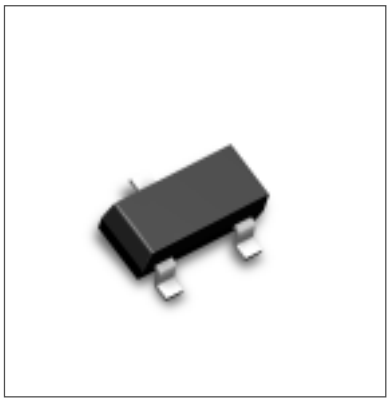
2N7002

PANJIT SEMI CONDUCTOR

N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

VOLTAGE 60 Volts **CURRENT** 115 mAmp **PACKAGE** SOT-23

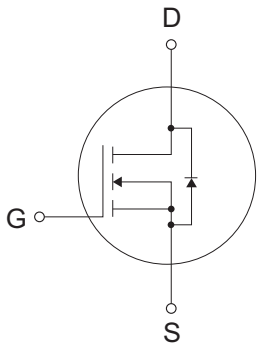


DESCRIPTION

• N-channel enhancement mode field effect transistor, designed for high speed pulsed amplifier and driver applications, which is manufactored by the N-Channel DMOS process.

FEATURES

- High density cell design for low $R_{DS(ON)}$.
- Voltage controlled small signal switching.
- Rugged and reliable.
- High saturation current capability.
- High-speed switcing.
- CMOS logic compatible input.
- Not thermal runaway.
- No secondary breakdown.



ABSOLUTE MAXIMUM RATINGS

T_A = 25°C Unless otherwise noted.

Parameter	Symbol	2N7002	Units
Drain-Source Voltage	V_{DSS}	60	V
Drain-Gate Voltage (Rgs ≤ 1MΩ)	V_{DRG}	60	V
Gate Source Voltage -Continuous -No Repetitive (tp<50μs)	V_{GSS}	± 20 ± 20	V
Maximum Drain Current -Continuous -Pulsed	I_D	115 800	mA
Maximum POwer Dissipation Derated Above 25°C	P_D	200	mW
Operation and Storage Temperature Range	T_J , T_{STG}	-55 to +150	mW / °C
Thermal Resistance, Junction-to-Ambient	RθJA	625	°C / W

ELECTRICAL CHARACTERISTICS

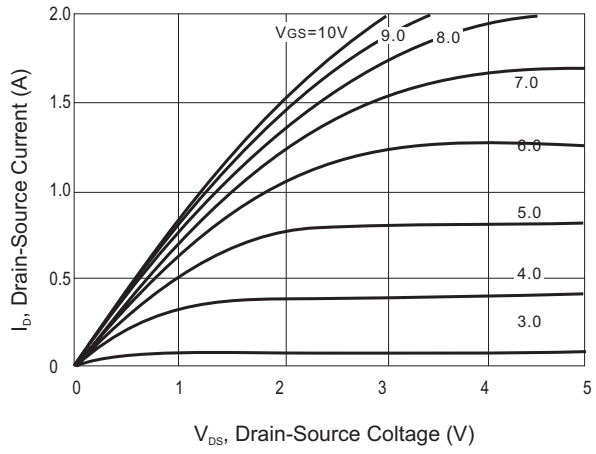
T_A = 25°C Unless otherwise noted.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=10μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V, T_J=25°C V_{DS}=60V, V_{GS}=0V, T_J=125°C	- -	- -	1.0 0.5	μA mA
Gate - Body Leakage, Forward	I_{GSSF}	V_{DS}=0V, V_{GS}=20V	-	-	100	nA
Gate - Body Leakage, Reverse	I_{GSSR}	V_{DS}=0V, V_{GS}= -20V	-	-	-100	nA
ON CHARACTERISTICS (note1)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	2.1	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=500mA, T_J=100°C	-	1.2	7.5	Ω
Drain-Source On-Voltage	$V_{DS(ON)}$	V_{GS}=10V, I_D=500mA V_{GS}=5.0V, I_D=50mA	- -	0.60 0.09	3.75 1.50	V
On-State Drain Current	$I_{D(ON)}$	V_{GS}=10V, $V_{DS} \geq 2V_{DS(ON)}$	500	2700	-	mA
Forward Transconductance	G_{FS}	$V_{DS} \geq 2V_{DS(ON)}$, I_D=200mA	80	320	-	mS
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, F=1.0 MHz	-	20	50	pF
Output Capacitance	C_{OSS}	V_{DS}=25V, V_{GS}=0V, F=1.0 MHz	-	11	25	pF
Reverse Transfer Capacitance	C_{RSS}	V_{DS}=25V, V_{GS}=0V, F=1.0 MHz	-	4	5	pF
Turn-On Time	T_{ON}	V_{DD}=30V, R_L=150Ω, I_D=200 mA V_{GS}=10V, R_{GEN}=25Ω	-	-	20	ns
Turn-Off Time	T_{OFF}	V_{DD}=30V, R_L=150Ω, I_D=200 mA V_{GS}=10V, R_{GEN}=25Ω	-	-	20	ns

