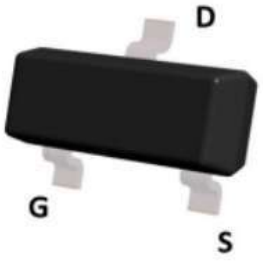
VC7002X

N-Channel Enhancement Mode Field Effect Transistor

Product Summary

- V_{DS} = 60V,I_D = 0.3A
  $R_{DS(ON)}$ < 3Ω @ V_{GS}=5V
  $R_{DS(ON)}$ < 2Ω @ V_{GS}=10V



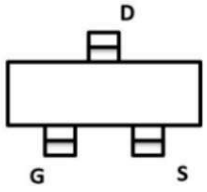
Top View

General Description

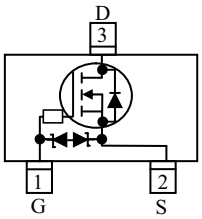
- Trench Power LV MOSFET technology
- High Power and current handing capability

Applications

- PWM application
- Load switch



SOT-23



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified.)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage (R_{GS} ≤1MΩ)		V_{DGR}	60	V
Gate Source Voltage	Continuous	V_{GSS}	±20	V
Drain Current	Continuous	I_D	300	mA
	Pulsed		900	
Power Dissipation		P_D	200	mW
Derated Above 25°C			1.6	mW/°C
Junction Temperature		T_J	+ 150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	625	°C/W
Junction to Case	θ_{JC}	215	°C/W

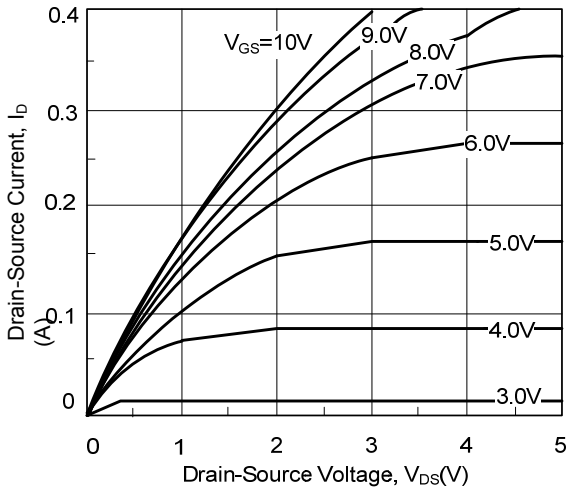
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=10μA	6			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSSF}	V_{GS}=20V, V_{DS}=0V			10	μA
	I_{GSSR}	V_{GS}=-20V, V_{DS}=0V			-10	μA
ON CHARACTERISTICS (Note)						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D=250μA	1.1	1.4	2.2	V
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	V_{GS}=10V, I_D=300mA		1.6	2.0	Ω
		V_{GS}=4.5V, I_D=200mA		2.4	3.0	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz			50	pF
Output Capacitance	C_{OSS}				25	pF
Reverse Transfer Capacitance	C_{RSS}				5	pF
Turn-On Time	t_{ON}	V_{DD}=30V, R_L=150Ω, I_D=200mA, V_{GS}=10V, R_G=25Ω			20	nS
Turn-Off Time	t_{OFF}				20	nS
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				300	mA
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				0.95	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=300mA (Note)		0.88	1.5	V

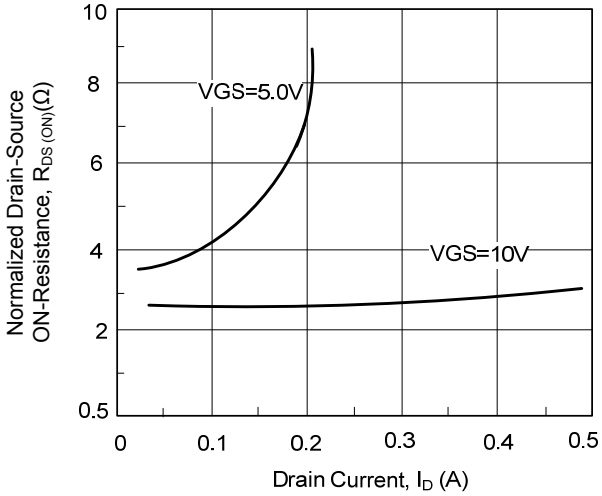
Note: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

