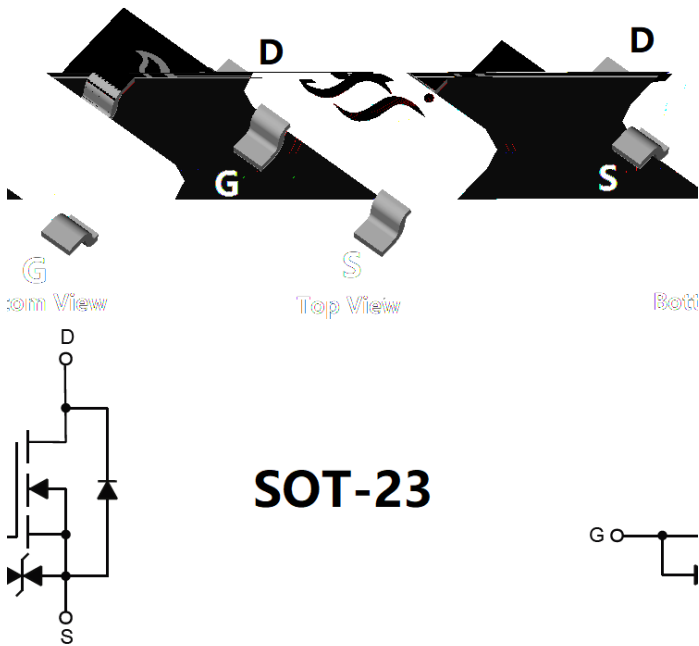




2N7002KC

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

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

Absolute Maximum Ratings ($T_A=25$ 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	$T_A=25$ @ Steady State	300
		$T_A=70$ @ Steady State	240
Pulsed Drain Current ^A	I_{DM}	1.5	A
Total Power Dissipation @ $T_A=25$	P_D	300	mW
Thermal Resistance Junction-to-Ambient @ Steady State ^B	R_{JA}	416	/ W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 +150	

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
2N7002KC	F2	72KC.	3000	30000	120000	reel



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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 =250	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	
Gate-Body Leakage Current	I _{GSS}	V _{GS} = 20V, V _{DS} =0V			10	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250	1	1.5	2.5	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D =300mA		1.9	2.5	
		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/ s		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} =50		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

