N-Channel 60V(D-S) MOSFET

Product summary		
V_{DS}	60	V
$R_{DS(ON)}$(at V_{GS}=10V) Typ.	1.2	Ω
$R_{DS(ON)}$(at V_{GS}=4.5V) Typ.	1.3	Ω
I_D(T_A=25℃)	0.34	A

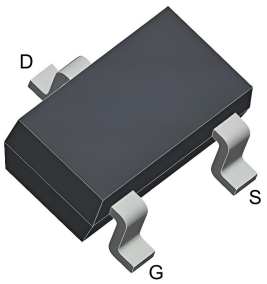
Features

- Low input Capacitance
- Trench Power MV MOSFET technology
- Fast Switching Speed

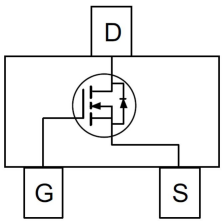
Applications

- Battery operated systems
- Solid-state relays

Pin Configuration



SOT-23



Packing Information

Device	Marking	Reel Size	Quantity(Min. Package)
2N7002	7002.	7″	3000pcs

Absolute Maximum Ratings (at T_A=25℃ Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current at V_{GS}=10V	T_A=25℃	0.34	A
		T_A=70℃	0.27	A
I_{DM}	Pulse Drain Current Tested [A]		1.5	A
P_D	Power Dissipation	T_A=25℃	0.35	W
T_J,T_{STG}	Junciton and Storage Temperature Range		-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient [B]	357	℃/W

Electrical Characteristics (at T_J =25℃ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V,V_{GS}=0V	--	--	1	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±20V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	1.0	1.5	2.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V,I_D=0.3A	--	1.2	2.5	Ω
		V_{GS}=4.5V,I_D=0.2A	--	1.3	3.0	Ω
V_{SD}	Forward Voltage	I_{SD}=0.3A,V_{GS}=0V	--	--	1.2	V
Dynamic Parameters						
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=30V f=1MHZ	--	16	--	pF
C_{oss}	Output Capacitance		--	10	--	pF
C_{rss}	Reverse Transfer Capacitance		--	5.5	--	pF
Switching Parameters						
Q_g	Total Gate Charge	V_{DS}=30V,I_D=0.3A V_{GS}=10V	--	1.7	--	nC
$t_{D(on)}$	Turn-on Delay Time	V_{DD}=30V I_D=0.3A,R_{GEN}=6Ω, V_{GS}=10V	--	5	--	nS
$t_{D(off)}$	Turn-off Delay Time		--	17	--	nS

