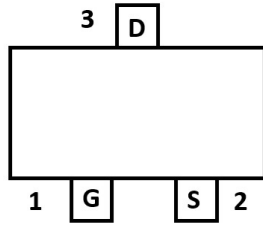
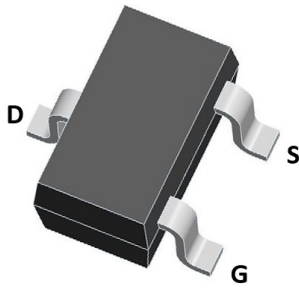
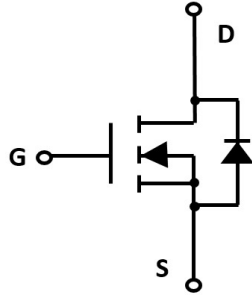


N-Channel Enhancement Mode Field Effect Transistor



SOT-323



Product Summary

- V_{DS} 60V
- I_D 340mA
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<2.5\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $<3.0\Omega$

General Description

- Trench Power MV MOSFET technology
- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage

Applications

- Battery operated systems
- Solid-state relays
- Direct logic-level interface: TTL/CMOS

■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-source Voltage	V_{DS}	60	V
Gate-source Voltage	V_{GS}	± 30	V
Drain Current	$T_A=25^\circ\text{C}$ @ Steady State	340	mA
	$T_A=70^\circ\text{C}$ @ Steady State	272	
Pulsed Drain Current ^A	I_{DM}	1.5	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$	P_D	150	mW
Thermal Resistance Junction-to-Ambient @ Steady State ^B	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

■ Ordering Information

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
2N7002W	F2	7002.	3000	30000	120000	7" reel



2N7002W

■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V,V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS1}	V _{GS} = ± 30V, V _{DS} =0V			± 100	nA
	I _{GSS2}	V _{GS} = ± 20V, V _{DS} =0V			± 50	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1	1.6	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D =300mA		1.2	2.5	Ω
		V _{GS} = 4.5V, I _D =200mA		1.3	3.0	
Forward Transconductance	g _{fs}	V _{DS} =10 V, I _D =200mA	80			ms
Diode Forward Voltage	V _{SD}	I _S =300mA,V _{GS} =0V			1.2	V
Maximum Body-Diode Continuous Current	I _S				340	mA
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =30V,V _{GS} =0V,f=1MHZ		27.5		pF
Output Capacitance	C _{oss}			2.75		
Reverse Transfer Capacitance	C _{rss}			1.9		
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V,V _{DS} =30V,I _D =0.3A		1.6		nC
Gate-Source Charge	Q _{gs}			0.47		
Gate-Drain Charge	Q _{gd}			0.25		
Reverse Recovery Charge	Q _{rr}	I _F =0.3A, di/dt=-100A/us		2.5		ns
Reverse Recovery Time	t _{rr}			11.5		
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V,V _{DD} =30V, I _D =300mA, R _{GEN} =6Ω		3.3		
Turn-on Rise Time	t _r			19		
Turn-off Delay Time	t _{D(off)}			9.6		
Turn-off fall Time	t _f			49		

A. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.