■ TY PICAL CHARACTERISTICS

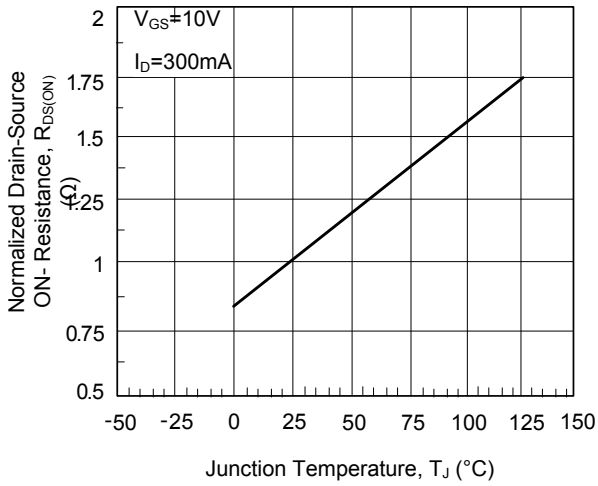
On-Resistance Characteristics



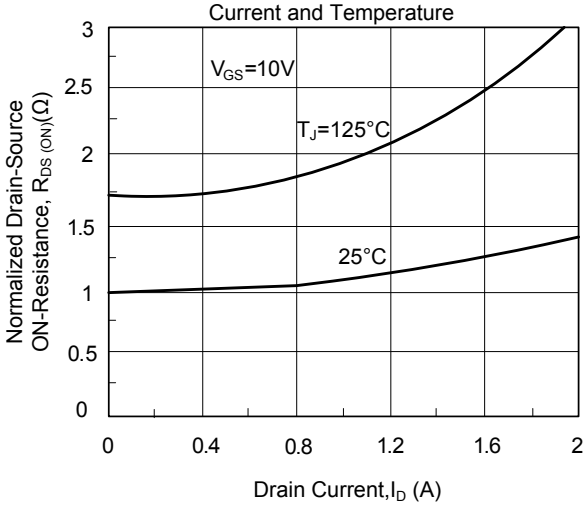
On-Resistance Varisation with Gate Voltage and Drain Current



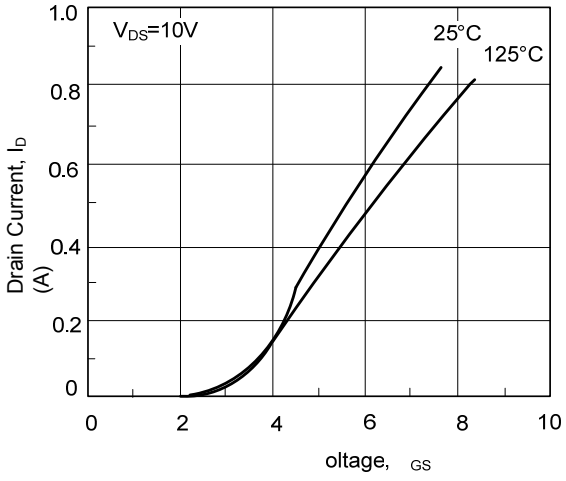
On-Resistance Varisation with Temperature



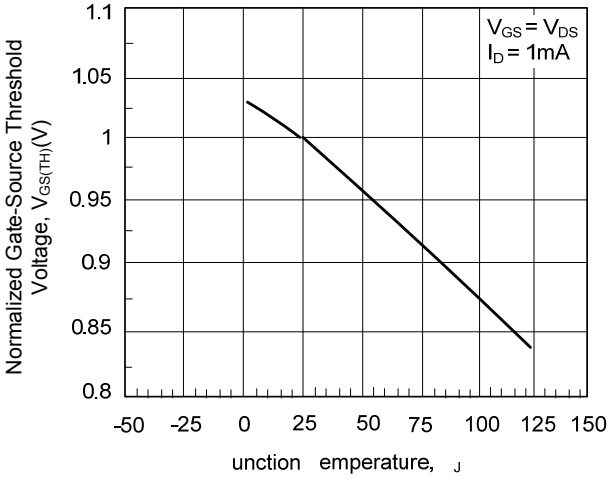
On-Resistance Varisation with Drain Current and Temperature



