

2N7002HV-TP Datasheet

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DiGi Electronics Part Number	2N7002HV-TP-DG
Manufacturer	Micro Commercial Co
Manufacturer Product Number	2N7002HV-TP
Description	N-CHANNEL MOSFET SOT-23
Detailed Description	N-Channel 60 V 115mA 200mW Surface Mount SOT-23

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Purchase and inquiry

Manufacturer Product Number:

2N7002HV-TP

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

60 V

Drive Voltage (Max Rds On, Min Rds On):

5V, 10V

Vgs(th) (Max) @ Id:

1.8V @ 250µA

Input Capacitance (Ciss) (Max) @ Vds:

50 pF @ 25 V

Power Dissipation (Max):

200mW

Mounting Type:

Surface Mount

Package / Case:

TO-236-3, SC-59, SOT-23-3

Manufacturer:

Micro Commercial Co

Product Status:

Not For New Designs

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

115mA

Rds On (Max) @ Id, Vgs:

7.5Ohm @ 500mA, 10V

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (TJ)

Supplier Device Package:

SOT-23

Base Product Number:

2N7002

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

Features

- Trench MV MOSFET Technology
- Low Threshold Voltage
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

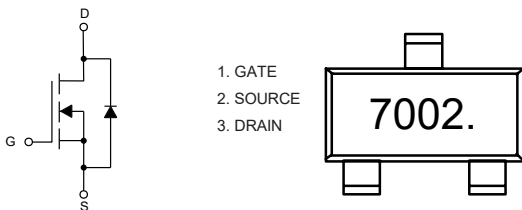
- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature: -55°C to +150°C
- Thermal Resistance: 320°C/W Junction to Ambient (Note2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	115
		$T_A=100^\circ\text{C}$	73
Pulsed Drain Current (Note3)	I_{DM}	460	mA
Total Power Dissipation (Note4)	P_D	390	mW

Note:

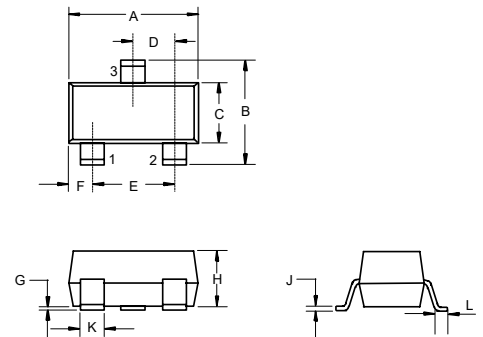
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of $R_{\theta JA}$ is measured with the device mounted on the minimum recommended pad size, in a still air environment with $T_A=25^\circ\text{C}$.
3. Repetitive rating; pulse width limited by max. junction temperature.
4. P_D is based on max. junction temperature, using junction to ambient thermal resistance.

Internal Structure and Marking Code



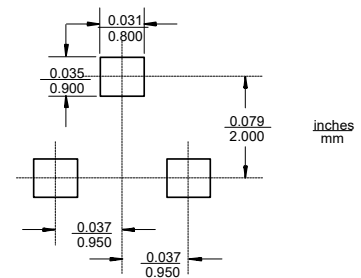
N-Channel MOSFET

SOT-23



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.110	0.120	2.80	3.04	
B	0.083	0.104	2.10	2.64	
C	0.047	0.055	1.20	1.40	
D	0.034	0.041	0.85	1.05	
E	0.067	0.083	1.70	2.10	
F	0.018	0.024	0.45	0.60	
G	0.0004	0.006	0.01	0.15	
H	0.035	0.043	0.90	1.10	
J	0.003	0.007	0.08	0.18	
K	0.012	0.020	0.30	0.51	
L	0.007	0.020	0.20	0.50	

Suggested Solder Pad Layout



Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=10\mu A$	60			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$			80	nA
		$V_{DS}=60V, V_{GS}=0V, T_J=125^\circ C$			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.6	1.7	1.8	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=500mA$		0.9	3	Ω
		$V_{GS}=5V, I_D=50mA$		1	4	
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=200mA$		300		mS
Gate Resistance	R_g	F=1 MHz, Open drain		6		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				115	mA
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=115mA$			1.5	V
Reverse Recovery Time	t_{rr}	$I_F=0.34A, dI_F/dt=100A/\mu s$		7		ns
Reverse Recovery Charge	Q_{rr}				8	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		34		μF
Output Capacitance	C_{oss}			5		
Reverse Transfer Capacitance	C_{rss}			4		
Total Gate Charge	Q_g	$V_{DS}=25V, V_{GS}=10V, I_D=0.35A$		1.6		nC
Gate-Source Charge	Q_{gs}			0.47		
Gate-Drain Charge	Q_{gd}			0.25		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_{GEN}=25\Omega, I_{DS}=340mA$		0.8		ns
Turn-On Rise Time	t_r			15		
Turn-Off Delay Time	$t_{d(off)}$			4		
Turn-Off Fall Time	t_f			33		

