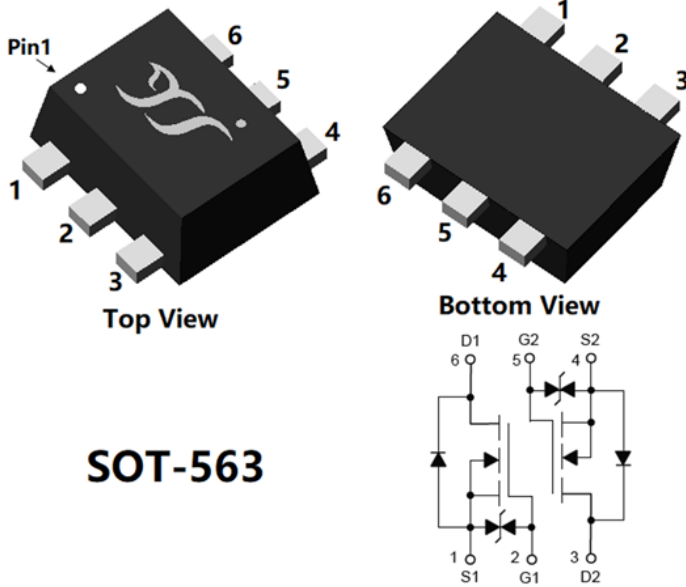


N-Channel Enhancement Mode Field Effect Transistor



Product Summary

- V_{DS} 60V
- I_D 300mA
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <2.5ohm
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) <3.0ohm
- Gate-Source ESD Rating Up to 2KV (HBM)

General Description

- Trench Power MV MOSFET technology
- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- DC/DC Converter
- Load Switch for Portable Devices

■ 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}	± 20	V
Drain Current	I_D	$T_A=25^\circ\text{C}$ @ Steady State	300
		$T_A=70^\circ\text{C}$ @ Steady State	240
Pulsed Drain Current ^A	I_{DM}	1.5	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$	P_D	250	mW
Thermal Resistance Junction-to-Ambient @ Steady State ^B	$R_{\theta JA}$	500	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
2N7002KCX	F2	72C	3000	30000	120000	7" reel



2N7002KCX

■ Electrical Characteristics (T_J=25°C 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 _{GSS}	V _{GS} = ±20V, V _{DS} =0V			±10	μA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1	1.5	2.5	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D =300mA		1.9	2.5	Ω
		V _{GS} = 4.5V, I _D =200mA		2.0	3.0	
Diode Forward Voltage	V _{SD}	I _S =300mA, V _{GS} =0V			1.2	V
Maximum Body-Diode Continuous Current	I _S				300	mA
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =0.3A		0.13		S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f=1MHZ		21		pF
Output Capacitance	C _{oss}			9		
Reverse Transfer Capacitance	C _{rss}			4		
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =30V, I _D =0.3A		1.22	2.4	nC
Gate-Source Charge	Q _{gs}			0.5		
Gate-Drain Charge	Q _{gd}			0.18		
Reverse Recovery Charge	Q _{rr}	V _{GS} =0V, I _S =300mA, V _R =25V, di/dt=100A/μs		3.6		
Reverse Recovery Time	t _{rr}			16		
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =50V, I _D =200mA, R _{GEN} =50Ω		7		ns
Turn-on Rise Time	t _r			19		
Turn-off Delay Time	t _{D(off)}			20		
Turn-off fall Time	t _f			84		

