



YEA SHIN TECHNOLOGY CO., LTD

2N7002SDW

# Dual N-Channel Small Signal MOSFET



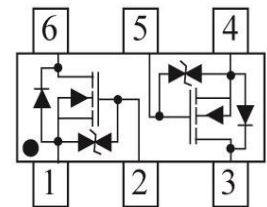
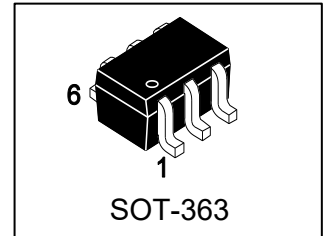
VDS= 60V, ID= 320mA

## FEATURES

- ESD protected
- Low RDS(on)

## 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
2N7002SDW	701	3000/Tape&Reel

## MAXIMUM RATINGS(Ta = 25 °C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	VDSS	60	V
Gate-Source Voltage	VGS	±20	V
Drain Current	ID		mA
– Steady State TA = 25°C		320	
TA = 85°C		230	
– t<5s TA = 25°C		380	
TA = 85°C		270	
Pulsed Drain Current (tp=10µs)	IDM	1.5	A
Source Current (Body Diode)	IS	300	mA

## THERMAL CHARACTERISTICS

Parameter	Symbol	Limits	Unit
Total Device Dissipation(Note 1)	PD		mW
– Steady State		300	
– t<5s		420	
Junction-to-Ambient(Note 1)	ROJA		°C/W
– Steady State		417	
– t<5s		300	
Lead Temperature for Soldering Purposes (1/8 " from case for 10 s)	TL	260	°C
Junction and Storage temperature	TJ,Tstg	-55~+150	°C
Gate-Source ESD Rating(HBM, Method 3015)	ESD	2000	V

# DEVICE CHARACTERISTICS

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### 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) (VGS = 0, VDS = 50 V)	IDSS	TJ = 25°C	-	1.0	μA
		TJ = 125°C	-	500	
		TJ = 25°C	-	100	nA
Gate–Body Leakage Current, Forward (VGS = 20 V)	IGSSF	-	-	10	μA
Gate–Body Leakage Current, Reverse (VGS = - 20 V)	IGSSR	-	-	-10	μA

#### ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage (VDS = VGS, ID = 250μA)	VGS(th)	1.0	-	2.0	V
Negative Threshold Temperature Coefficient	VGS(TH)/TJ	-	4	-	mV/°C
Static Drain–Source On–State Resistance (VGS = 10 V, ID = 500 mA) (VGS = 4.5 V, ID = 200 mA)	RDS(on)	-	-	2.8	Ω
		-	-	3.2	
Forward Transconductance (VDS = 5.0 V, ID = 200 mA)	gfs	80	-	-	mS

#### DYNAMIC CHARACTERISTICS

Input Capacitance (VDS = 25 V, VGS = 0, f = 1.0 MHz)	Ciss	-	21	42	pF
Output Capacitance (VDS = 25 V, VGS = 0, f = 1.0 MHz)	Coss	-	12	24	pF
Reverse Transfer Capacitance (VDS = 25 V, VGS = 0, f = 1.0 MHz)	Crss	-	0.35	0.7	pF
Total Gate Charge	VGS = 4.5 V, VDS = 10 V; ID= 500 mA	QG(TOT)	-	0.44	nC
Gate–to–Source Charge		QGS	-	0.2	
Gate–to–Drain Charge		QGD	-	0.1	

#### SWITCHING CHARACTERISTICS

Turn-On Delay Time	VDS = 30 V, VGEN = 10 V, ID = 500 mA, RG = 25Ω, RL = 60Ω	td(on)	-	2.7	ns
Rise Time		tr	-	2.5	
Turn-Off Delay Time		td(off)	-	13	
Fall Time		tf	-	8	

