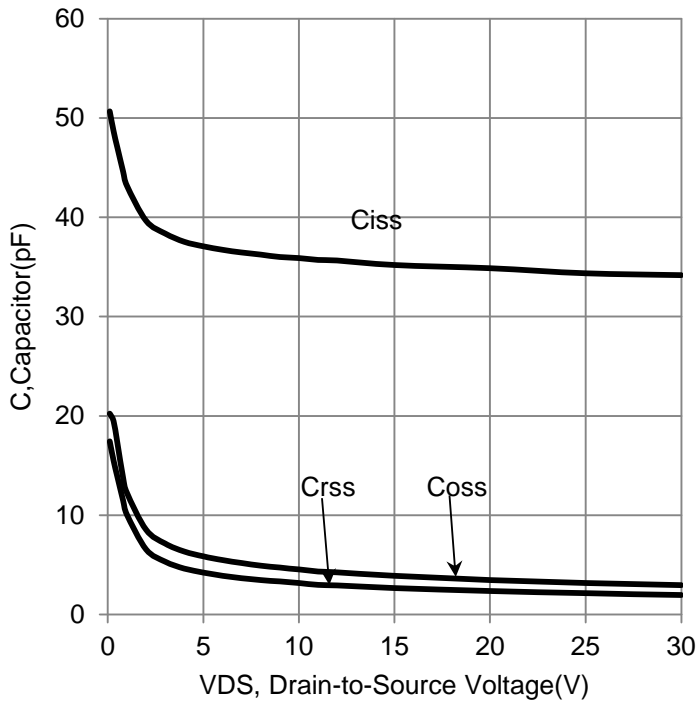
ELECTRICAL CHARACTERISTICS CURVES (Con.)