Curve Characteristics

Fig.1 - Typical Output Characteristics

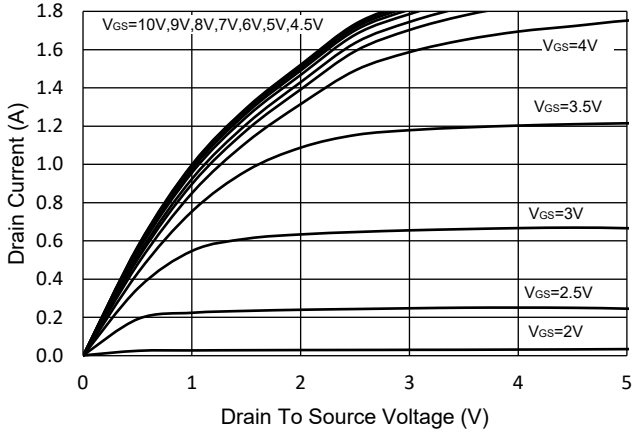


Fig.2 - Transfer Characteristic

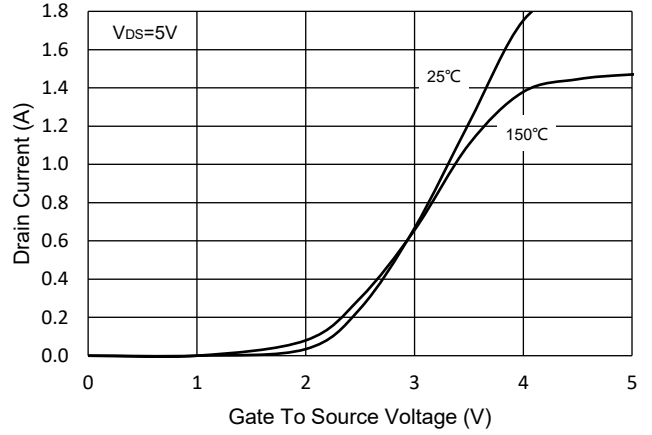


Fig.3 - $R_{DS(ON)}$ - V_{GS}

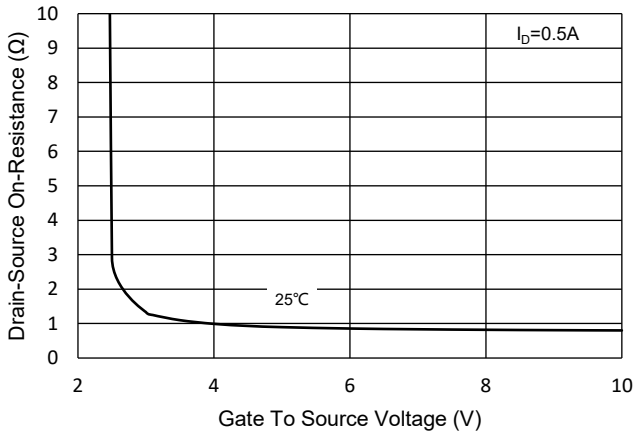


Fig.4 - $R_{DS(ON)}$ - I_D

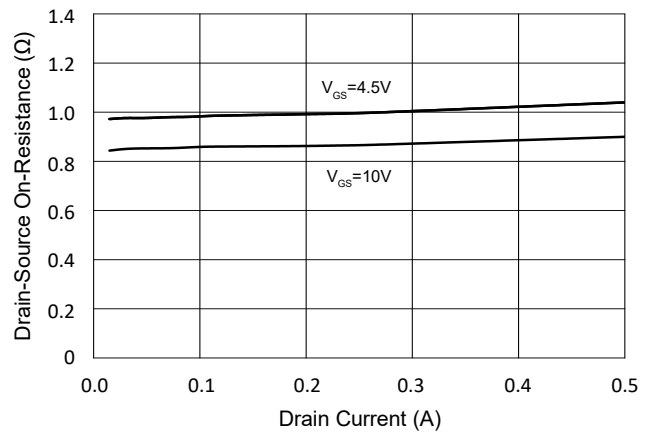


Fig.5 - Capacitance Characteristics

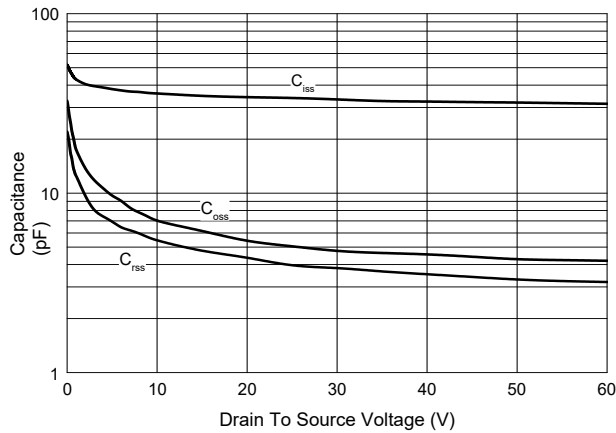
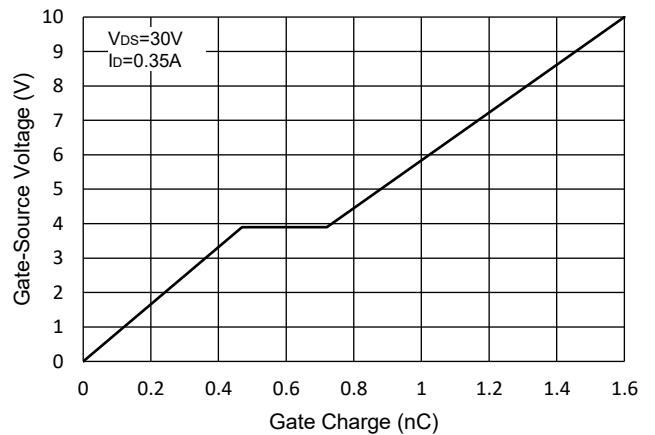