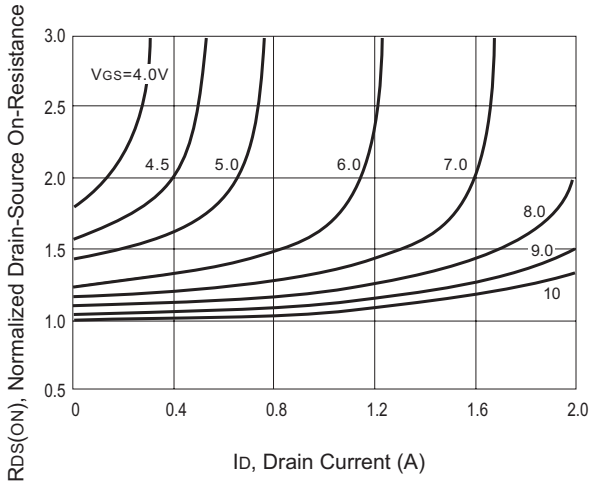
Note:

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

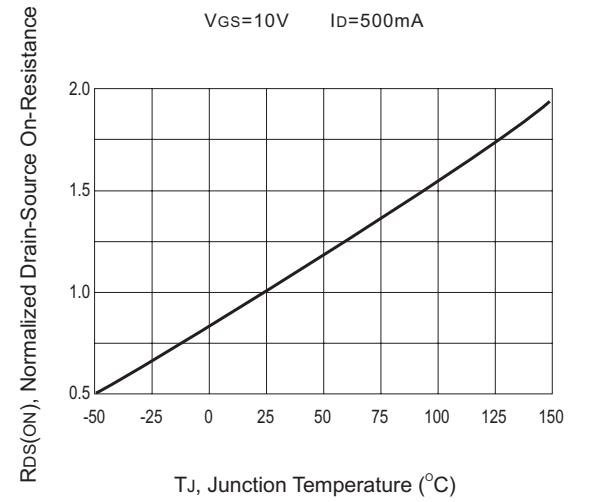
RATING and CHARACTERISTIC CURVES



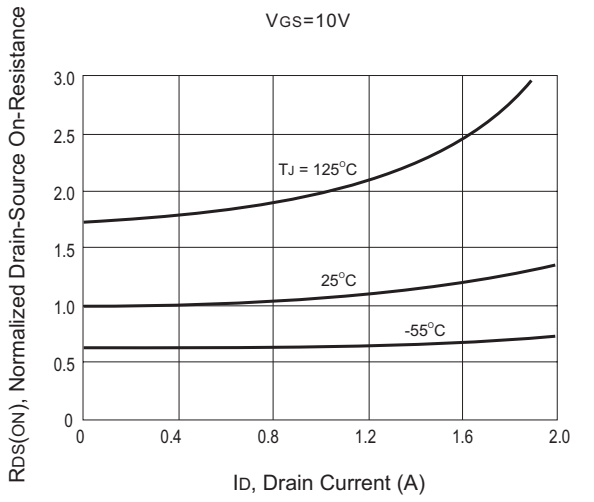
On-Region Characteristics



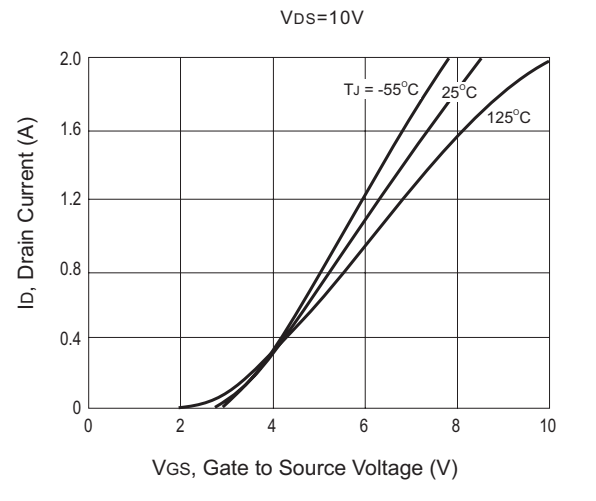
On-Resistance v.s. Gate Voltage and Drain Current



