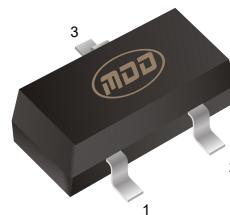


SOT-23

V_{(BR)DSS}	R_{DS(on)MAX}	I_D
60V	2.5Ω@10V	300mA
	3.0Ω@4.5V	

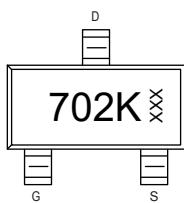


1. Gate
2. Source
3. Drain

Features

- Trench Power MV MOSFET technology
- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage
- ESD Protected up to 2KV(HBM)

Marking

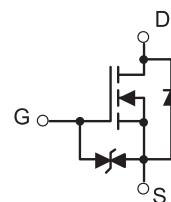


XXX:Date Code

Application

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

Equivalent Circuit



Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	60	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _D	300	mA
Pulsed Drain Current (Note 1)	I _{DM}	1.5	A
Power Dissipation (Note 2)	P _D	300	mW
Thermal Resistance from Junction to Ambient (Note 2)	R _{θJA}	416	°C/W
Junction Temperature and Storage Temperature	T _{J,T_{stg}}	-50 ~ 150	°C

Notes: Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



2N7002K

60V N-Channel Enhancement Mode MOSFET

T_a = 25°C unless otherwise specified

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60	--	--	V
I _{DS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V	--	--	1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±10	uA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1	1.5	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance(Note 3)	V _{GS} =10V, I _D =300mA	--	1.9	2.5	Ω
		V _{GS} =4.5V, I _D =200mA	--	2.0	3.0	Ω

Dynamic Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{DS} =30V V _{GS} =0V f=1MHz	--	21	--	pF
C _{oss}	Output Capacitance		--	9	--	pF
C _{rss}	Reverse Transfer Capacitance		--	4	--	pF
Q _g	Total Gate Charge	V _{DS} =30V V _{GS} =10V I _D =0.3A	--	1.22	2.4	nC
Q _{gs}	Gate Source Charge		--	0.5	--	nC
Q _{gd}	Gate Drain Charge		--	0.18	--	nC

Switching Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
t _{d(on)}	Turn on Delay Time	V _{DS} =30V V _{GS} =10V I _D =300mA R _G =6Ω	--	7	--	ns
t _r	Turn on Rise Time		--	19	--	ns
t _{d(off)}	Turn Off Delay Time		--	20	--	ns
t _f	Turn Off Fall Time		--	84	--	ns

Source Drain Diode Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
I _{SD}	Source drain current(Body Diode)	T _A =25°C	--	--	300	mA
V _{SD}	Drain-Source Diode Forward Voltage	I _S =300mA, V _{GS} =0V	--	--	1.2	V

Notes: 1.Pulse width limited by maximum allowable junction temperature2.The value of P_D&R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz.Copper, double sided, in a still air environment with T_a=25°C.