Fig.6 - Gate Charge



Curve Characteristics

Fig.7 - Normalized Threshold Voltage

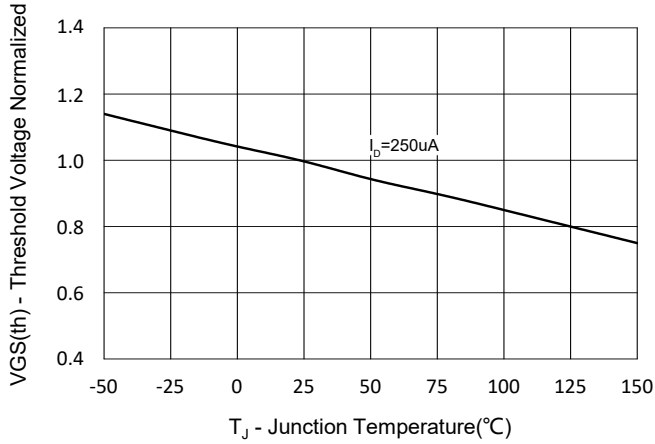


Fig.8 - Normalized On Resistance Characteristics

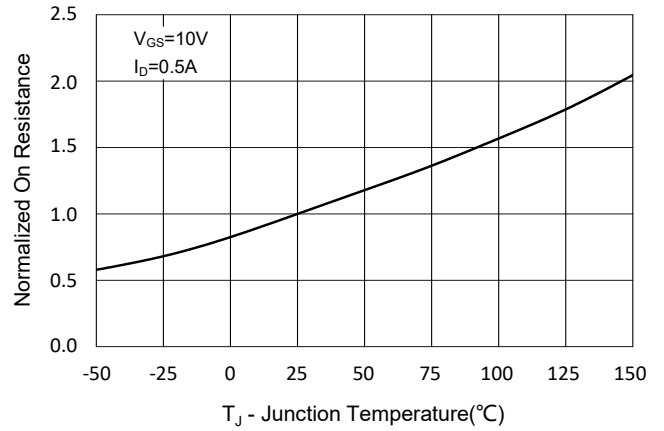


Fig.9 - I_S - V_{SD}

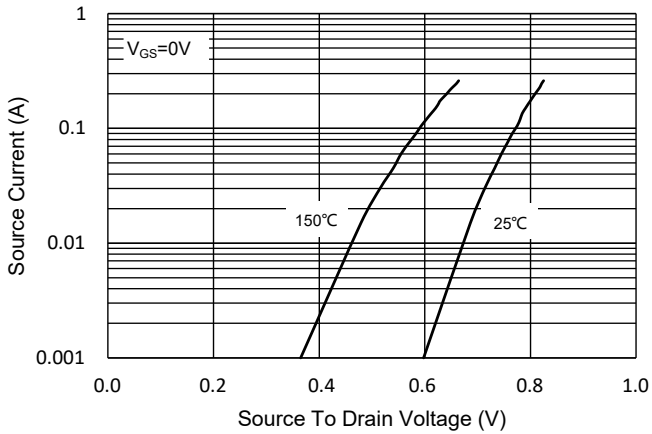


Fig.10 - Drain Current

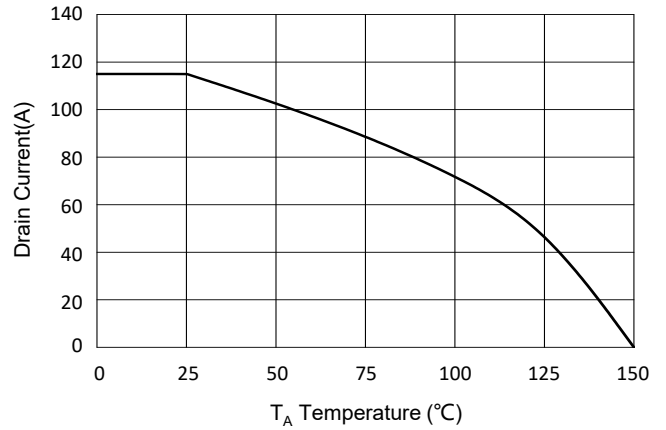
