YEA SHIN TECHNOLOGY CO., LTD

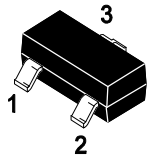
2N7002

N-Channel Enhancement MOSFET

VDS= 60V, ID= 115mA

1. FEATURES

- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- ESD Protected:1000V

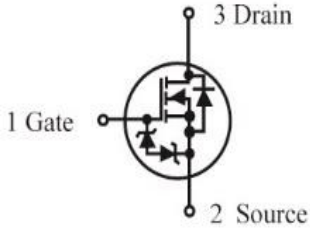


SOT-23

2. DEVICE MARKING AND ORDERING INFORMATION

MARKING

702



PACKAGE INFORMATION

Package	Shipping
SOT-23	3000/Tape&Reel

3. MAXIMUM RATINGS(Ta = 25ºC)

Parameter	Symbol	Limits	Unit
Drain–Source Voltage	VDSS	60	Vdc
Drain–Gate Voltage (RGS = 1.0 MΩ)	VDGR	60	Vdc
Drain Current	ID		mAdc
– Continuous TC = 25°C		±115	
TC = 100°C		±75	
– Pulsed (Note 1)	IDM	±800	
Gate–Source Voltage			
– Continuous	VGS	±20	Vdc
– Non–repetitive (tp≤50μs)	VGSM	±40	Vdc

4. THERMAL CHARACTERISTICS

Parameter	Symbol	Limits	Unit
Total Device Dissipation, FR−5 Board (Note 2) @ TA = 25ºC	PD	225	mW
Derate above 25ºC		1.8	mW/ºC
Thermal Resistance, Junction–to–Ambient(Note 2)	RΘJA	556	ºC/W
Junction and Storage temperature	TJ,Tstg	−55~+150	° C

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. FR–5 = 1.0×0.75×0.062 in.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