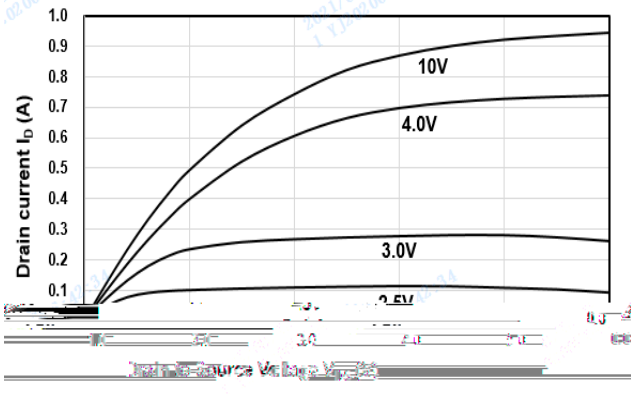


Figure1. Output Characteristics

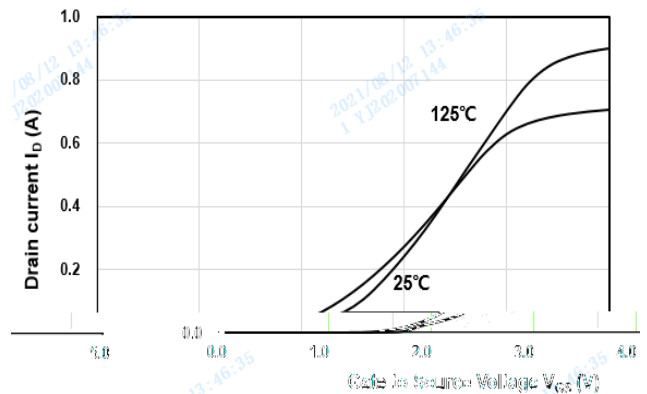


Figure2. Transfer Characteristics

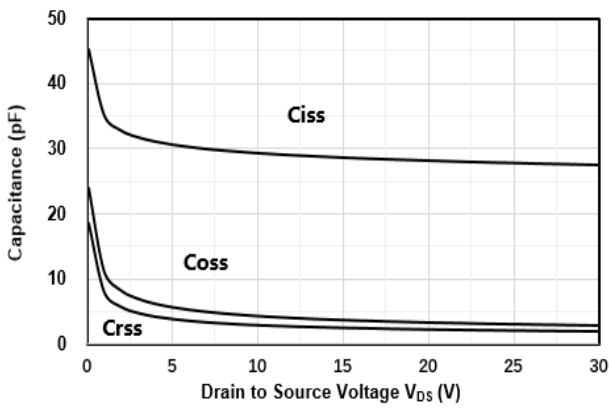


Figure3. Capacitance Characteristics

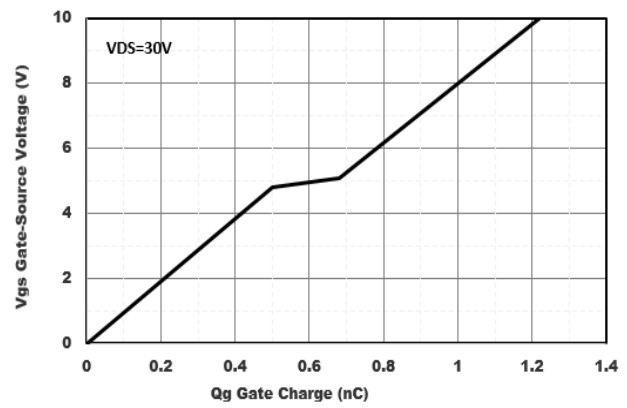


Figure4. Gate Charge

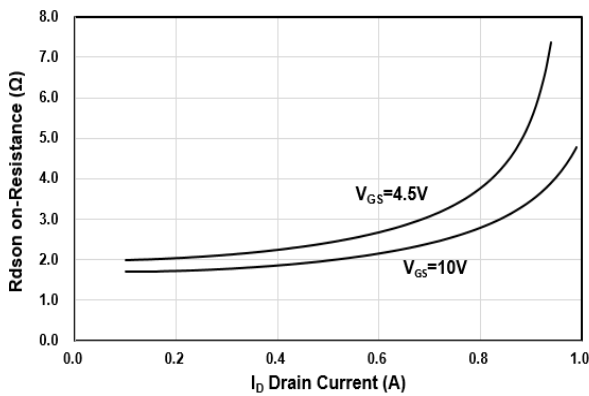


Figure5. Drain-Source on Resistance

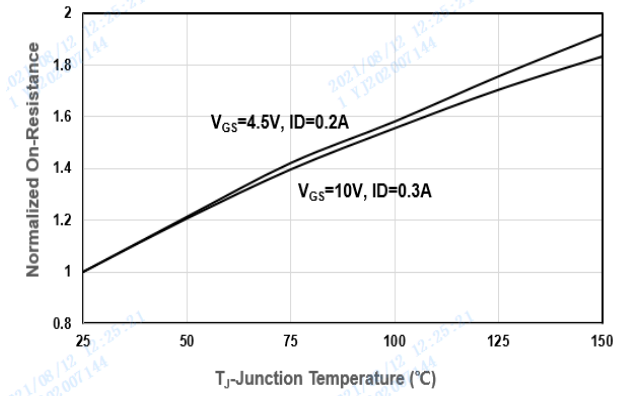


Figure6. Drain-Source on Resistance



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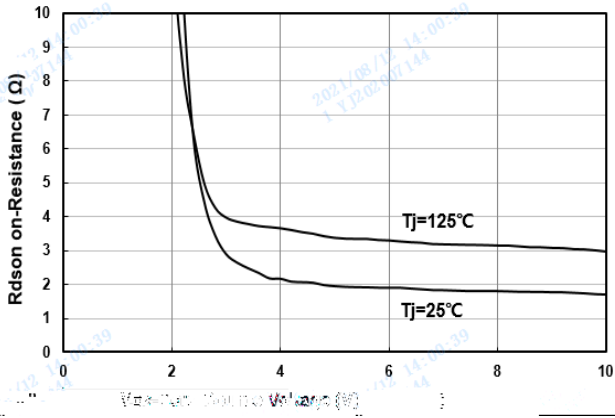