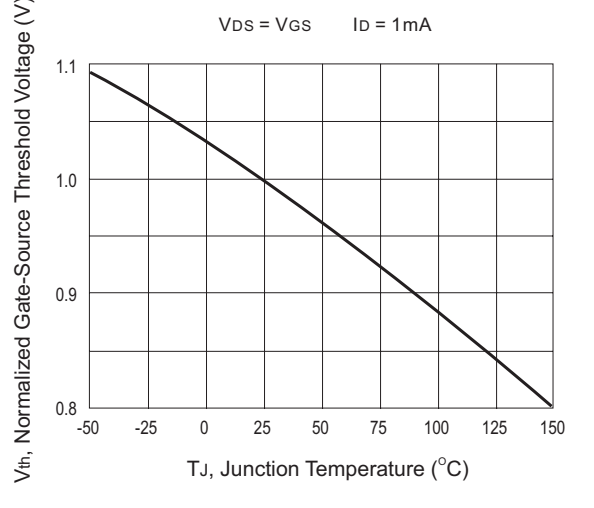
On-Resistance v.s Temperature



On-Resistance v.s Drain

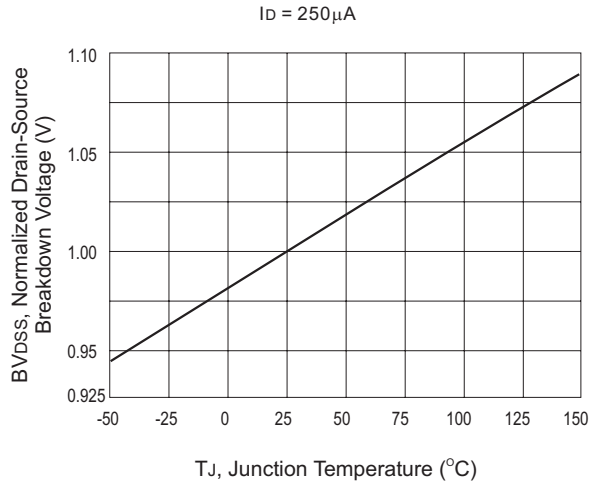


Transfer Characteristics

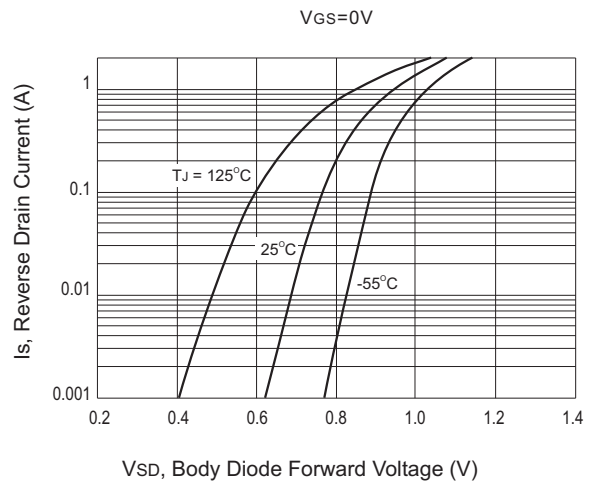


Gate Threshold v.s. Temperature