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

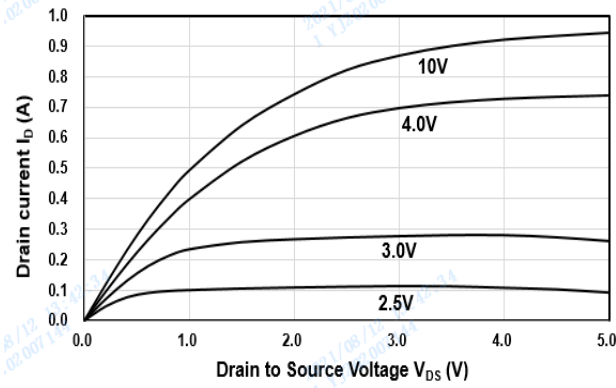


Figure1. Output Characteristics

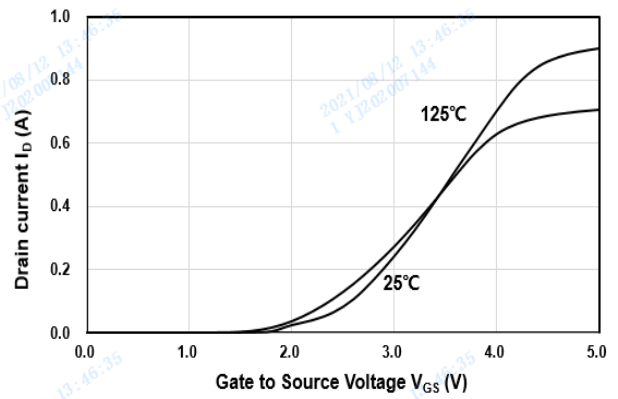


Figure2. Transfer Characteristics

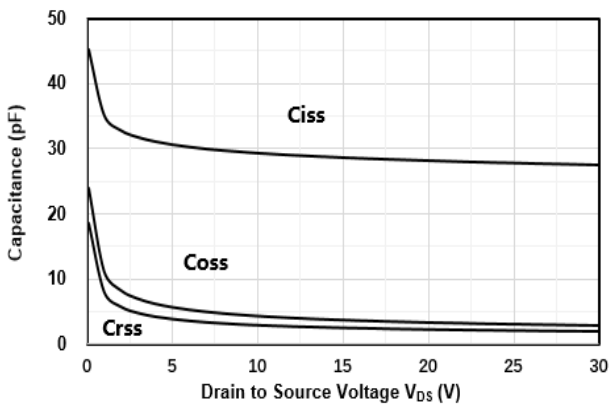


Figure3. Capacitance Characteristics

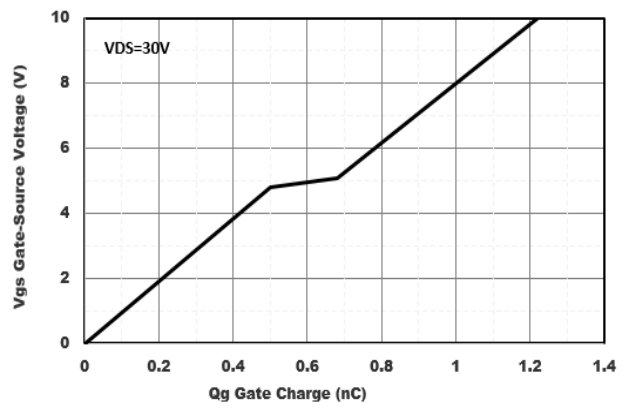


Figure4. Gate Charge

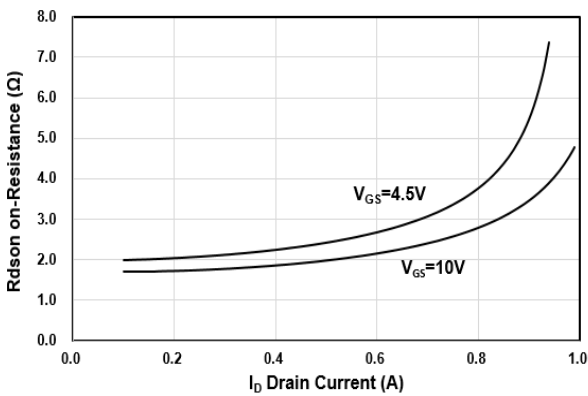


Figure5. Drain-Source on Resistance

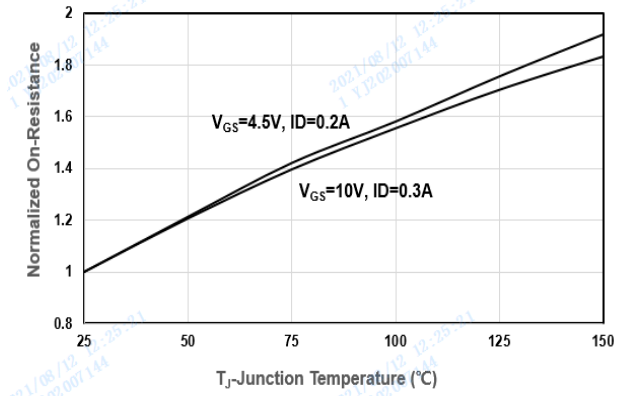


Figure6. Drain-Source on Resistance



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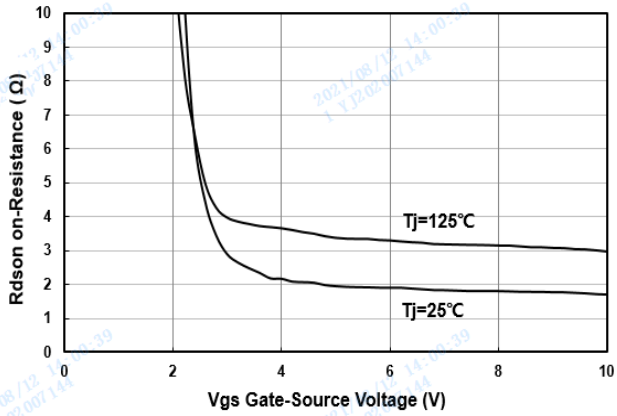