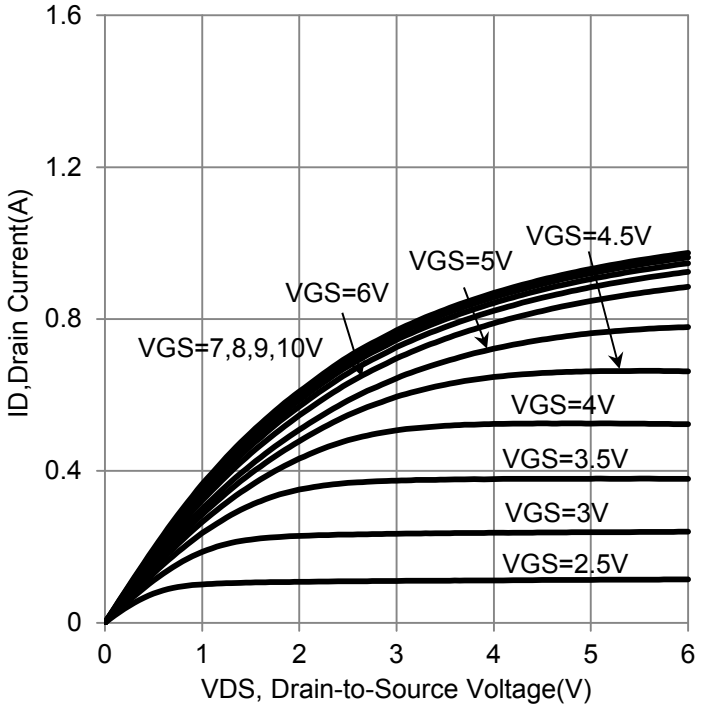
Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain–Source Breakdown Voltage (V_{GS} = 0, I_D = 10 μAdc)		$V_{(BR)DSS}$	60	–	–	Vdc
Zero Gate Voltage Drain Current (V_{GS} = 0, V_{DS} = 60 Vdc)	T_J = 25°C T_J = 125°C	I_{DSS}	– –	– –	1.0 500	μAdc
Gate–Body Leakage Current, Forward (V_{GS} = 20 Vdc)		I_{GSSF}	–	–	1.0	μAdc
Gate–Body Leakage Current, Reverse (V_{GS} = –20 Vdc)		I_{GSSR}	–	–	-1.0	μAdc
ON CHARACTERISTICS (Note 3.)						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μAdc)		$V_{GS(th)}$	1.0	1.6	2.0	Vdc
On–State Drain Current (V_{DS} ≥ 2.0 $V_{DS(on)}$, V_{GS} = 10 Vdc)		$I_{D(on)}$	500	–	–	mA
Static Drain–Source On–State Voltage (V_{GS} = 10 Vdc, I_D = 500 mAdc) (V_{GS} = 5.0 Vdc, I_D = 50 mAdc)		$V_{DS(on)}$	 – –	 – –	 3.75 0.375	Vdc
Static Drain–Source On–State Resistance (V_{GS} = 10 V, I_D = 500 mAdc) (V_{GS} = 5.0 Vdc, I_D = 50 mAdc) 	 T_C = 25°C T_C = 125°C T_C = 25°C T_C = 125°C	$r_{DS(on)}$	 – – – –	 1.4 – 1.8 –	 7.5 13.5 7.5 13.5	Ohms
Forward Transconductance (V_{DS} ≥ 2.0 $V_{DS(on)}$, I_D = 200 mAdc)		g_{FS}	80	–	–	mmhos
DYNAMIC CHARACTERISTICS						
Input Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{iss}	–	17	50	pF
Output Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{oss}	–	10	25	pF
Reverse Transfer Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{rss}	–	2.5	5.0	pF
SWITCHING CHARACTERISTICS (Note 2.)						
Turn–On Delay Time	(V_{DD} = 25 Vdc , I_D ≅ 500 mAdc, R_G = 25 Ω, R_L = 50 Ω, V_{gen} = 10 V)	$t_{d(on)}$	–	7	20	ns
Turn–Off Delay Time		$t_{d(off)}$	–	11	40	ns
BODY–DRAIN DIODE RATINGS						
Diode Forward On–Voltage (I_S = 115 mAdc, V_{GS} = 0 V)		V_{SD}	–	–	–1.5	Vdc
Source Current Continuous (Body Diode)		I_S	–	–	–115	mAdc
Source Current Pulsed		I_{SM}	–	–	–800	mAdc

