CHENMKO ENTERPRISE CO.,LTD

2N7002VPT

Lead free devices

SURFACE MOUNT
Dual N-Channel Enhancement MOS FET

VOLTAGE 60 Volts CURRENT 0.280 Ampere

APPLICATION

* Servo motor control.
* Power MOSFET gate drivers.
* Other switching applications.

FEATURE

* Small surface mounting type. (SOT-563)
* High density cell design for low $R_{DS(ON)}$
* Suitable for high packing density.
* Rugged and reliable.
* High saturation current capability.
* Voltage controlled small signal switch.

CONSTRUCTION

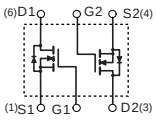
* Dual N-Channel Enhancement

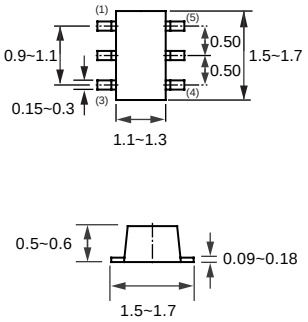
MARKING

* V7

SOT-563

CIRCUIT





Dimensions in millimeters

SOT-563

Absolute Maximum Ratings

T_A = 25°C unless otherwise noted

Symbol	Parameter	2N7002VPT	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{DGR}	Drain-Gate Voltage (R_{GS} ≤ 1 MΩ)	60	V
V_{GSS}	Gate-Source Voltage - Continuous	±20	V
	- Non Repetitive (tp < 50µs)	±40	
I_D	Maximum Drain Current - Continuous	280	mA
P_D	Maximum Power Dissipation	250	mW
T_J,T_{STG}	Operating and Storage Temperature Range	-55 to 150	°C
T_L	Maximum Lead Temperature for Soldering Purposes, 1/16" from Case for 10 Seconds	300	°C

Thermal characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	833	°C/W

2004-06

RATING CHARACTERISTIC CURVES (2N7002VPT)

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 10 µA	60	70		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		T_C=125°C			500	µA
I_{GSSF}	Gate - Body Leakage, Forward	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate - Body Leakage, Reverse	V_{GS} = -20 V, V_{DS} = 0 V			-100	nA
ON CHARACTERISTICS (Note 1)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 µA	1		2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 500 mA , Tj =125°C			13.5	Ω
		V_{GS} = 5.0 V, I_D = 50 mA			7.5	
$I_{D(ON)}$	On-State Drain Current	V_{GS} = 10 V, V_{DS} = 7.5$V_{DS(on)}$	800	1000		mA
g_{FS}	Forward Transconductance	V_{DS} = 10 $V_{DS(on)}$, I_D = 200 mA		200		mS
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz			50	pF
C_{oss}	Output Capacitance				25	
C_{rss}	Reverse Transfer Capacitance				5	
t_{on}	Turn-On Time	V_{DD} = 30 V, R_L = 150 Ω, I_D = 200 mA, V_{GS} = 10 V, R_{GEN} = 25 Ω			20	nS
t_{off}	Turn-Off Time				20	

Note:
1. Pulse Test: Pulse Width < 300µs, Duty Cycle < 2.0%.

RATING CHARACTERISTIC CURVES (2N7002VPT)