3.Pulse test ; Pulse width≤300us, duty cycle≤2%

■ Typical Performance Characteristics

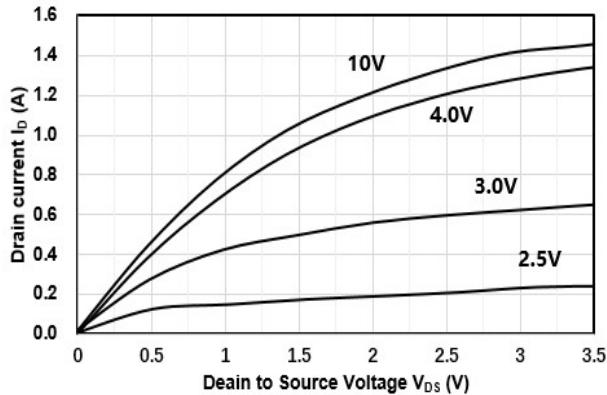


Figure1. Output Characteristics

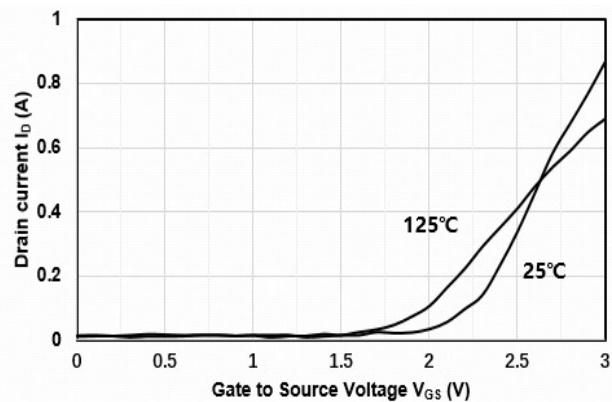


Figure2. Transfer Characteristics

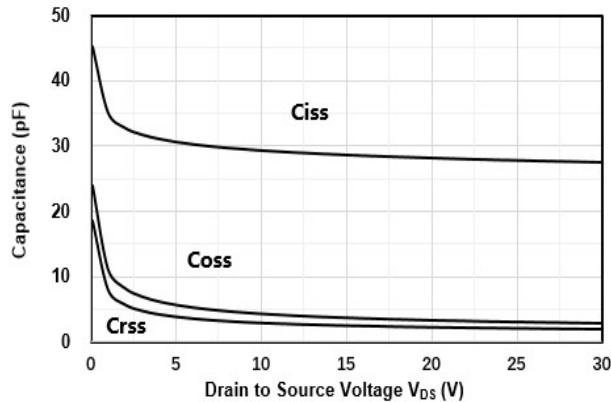


Figure3. Capacitance Characteristics

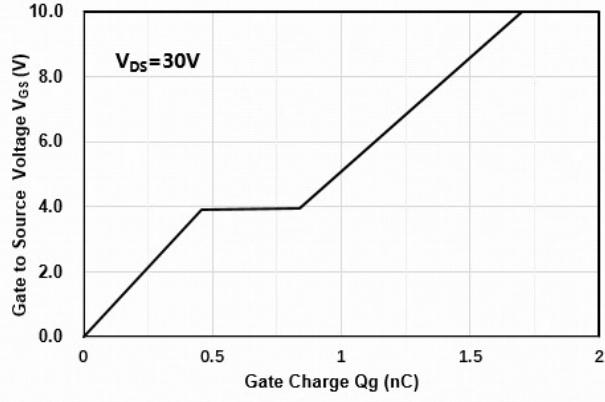


Figure4. Gate Charge

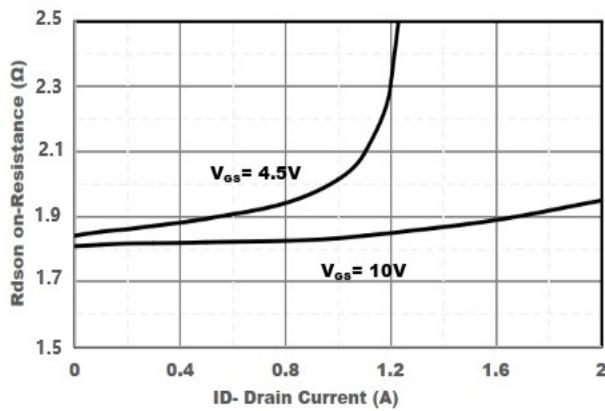


Figure5. Drain-Source on Resistance

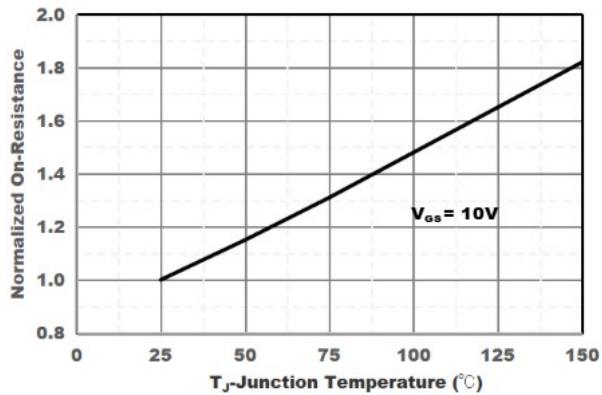


Figure6. Drain-Source on Resistance