#### BODY–DRAIN DIODE RATINGS

Diode Forward On–Voltage (IS = 0.5A, VGS = 0 V)	VSD	-	0.85	-	V
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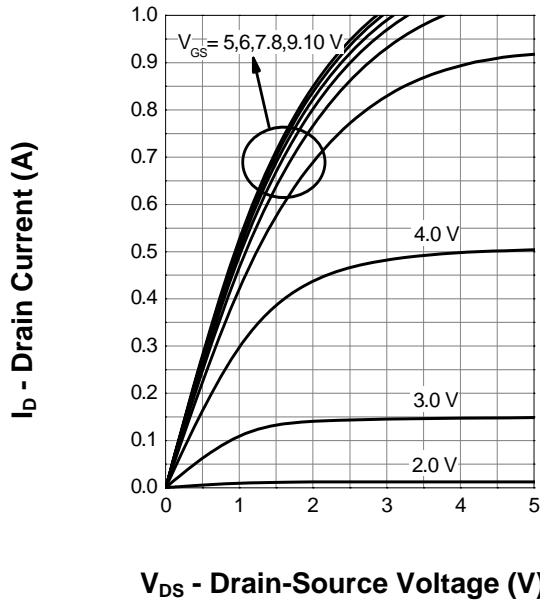
1. FR–4 = 1.0×0.75×0.062 in.

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

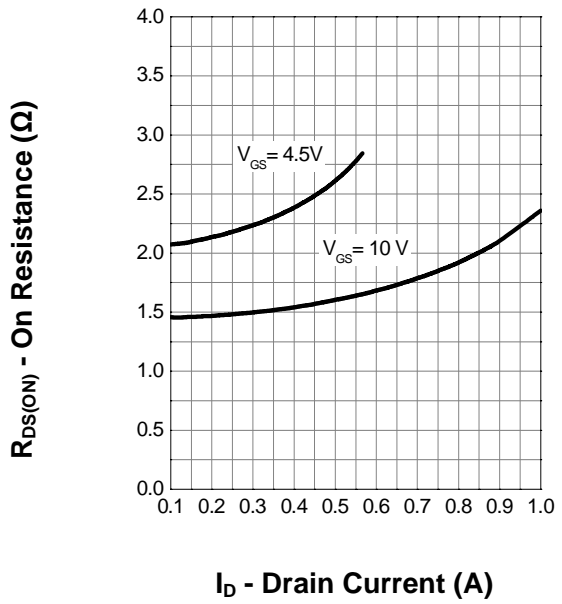
# DEVICE CHARACTERISTICS

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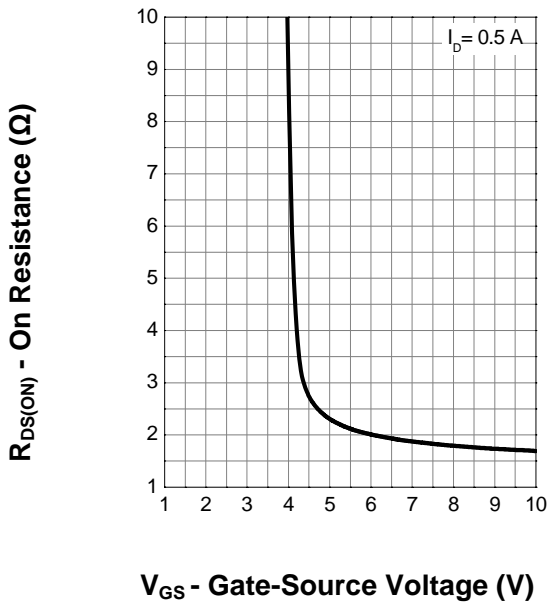
**Output Characteristics**