Transfer Characteristics

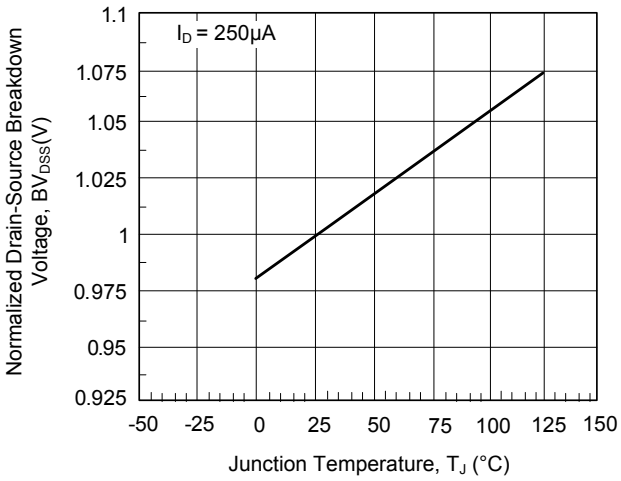


Gate Threshold Varisation with Temperature

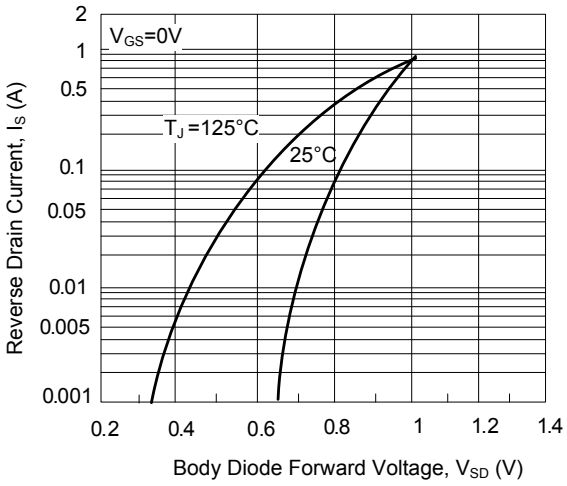


■ TYPICAL CHARACTERISTICS(Cont.)

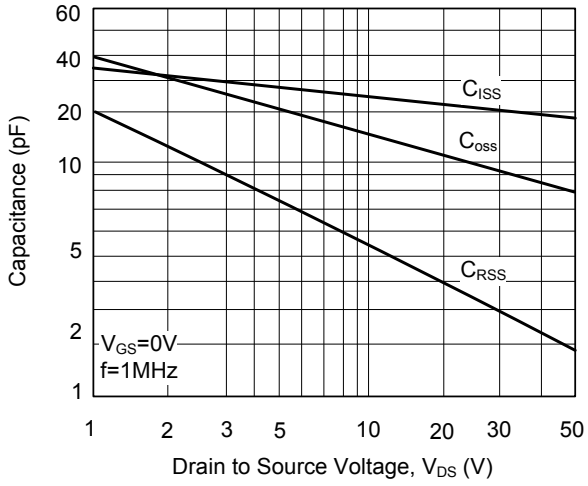
Breakdown Voltage Varisation with Temperature



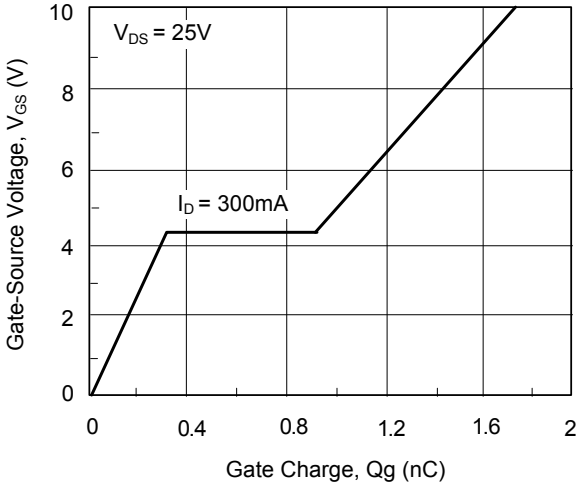
Body Diode Forward Voltage Varisation with Temperature