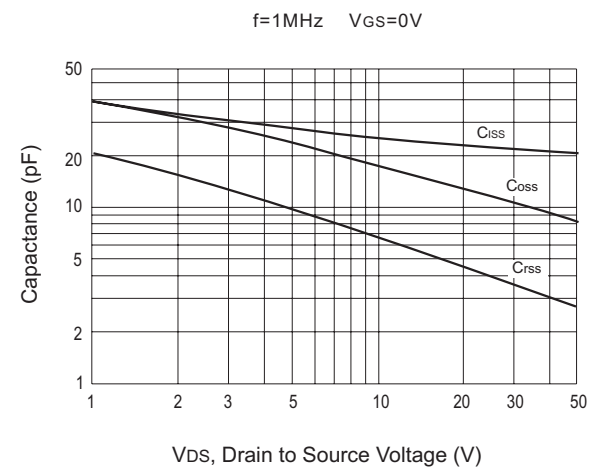
RATING and CHARACTERISTIC CURVES



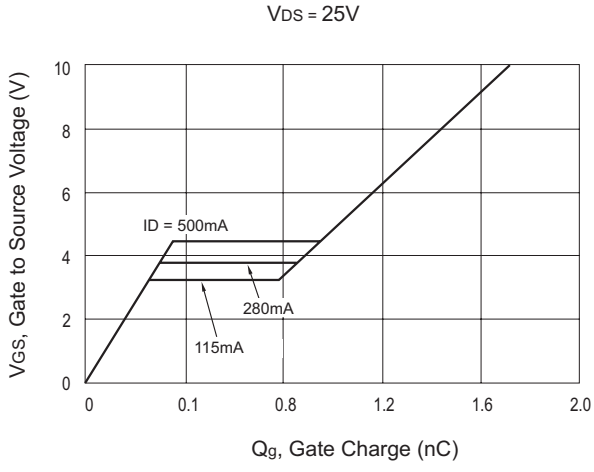
Breakdown Voltage v.s. Temperature



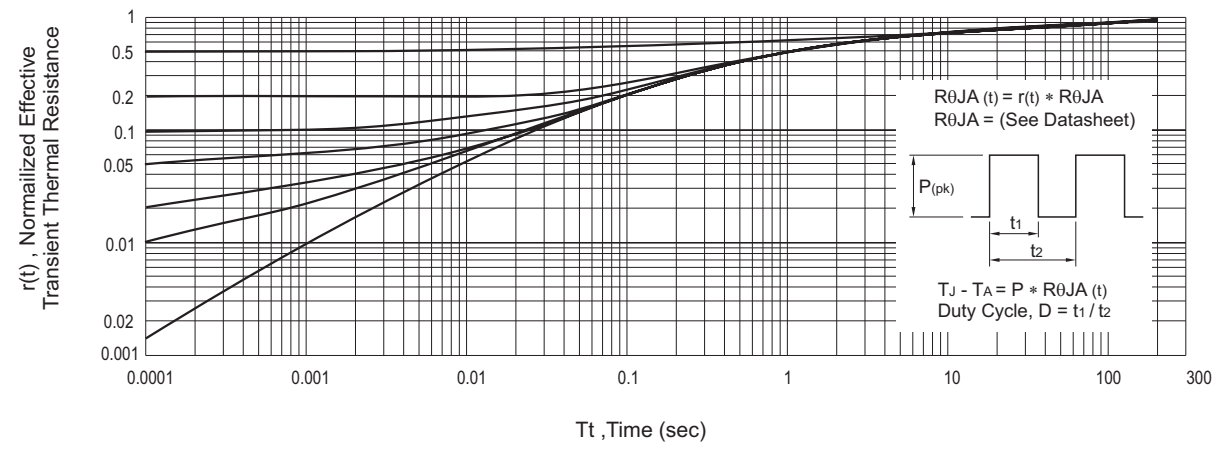
Body Diode Forward Voltage v.s. Current and Temperature