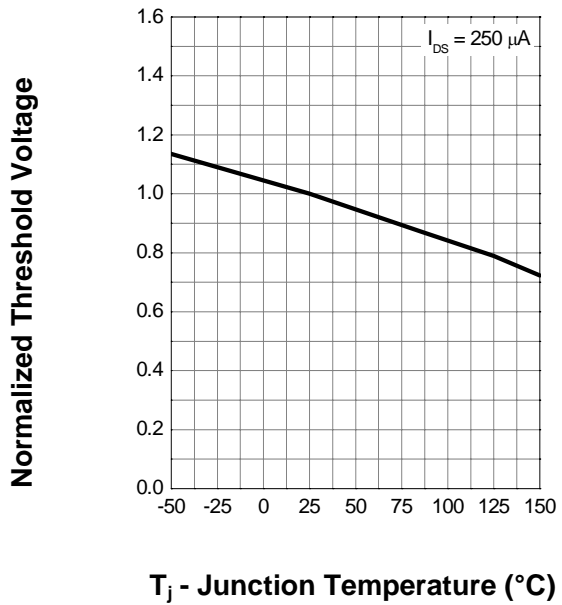
**Drain-Source On Resistance**



**Transfer Characteristics**

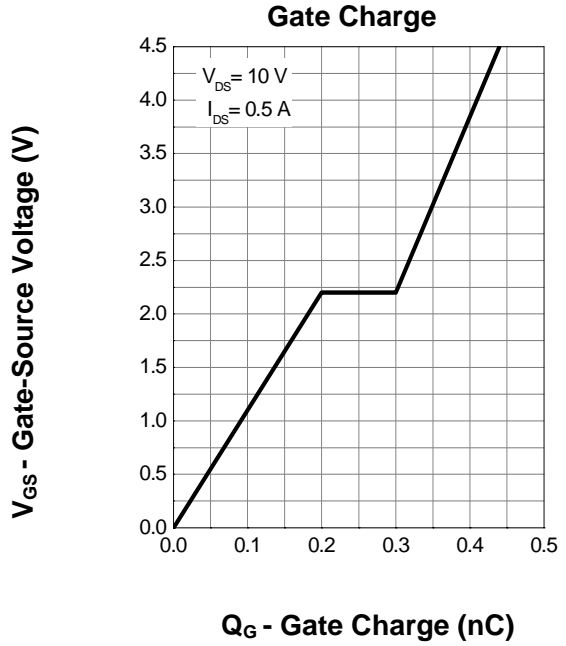
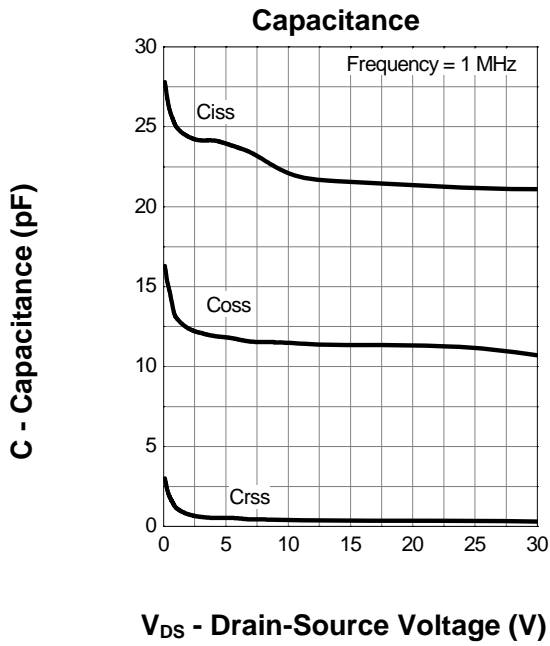
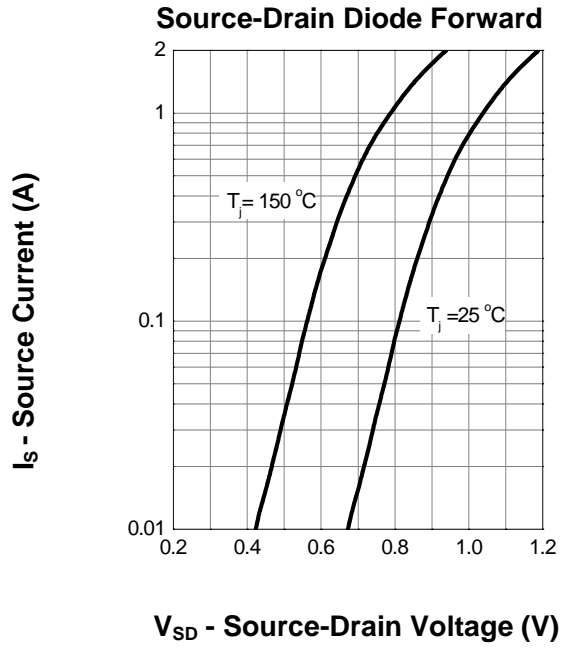
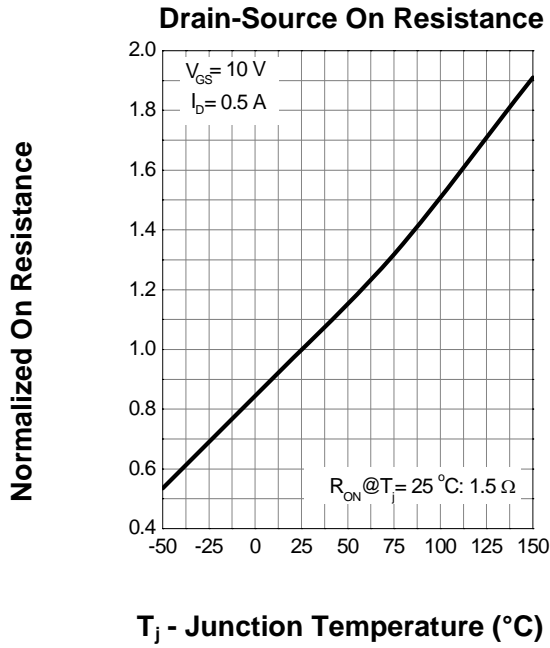