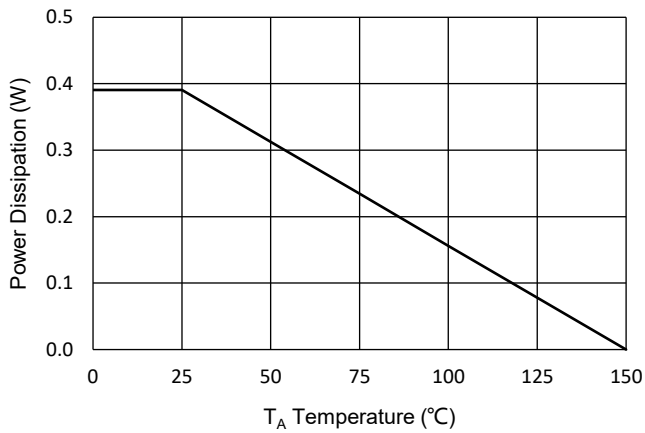


Fig.11 - PD Dissipation



Curve Characteristics

Fig.12 - Safe Operation Area

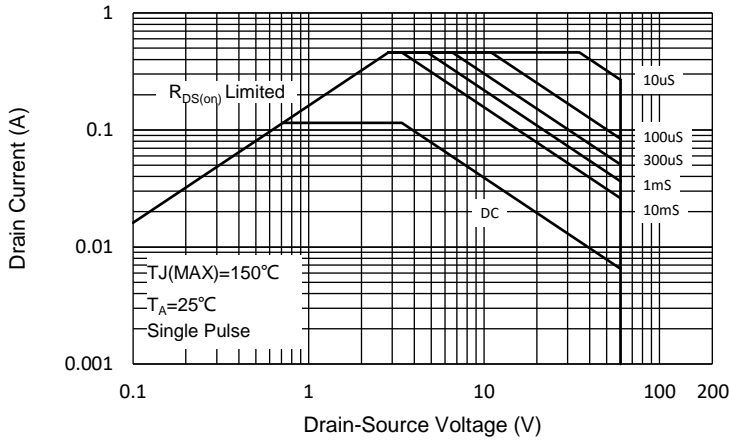
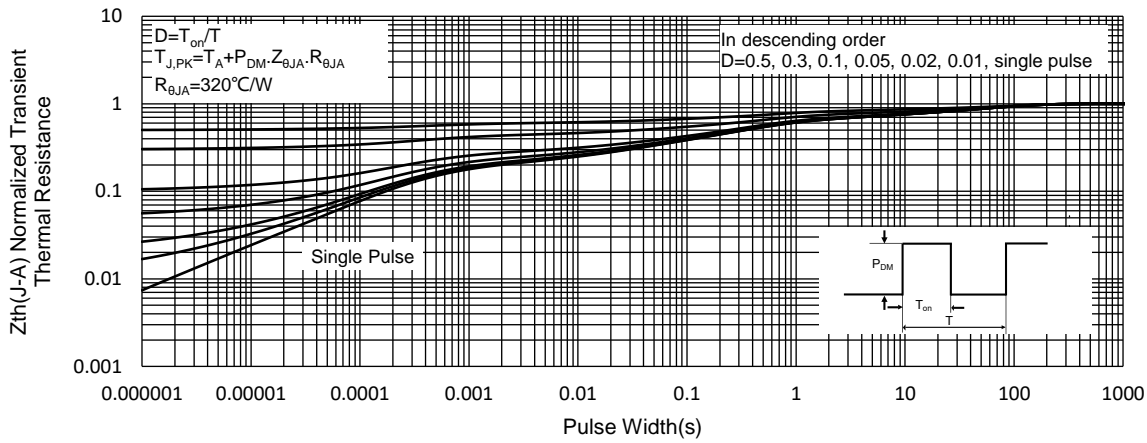


Fig.13 - Normalized Transient Thermal Impedance



Ordering Information

Device	Packing
Part Number-TP	Tape&Reel:3Kpcs/Reel

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