Typical Electrical Characteristics

Figure 1. On-Region Characteristics

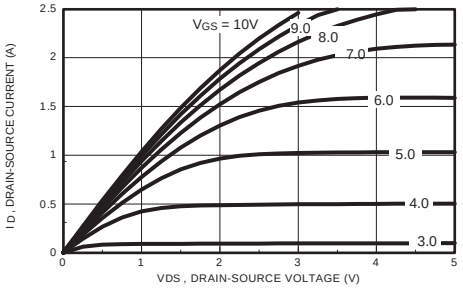


Figure 2. On-Resistance Variation with Gate Voltage and Drain Current

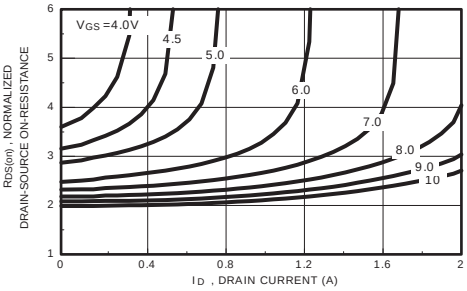


Figure 3. On-Resistance Variation with Temperature

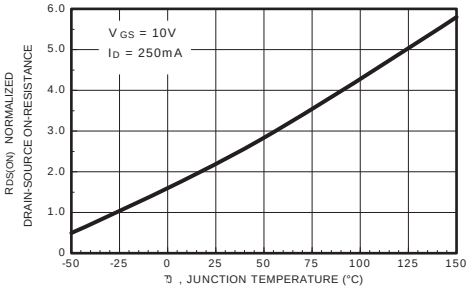


Figure 4. On-Resistance Variation with Drain Current and Temperature

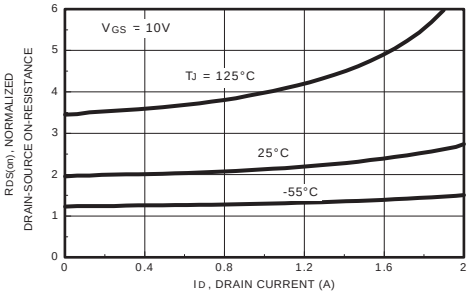


Figure 5. Transfer Characteristics

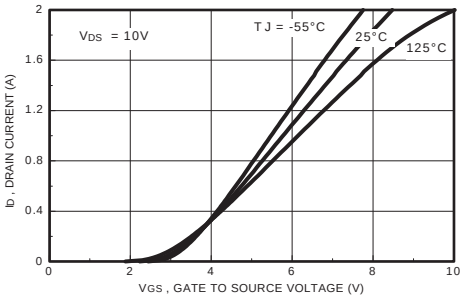
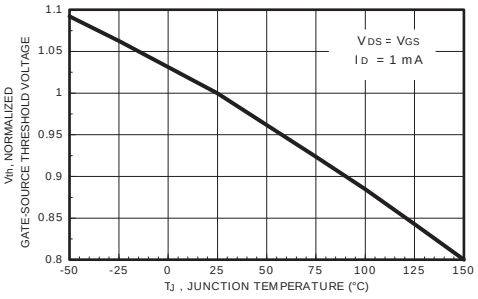


Figure 6. Gate Threshold Variation with Temperature



RATING CHARACTERISTIC CURVES (2N7002VPT)

Typical Electrical Characteristics (continued)

Figure 7. Breakdown Voltage Variation with Temperature

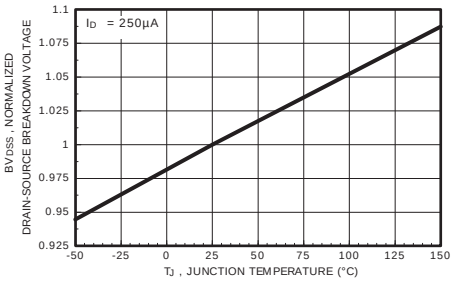


Figure 8. Body Diode Forward Voltage Variation with Drain Current

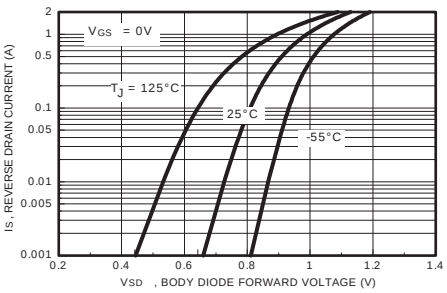


Figure 9. Capacitance Characteristics

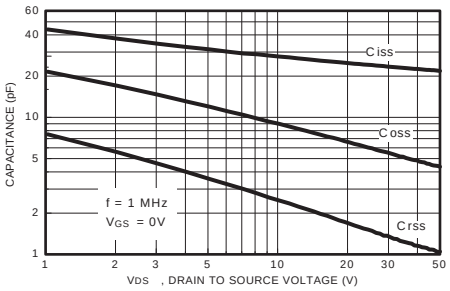


Figure 10. Gate Charge Characteristics

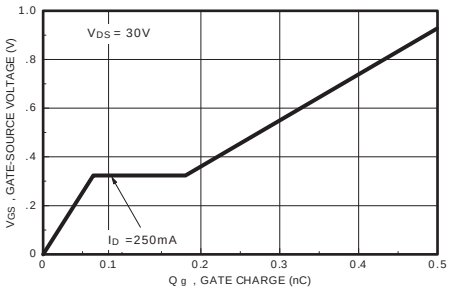


Figure 11.

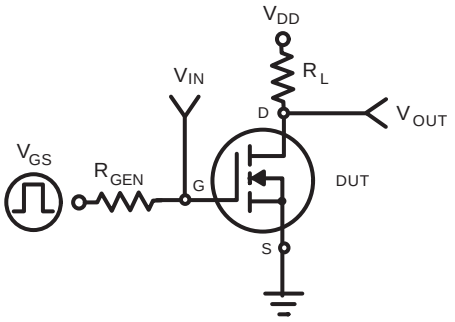
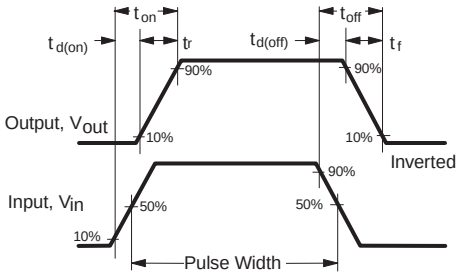


Figure 12. Switching Waveforms



RATING CHARACTERISTIC CURVES (2N7002VPT)

Typical Electrical Characteristics (continued)

Figure 13. 2N7002VPT Maximum Safe Operating Area

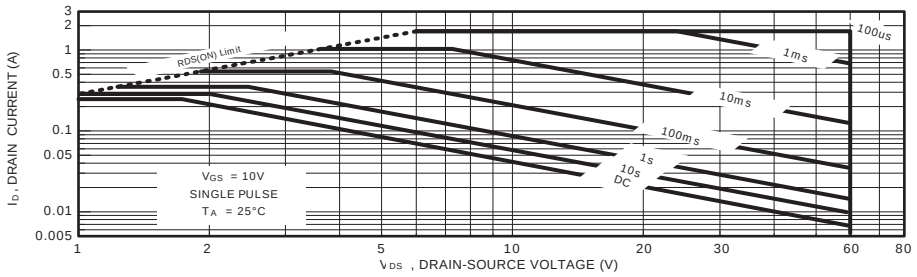


Figure 14. 2N7002VPT Transient Thermal Response Curve