Capacitance Characteristics

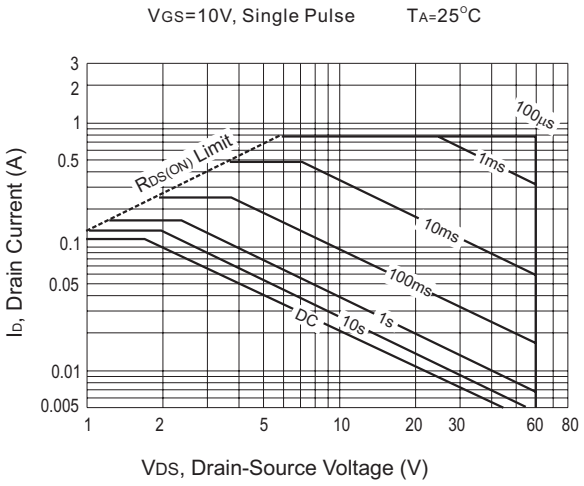


Gate Charge Characteristics

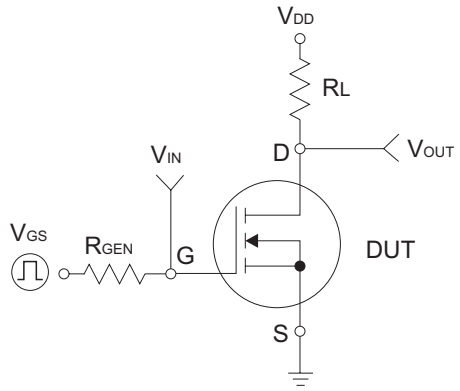


Transient Thermal Respone Curve

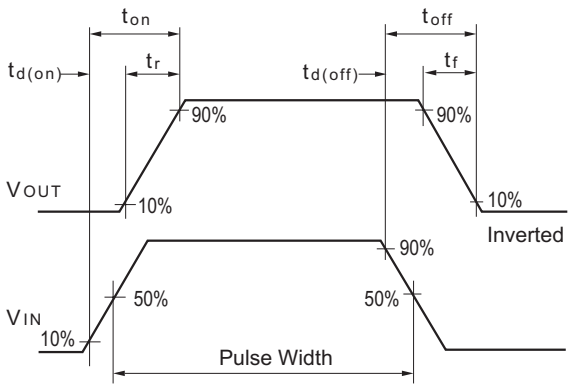
RATING and CHARACTERISTIC CURVES



Maximum Safe Operating Area

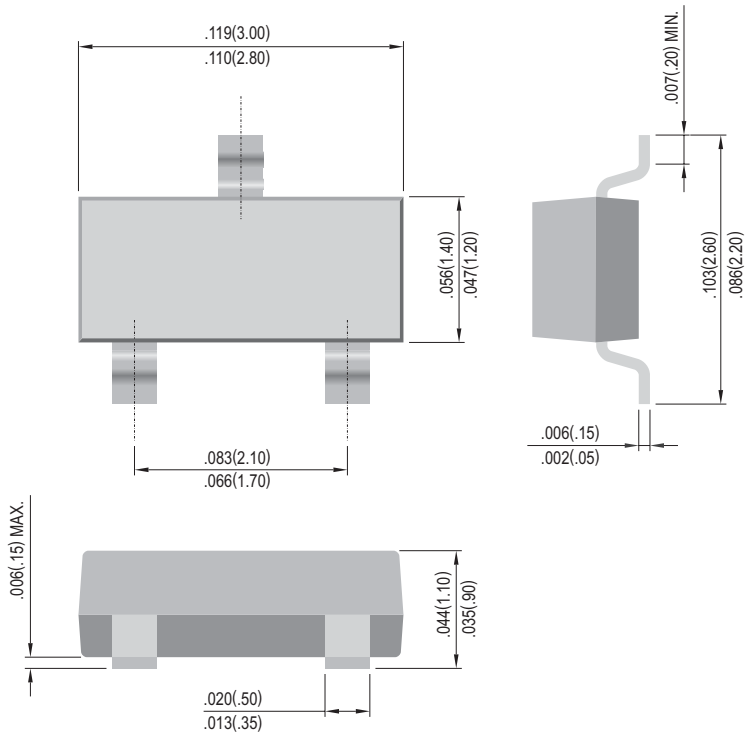


Switching Test Circuit



Switching Waveforms

SOT-23


.119(3.00)
.110(2.80)
.056(1.40)
.047(1.20)
.083(2.10)
.066(1.70)
.007(.20) MIN.
.103(2.60)
.086(2.20)
.006(.15)
.002(.05)
.006(.15) MAX.
.044(1.10)
.035(.90)
.020(.50)
.013(.35)