■ Typical Performance Characteristics

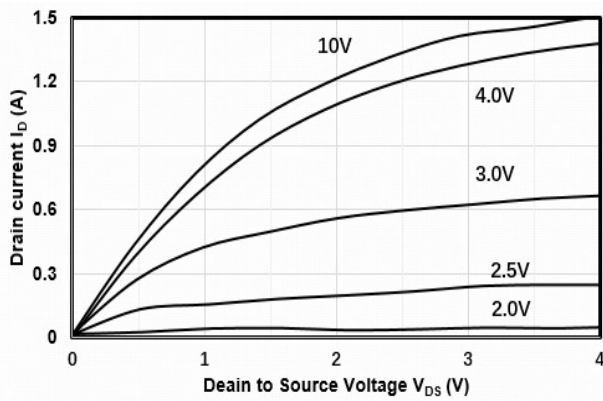


Figure1. Output Characteristics

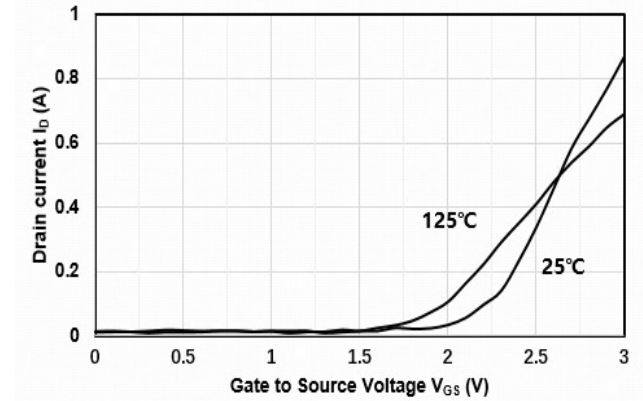


Figure2. Transfer Characteristics

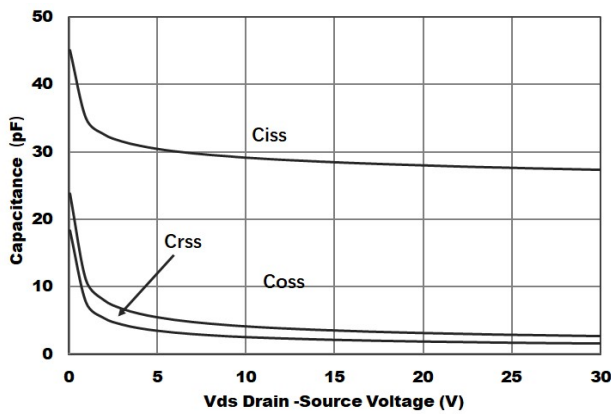


Figure3. Capacitance Characteristics

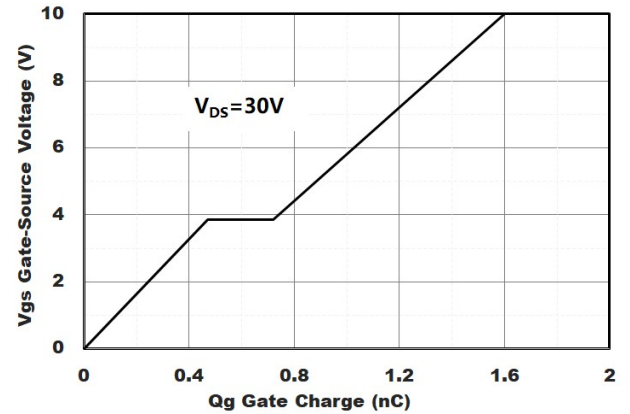


Figure4. Gate Charge

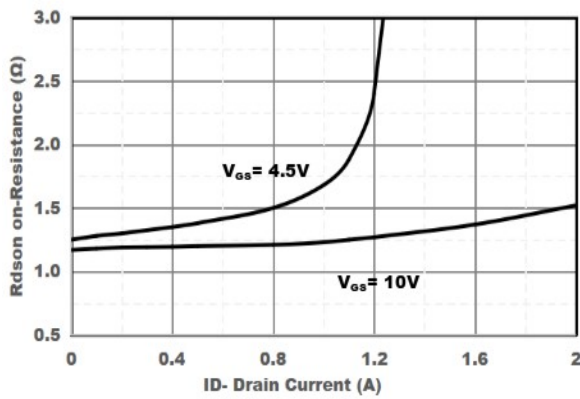


Figure5. Drain-Source on Resistance

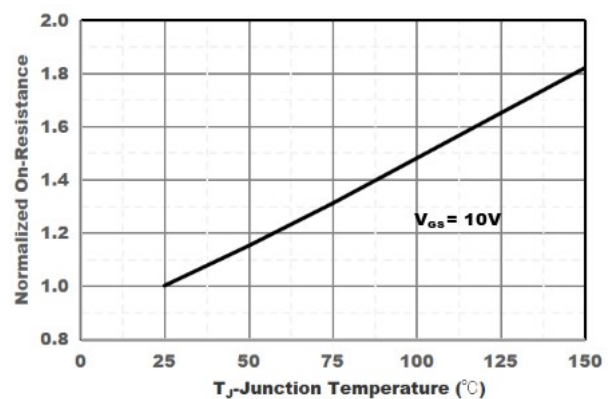


Figure6. Drain-Source on Resistance



2N7002W

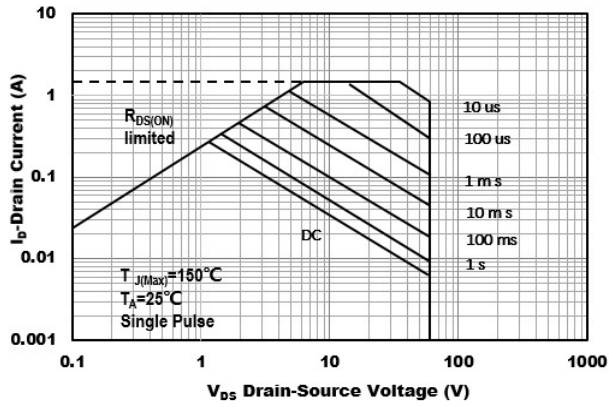


Figure7. Safe Operation Area

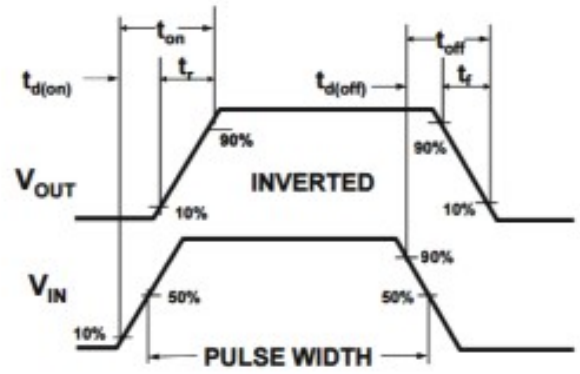
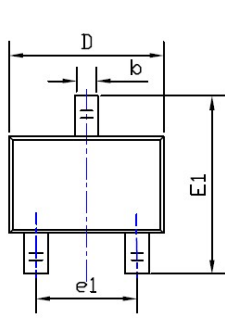


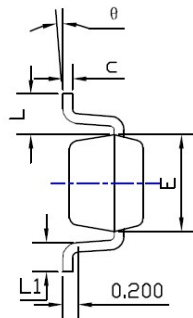
Figure8. Switching wave



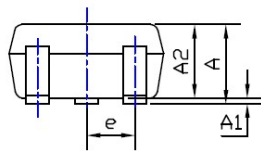