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

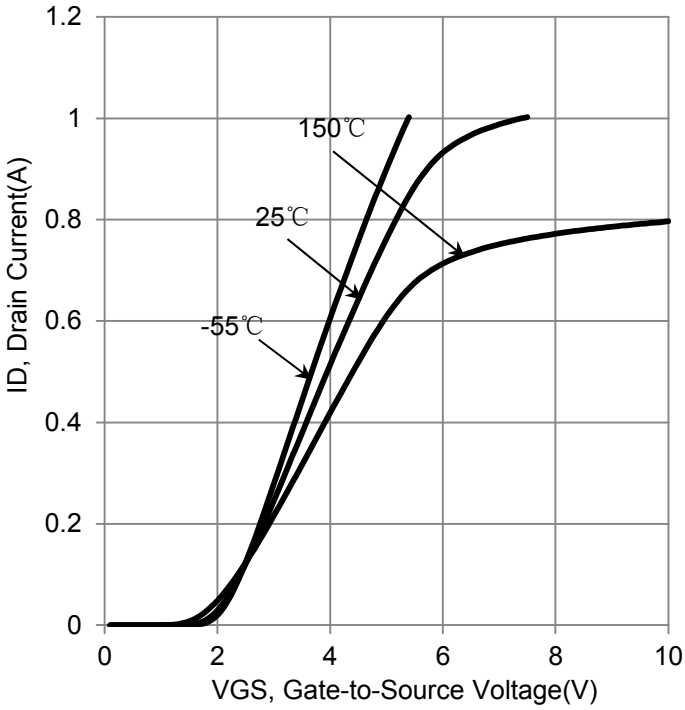
DEVICE CHARACTERISTICS

2N7002

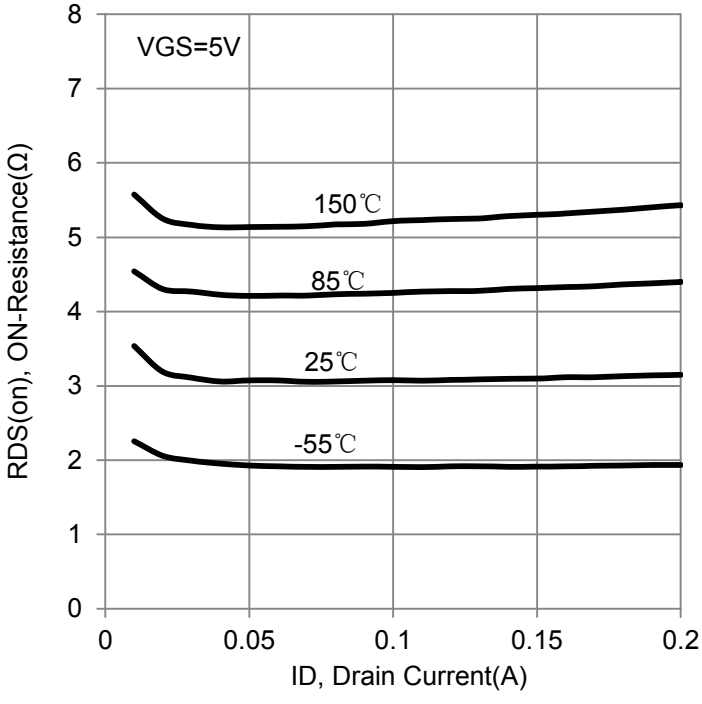
6. ELECTRICAL CHARACTERISTICS CURVES



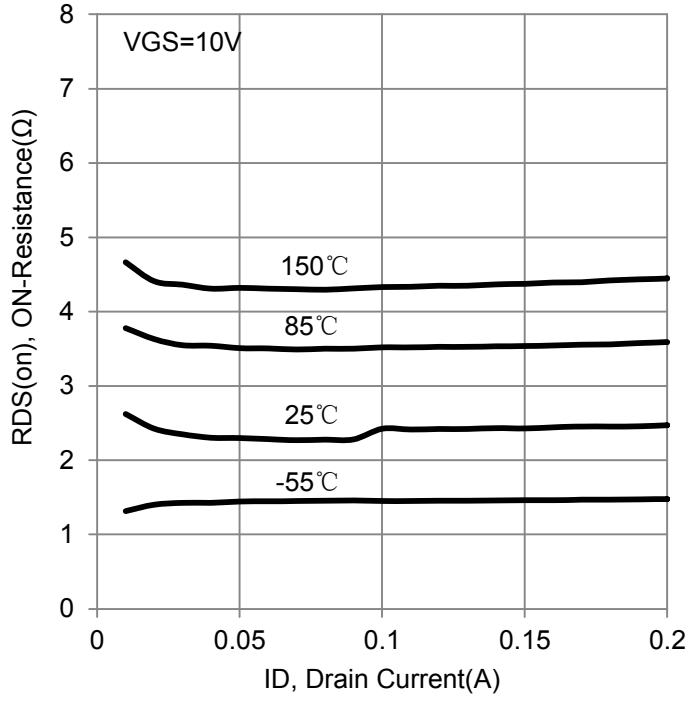
ON-Region Characteristics