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

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

Typical Characteristics

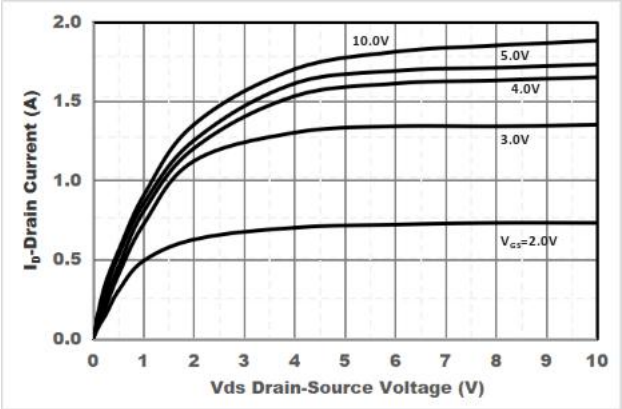


Figure1. Output Characteristics

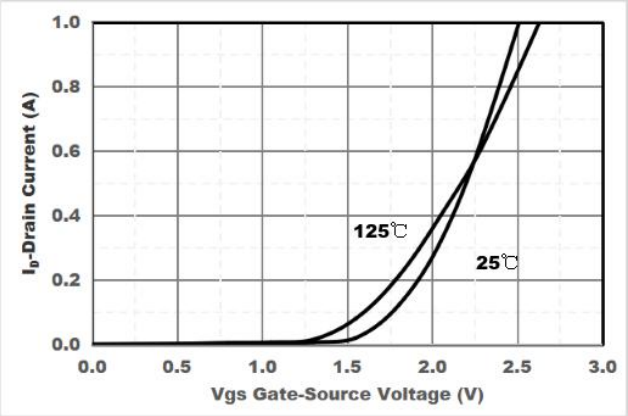


Figure2. Transfer Characteristics

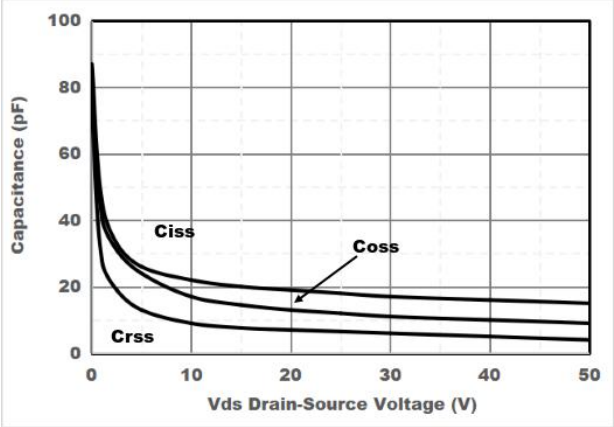


Figure3. Capacitance Characteristics

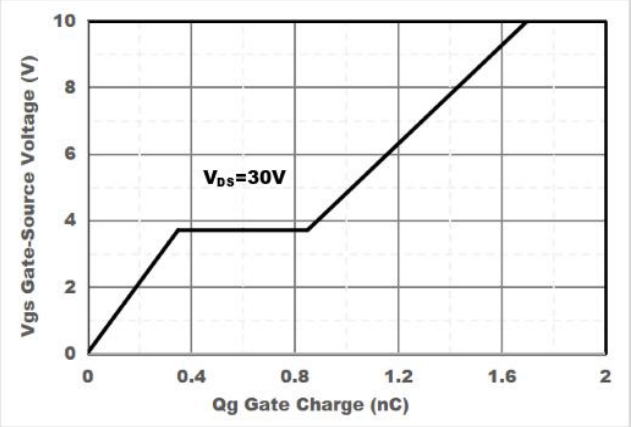


Figure4. Gate Charge

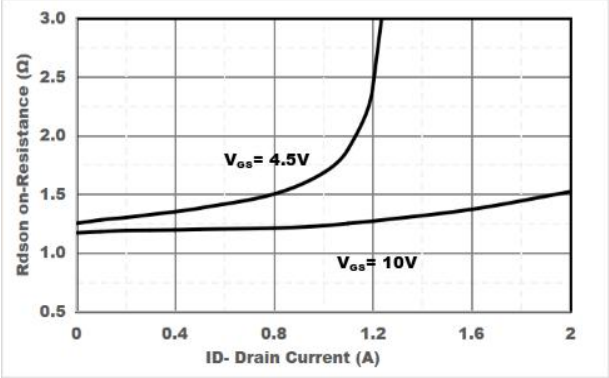


Figure5. Drain-Source on Resistance

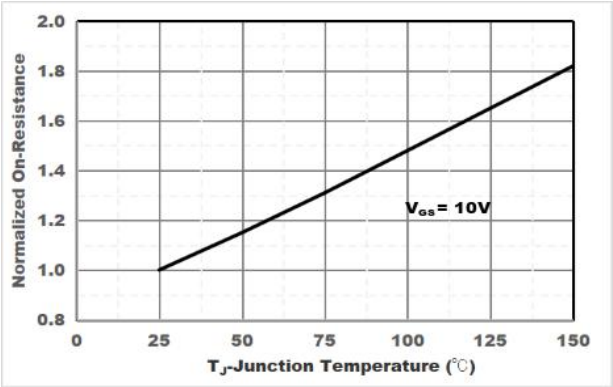


Figure6. Drain-Source on Resistance

Typical Characteristics

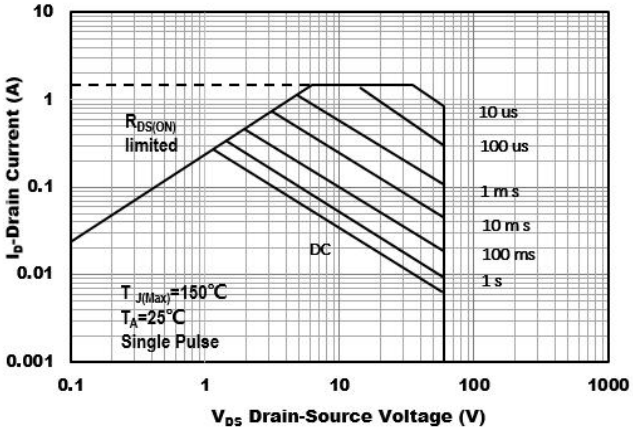


Figure7. Safe Operation Area

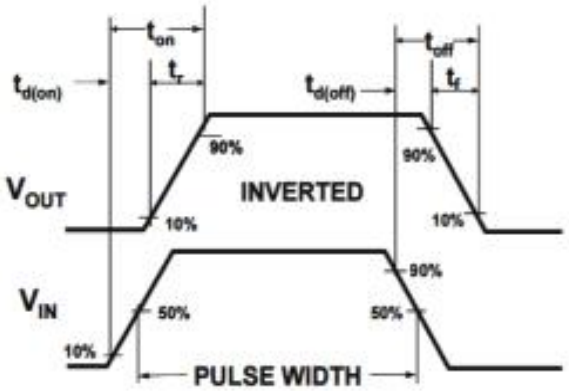
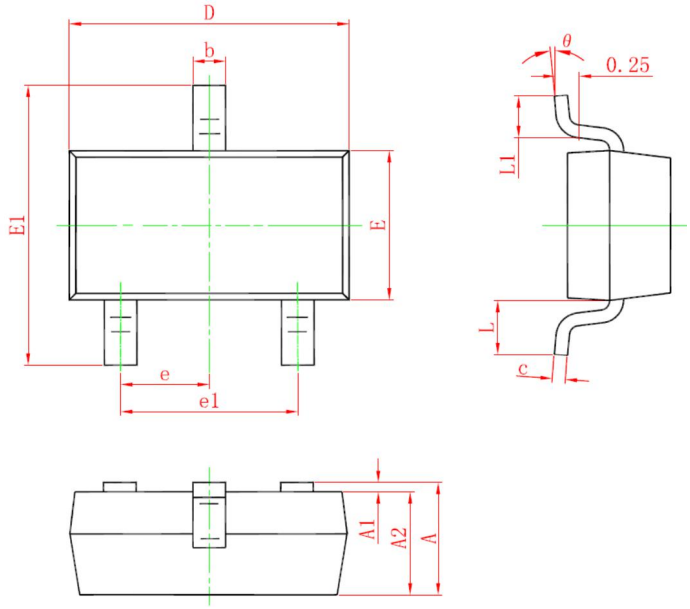


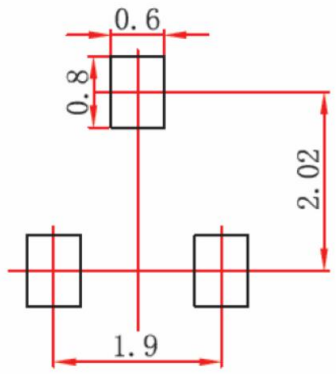
Figure8. Switching wave

SOT-23 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Recommended Pad outline



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.