■ SOT-323 Package Information



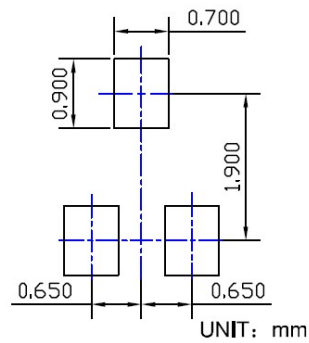
TOP VIEW



SIDE VIEW



SIDE VIEW



SUGGESTED SOLDER PAD LAYOUT

SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.035	---	0.043	0.900	---	1.100
A1	0.000	---	0.004	0.000	---	0.100
A2	0.035	0.037	0.039	0.900	0.950	1.000
b	0.006	0.012	0.016	0.150	0.300	0.400
c	0.004	---	0.010	0.100	---	0.250
D	0.071	0.079	0.087	1.800	2.000	2.200
E	0.045	0.049	0.053	1.150	1.250	1.350
E1	0.085	0.091	0.096	2.150	2.300	2.450
e	0.026TYP			0.650TYP		
e1	0.047	0.051	0.055	1.200	1.300	1.400
L	0.021REF			0.525REF		
L1	0.010	0.014	0.018	0.260	0.360	0.460
theta	0°	---	8°	0°	---	8°

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



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