Transfer Characteristcs



RDS(on) vs. ID

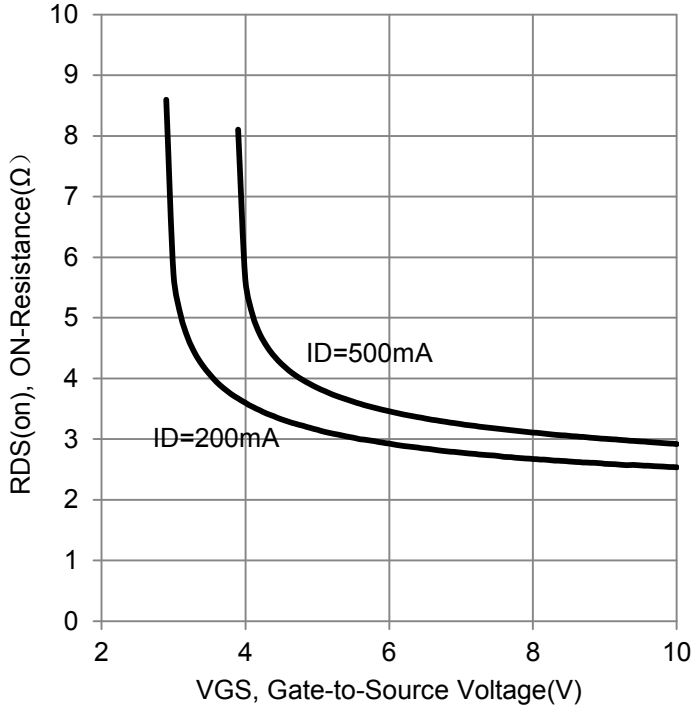


RDS(on) vs. ID

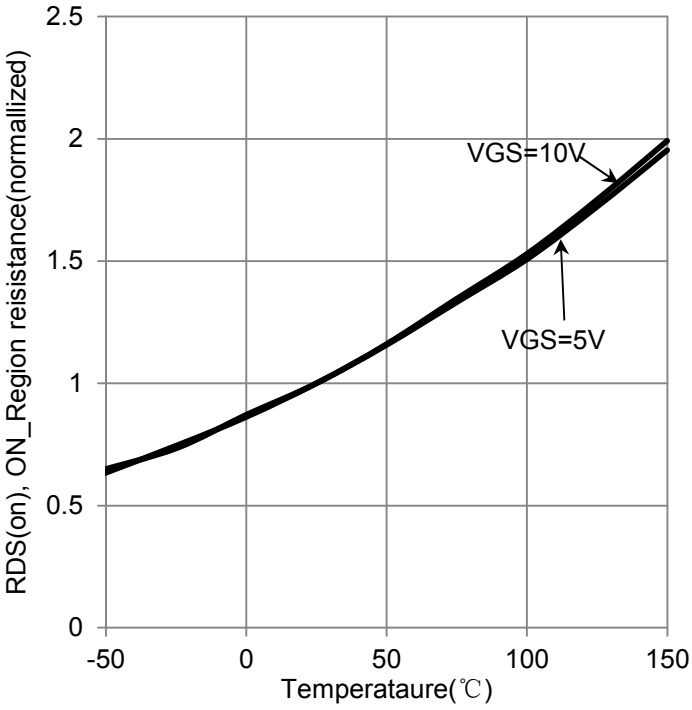
DEVICE CHARACTERISTICS

2N7002

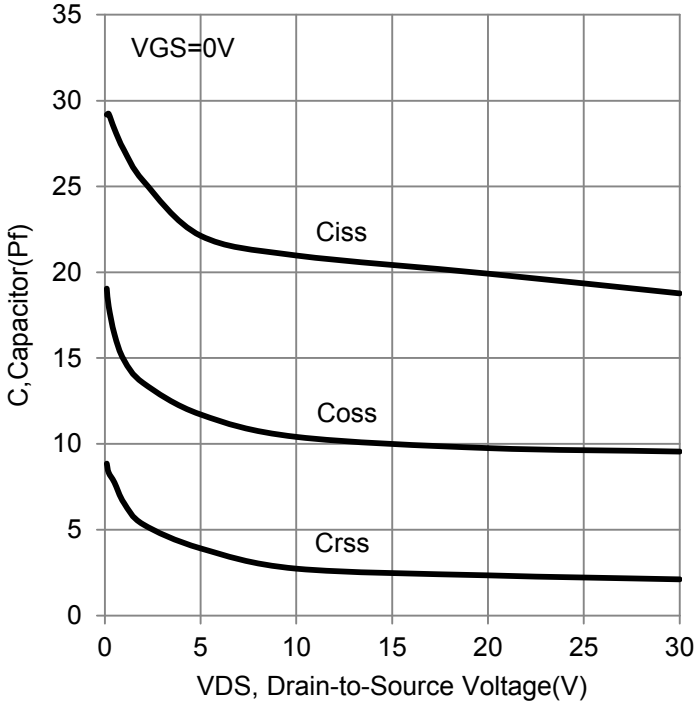
6. ELECTRICAL CHARACTERISTICS CURVES（Con.)