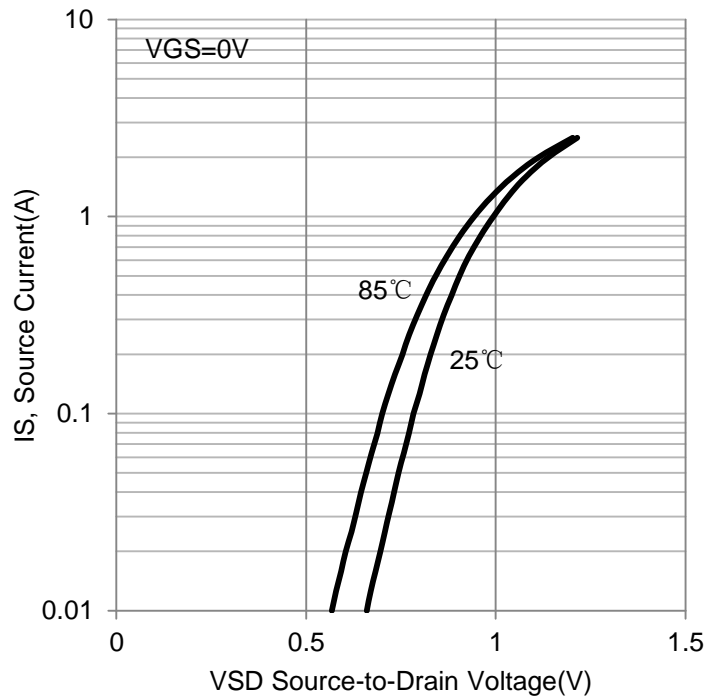
RDS(on) vs. VGS



RDS(on) vs. Temperature



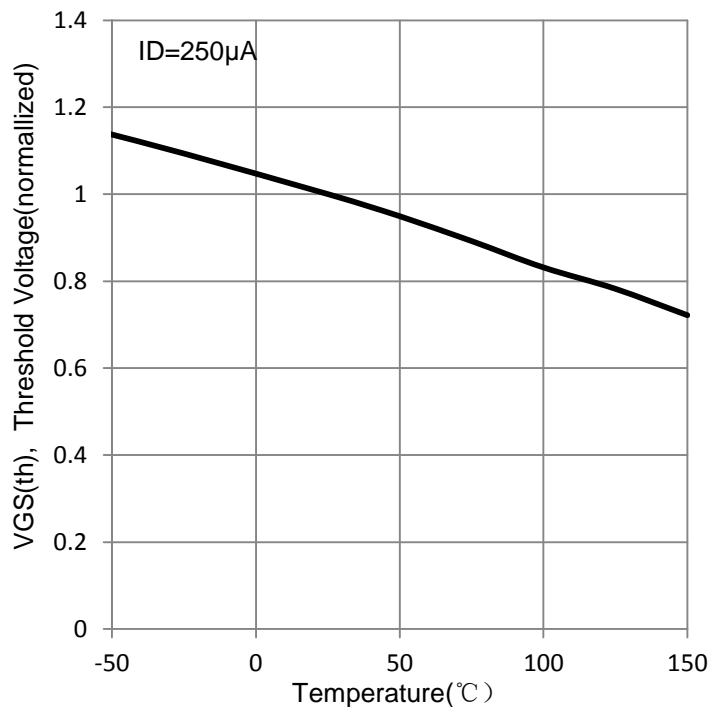
Capacitor vs. VDS



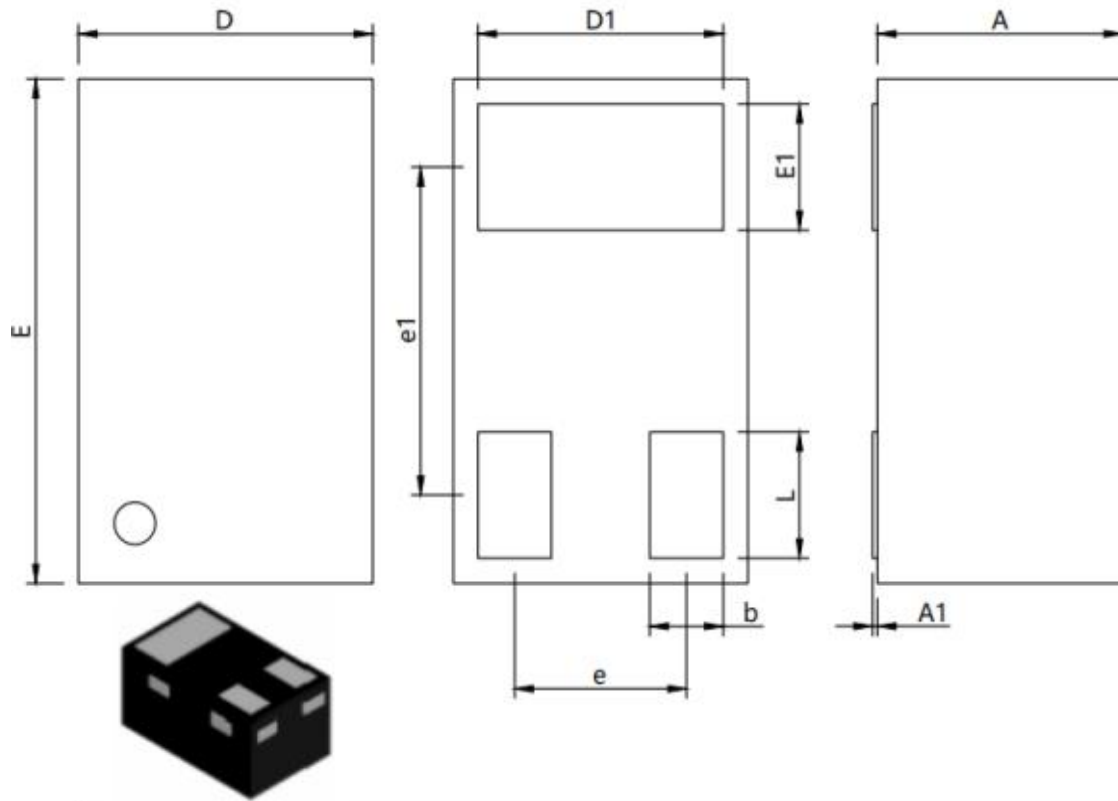
IS vs. VSD



ELECTRICAL CHARACTERISTICS CURVES (Con.)



VGS(th) vs. Temperature



DFN1.0*0.6*0.5-3L REV.M POD			
	min(mm)	typ(mm)	max(mm)
D	0.55	0.60	0.65
E	0.95	1.00	1.05
D1	0.45	0.50	0.55
E1	0.20	0.25	0.30
e	0.35bsc		
e1	0.65bsc		
L	0.20	0.25	0.30
b	0.10	0.15	0.20
A	0.45	0.50	0.55
A1	-	0	0.05