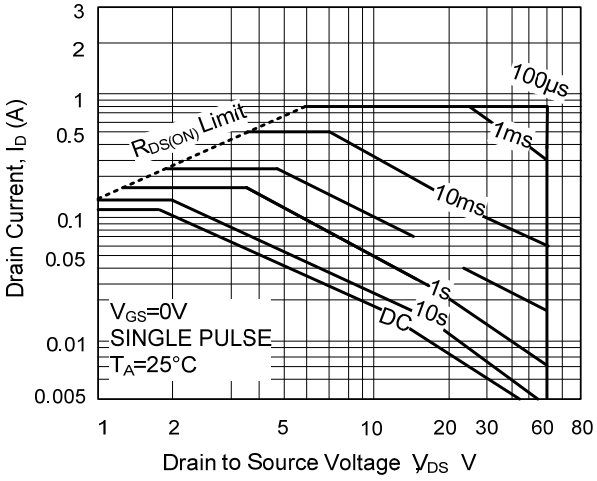
Capacitance Characteristics



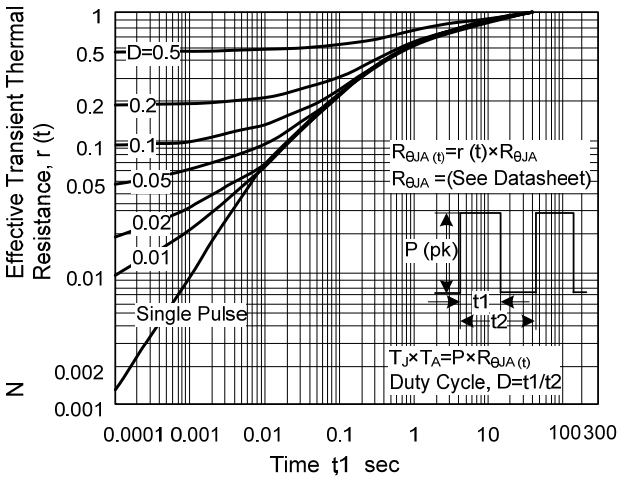
Gate Charge Characteristics



Maximum Safe Operating Area



Transient Thermal Response Curve



■ TEST CIRCUIT AND WAVEFORM

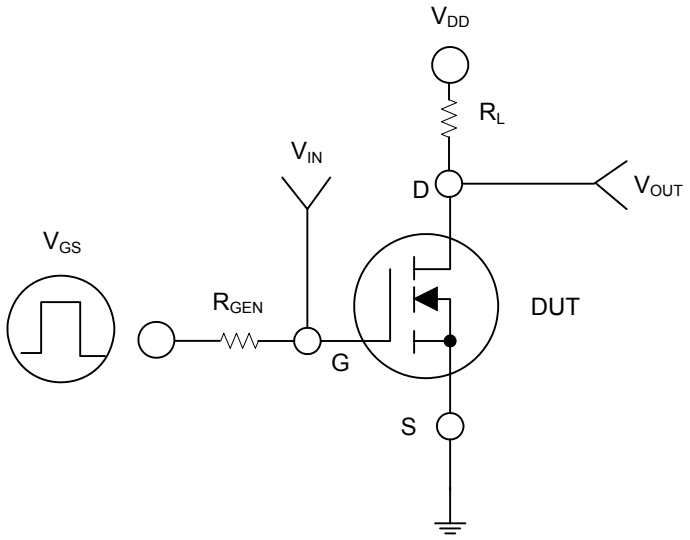


Fig. 1

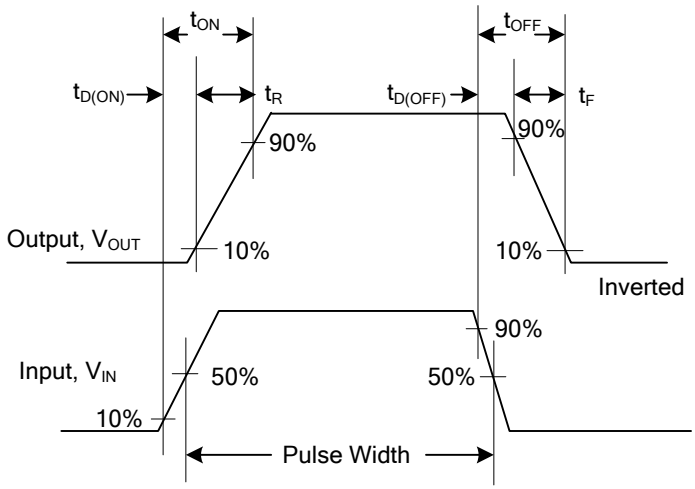
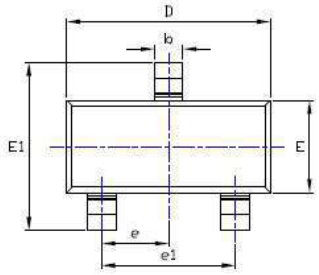
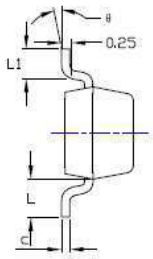


Fig. 2 Switching Waveforms

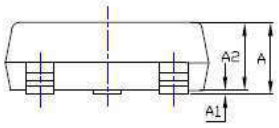
■ SOT-23 Package information



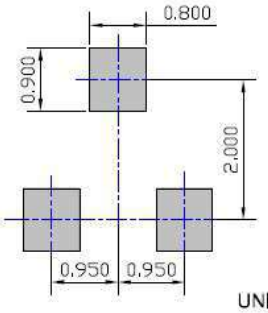
TOP VIEW



SIDE VIEW



SIDE VIEW



UNIT：mm

SUGGESTED SOLDER PAD LAYOUT

SYMBOL	DIMENSIONS					
	INCHES			Millmeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.035	---	0.045	0.900	---	1.150
A1	0.000	---	0.004	0.000	---	0.100
A2	0.035	0.038	0.041	0.900	0.975	1.050
b	0.012	0.016	0.020	0.300	0.400	0.500
c	0.004	---	0.008	0.100	---	0.200
D	0.110	0.114	0.118	2.800	2.900	3.000
E	0.047	0.051	0.055	1.200	1.300	1.400
E1	0.089	0.094	0.100	2.250	2.400	2.550
e	0.037TYP			0.950TYP		
e1	0.071	0.075	0.079	1.800	1.900	2.000
L	0.022REF			0.550REF		
L1	0.012	0.016	0.200	0.300	0.400	0.500
θ	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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