Figure 7. On-Resistance vs V_{GS}

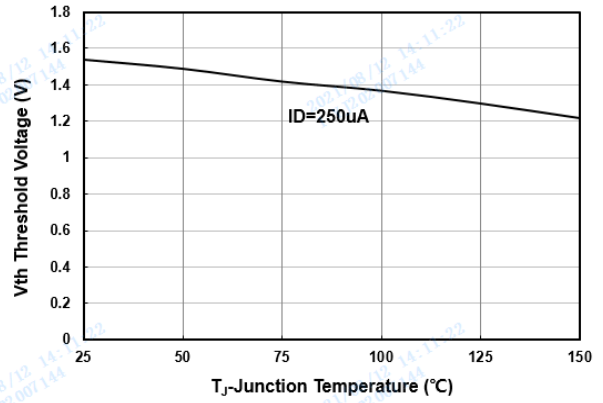


Figure 8. Threshold Voltage vs Temperature

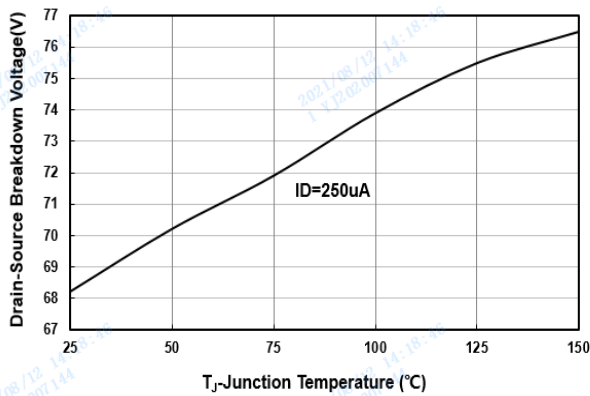


Figure 9. Breakdown Voltage vs Temperature

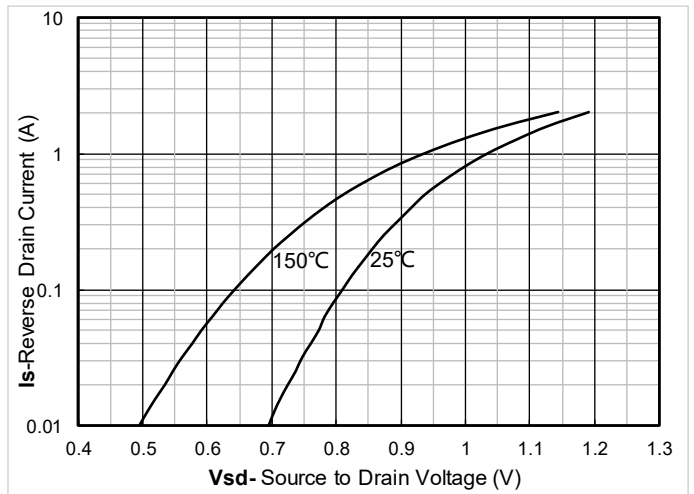


Figure 10. Forward characteristics of reverse diode

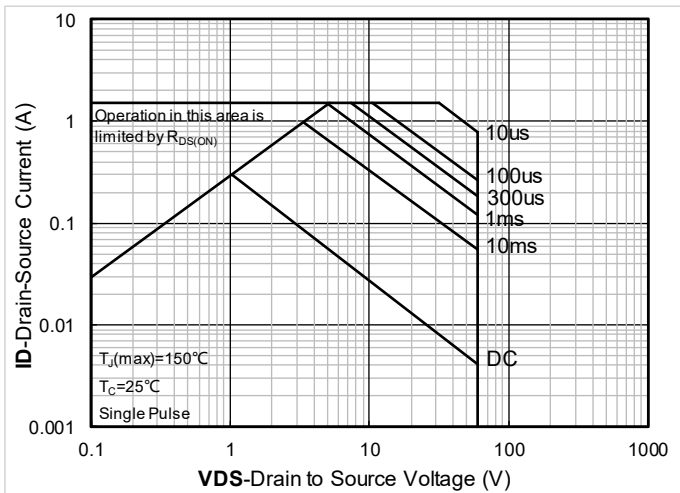
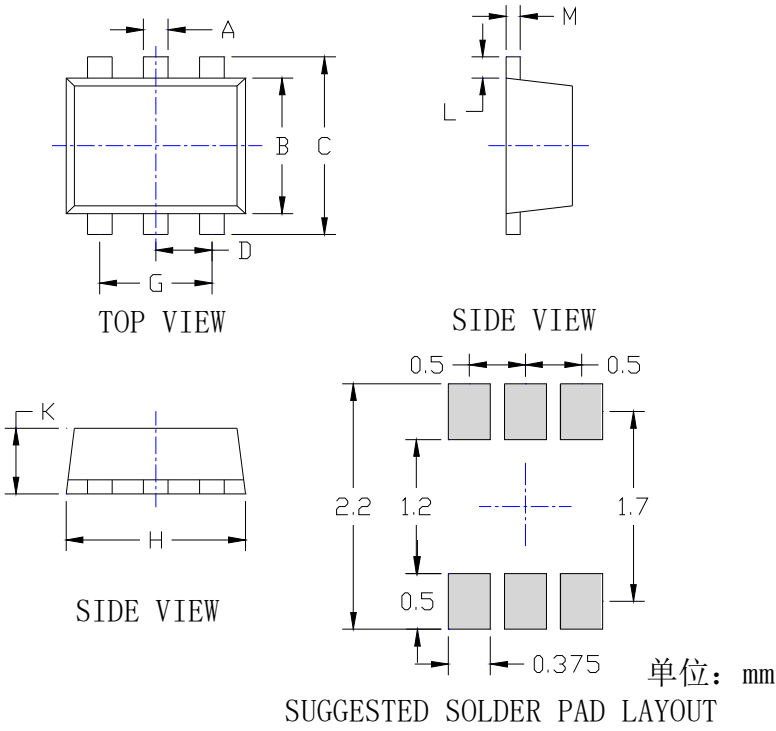


Figure 11. Safe Operation Area



2N7002KCX

■ SOT-563 Package information



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.006	0.011	0.150	0.300
B	0.043	0.051	1.100	1.300
C	0.059	0.067	1.500	1.700
D	0.016	0.024	0.400	0.600
G	0.035	0.043	0.900	1.100
H	0.059	0.067	1.500	1.700
K	0.021	0.026	0.550	0.650
L	0.004	0.011	0.100	0.300
M	0.004	0.007	0.100	0.180

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.



2N7002KCX

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