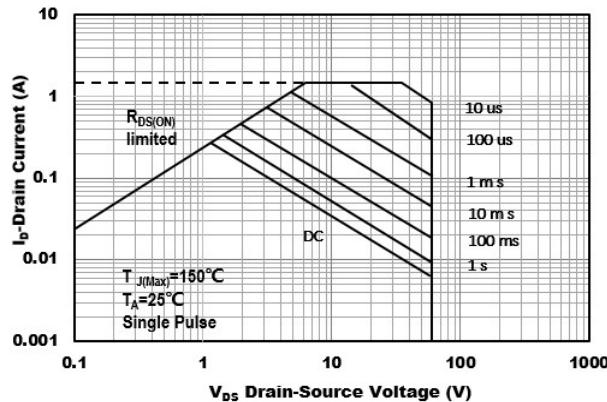


Figure7. Safe Operation Area

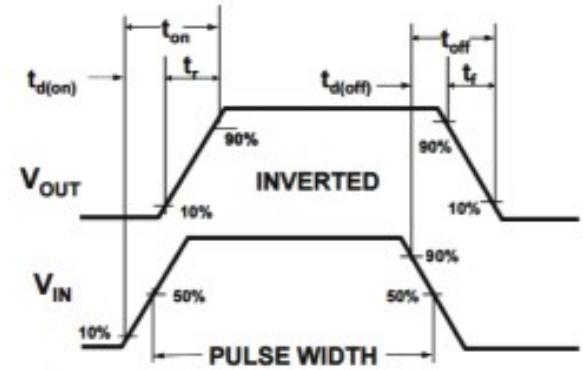
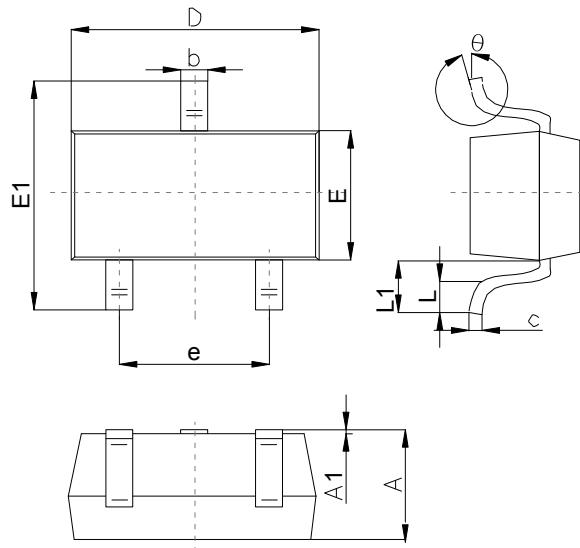


Figure8. Switching wave

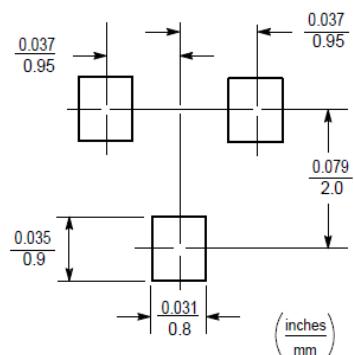
Outline Drawing

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	0.65		1.40
A1	0.00		0.20
b	0.30		0.55
c	0.08		0.20
D	2.70		3.10
E	1.15		1.65
E1	2.10		2.80
e	1.70		2.10
L	0.15		0.50
L1	0.35		0.70
θ	0°		12°

Suggested Pad Layout



Note:

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