**Gate Threshold Voltage**



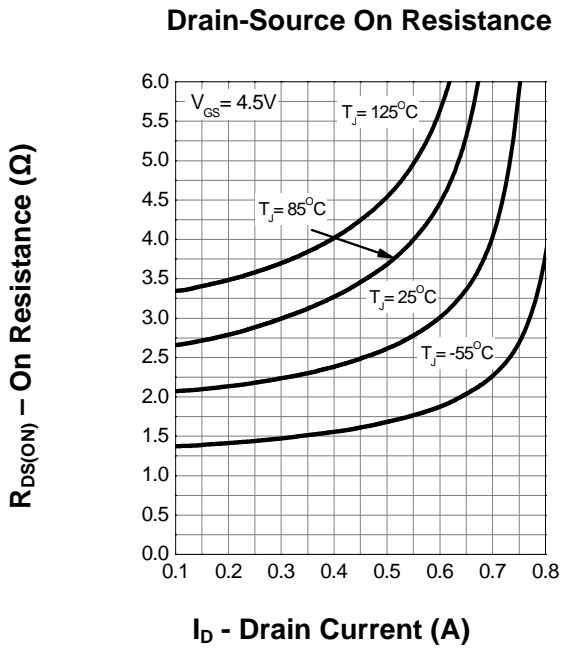
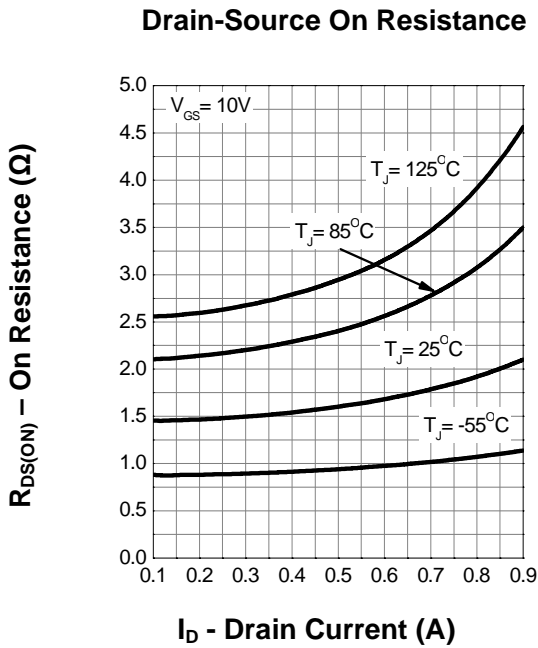
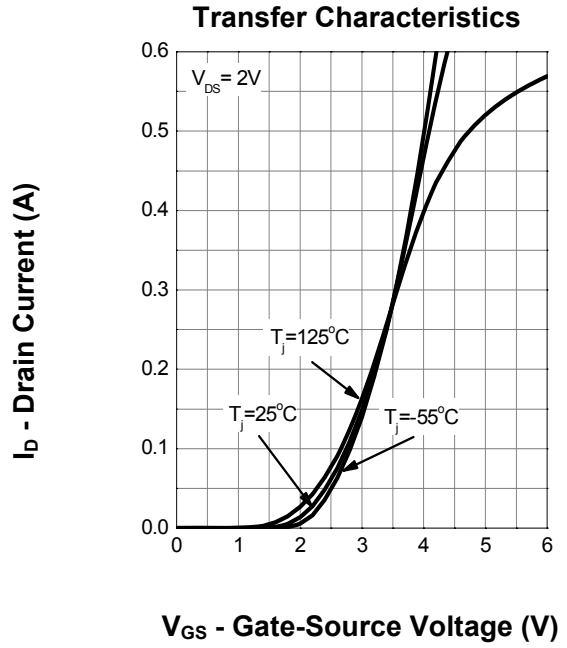
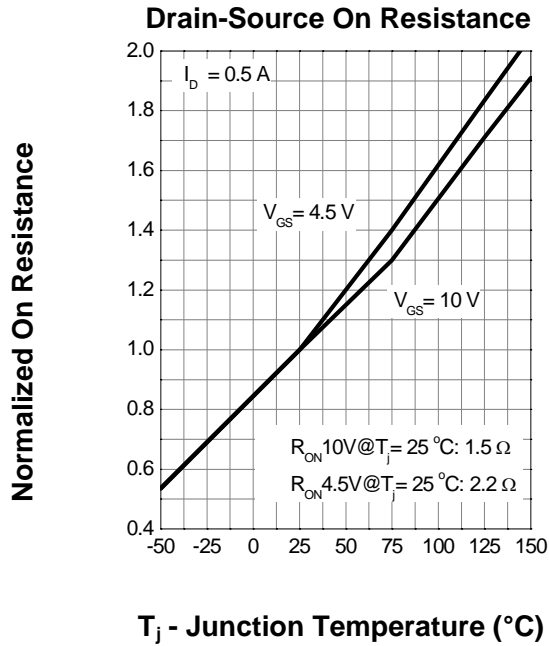
# DEVICE CHARACTERISTICS