Figure 7. On-Resistance vs V_{GS}

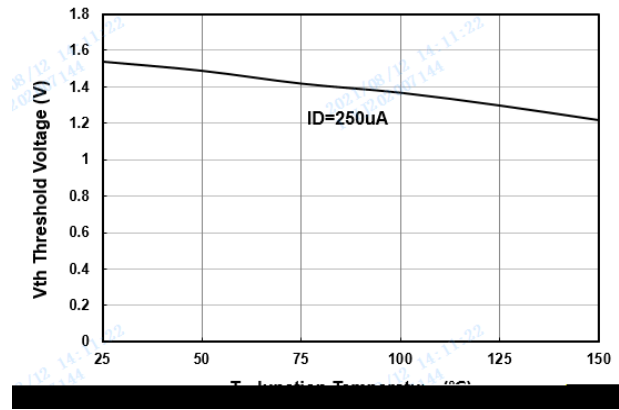


Figure 8. Threshold Voltage vs Temperature

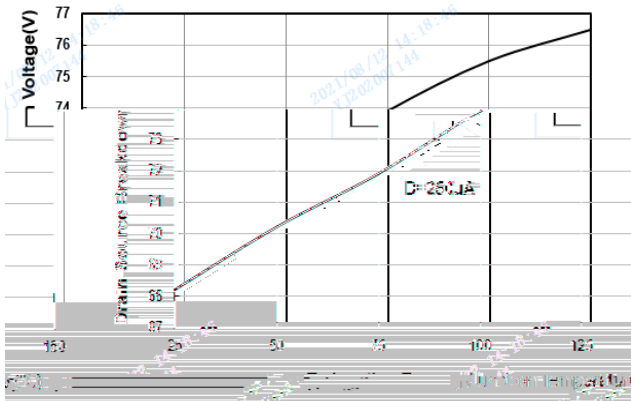


Figure 9. Breakdown Voltage vs Temperature

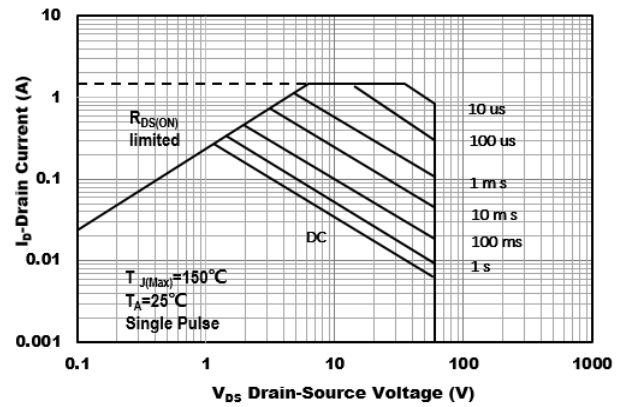


Figure 10. Safe Operation Area

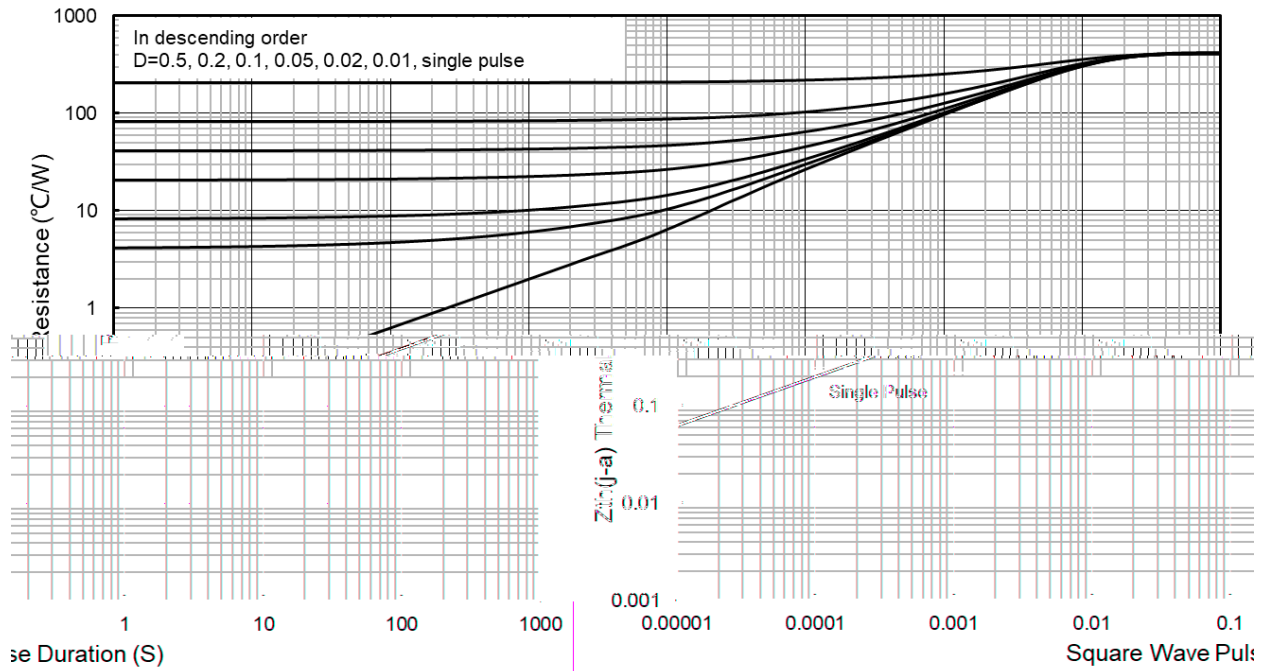
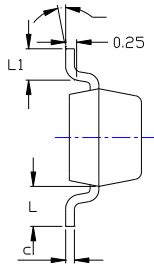
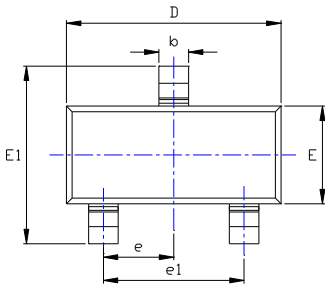


Figure 11. Maximum Transient Thermal Impedance

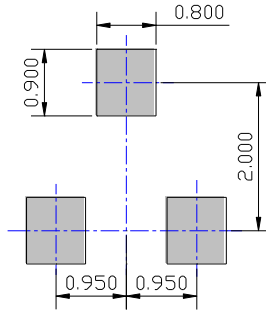
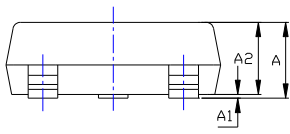


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SOT-23 Package information



SYMBOL	DIMENSIONS		Millimeter	
	INCHES		MIN.	MAX.
A	0.035	0.		



p í#®í ®



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