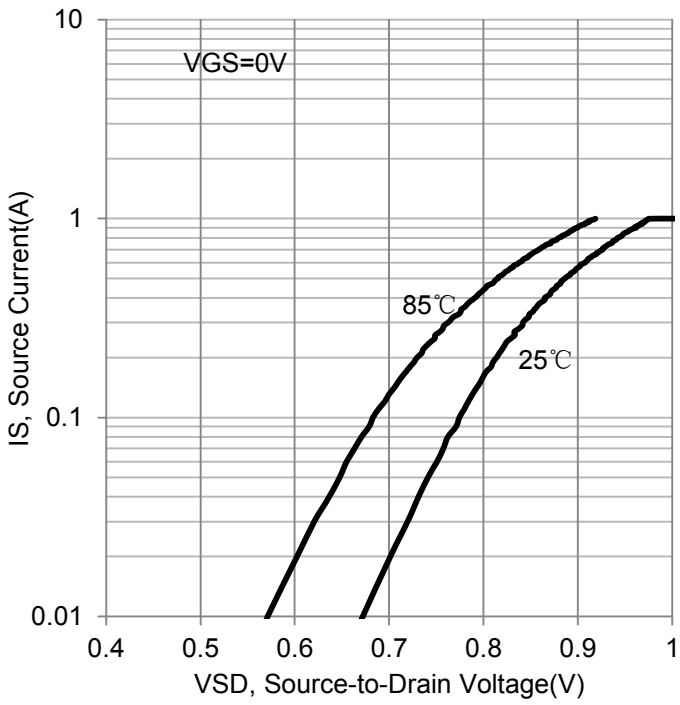
RDS(on) vs. VGS



RDS(on) vs. Temperature

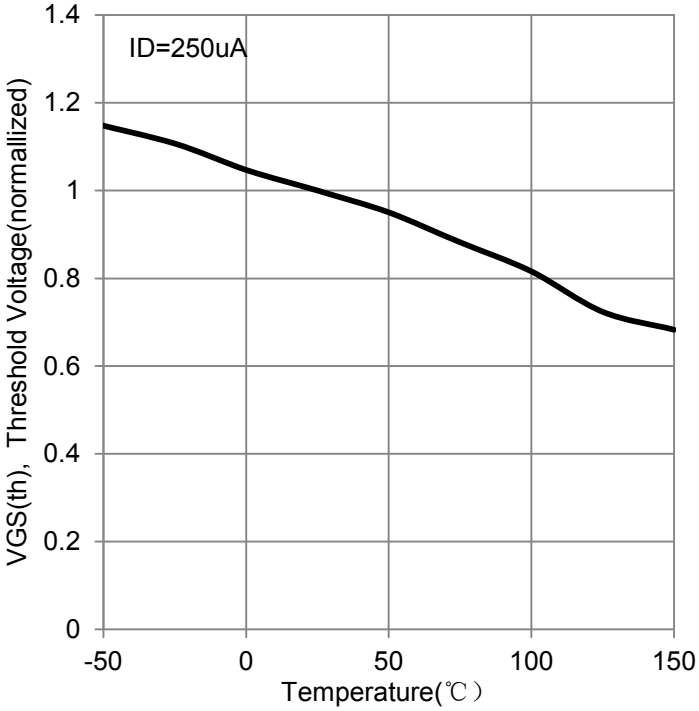


Capacitor vs.VDS

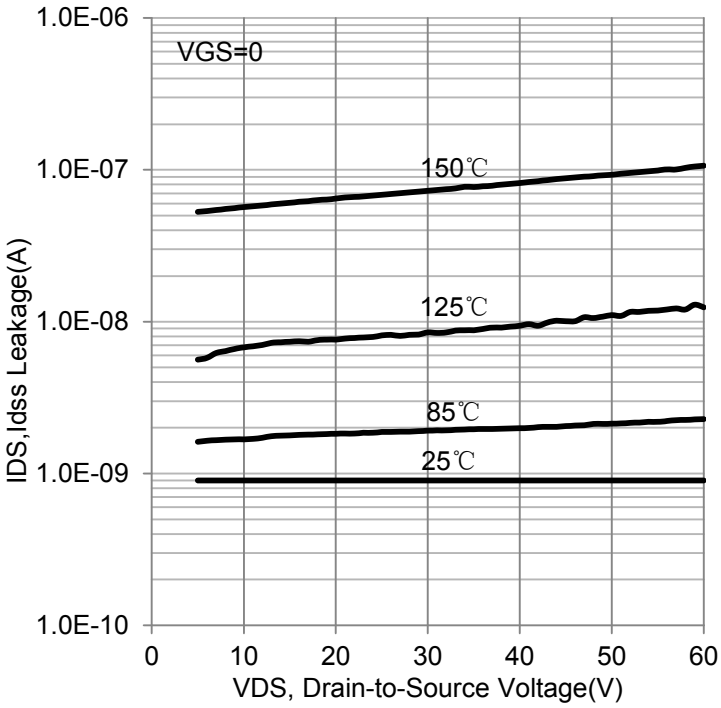


IS vs.VSD

6. ELECTRICAL CHARACTERISTICS CURVES（Con.)



VGS(th) vs. Temperature

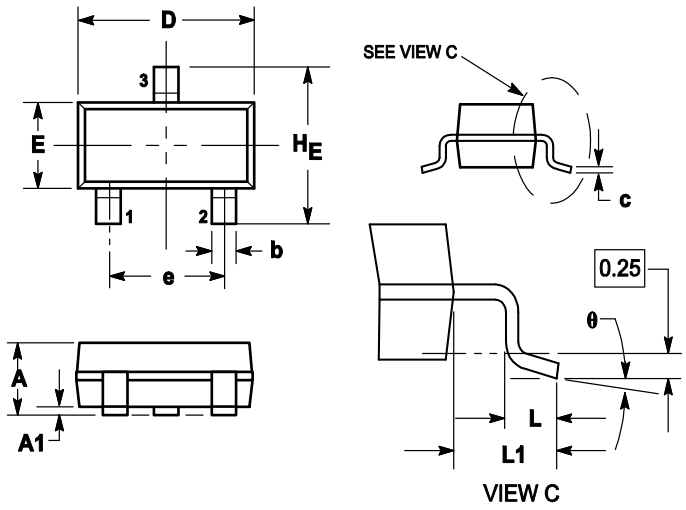


IDS vs. VDS

PACKAGE OUTLINE & DIMENSIONS

2N7002

7.OUTLINE AND DIMENSIONS



Notes:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1	1.11	0.035	0.04	0.044
A1	0.01	0.06	0.1	0.001	0.002	0.004
b	0.37	0.44	0.5	0.015	0.018	0.02
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.9	3.04	0.11	0.114	0.12
E	1.20	1.3	1.4	0.047	0.051	0.055
e	1.78	1.9	2.04	0.07	0.075	0.081
L	0.10	0.2	0.3	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.4	2.64	0.083	0.094	0.104
θ	0°	---	10°	0°	---	10°

8.SOLDERING FOOTPRINT