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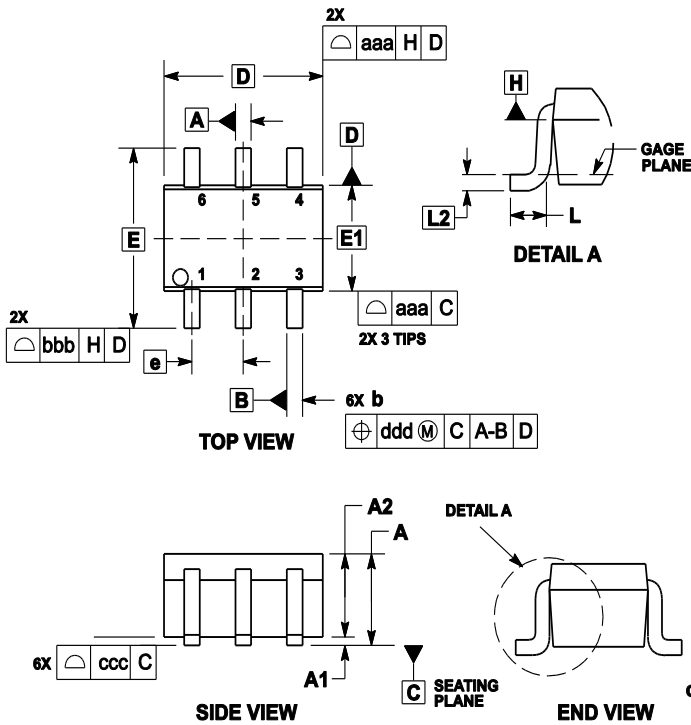
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# PACKAGE OUTLINE & DIMENSIONS

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## OUTLINE AND DIMENSIONS



DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	0.043
A1	0.00	---	0.10	0	---	0.004
A2	0.70	0.90	1.00	0.027	0.035	0.039
b	0.15	0.20	0.25	0.006	0.008	0.01
C	0.08	0.15	0.22	0.003	0.006	0.009
D	1.80	2.00	2.20	0.07	0.078	0.086
E	2.00	2.10	2.20	0.078	0.082	0.086
E1	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018
L2	0.15 BSC			0.006 BSC		
aaa	0.15			0.01		
bbb	0.30			0.01		
ccc	0.10			0.00		
ddd	0.10			0.00		

## SOLDERING FOOTPRINT

