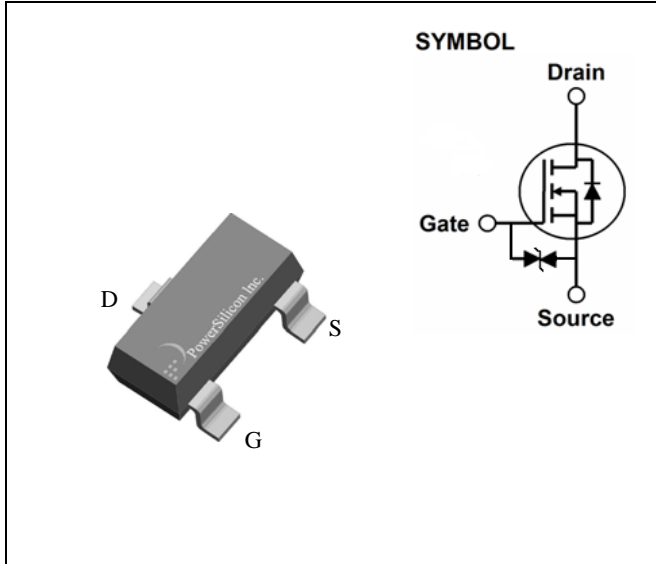


## N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR



### FEATURES

- N-channel Enhancement Mode Field Effect Transistor, Designed For High Speed Pulse Amplifier And Drive Application, Which Is Manufactured By The N-Channel DMOS Process.
- ESD MIL-STD 833,  $\pm 2.5\text{KV}$  Contact Discharge Compliant Protection

### MECHANICAL DATA

- Available in SOT-23 Package
- Solderability : MIL-STD-202, Method 208
- Full RoHS Compliance

### ORDERING INFORMATION

PART NUMBER	PACKAGE	SHIPPING	MARKING CODE
2N7002K□-T3	SOT-23	Tape Reel	7002K

**Notes:**

1. □: none is for Lead Free package;  
"G" is for Halogen Free package.

### THERMAL DATA

PARAMETER	SYMBOL	VALUES	UNIT
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	357	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	90	$^{\circ}\text{C}/\text{W}$

**Notes:**

2.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design. The value of  $R_{\theta JA}$  is measured with device mounted on 1 in<sup>2</sup> FR-4 board with 2 oz copper.

**ABSOLUTE MAXIMUM RATINGS**
 $T_A = 25^\circ\text{C}$ , unless otherwise noted. <sup>(Note 3)</sup>

PARAMETER	SYMBOL	VALUE	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current (Pulsed) <sup>(Note 4)</sup>	$I_{DM}$	800	mA
Drain Current (Continuous)	$I_D$	300	mA
Maximum Power Dissipation	$P_D$	350	mW
Operating Junction Temperature Range	$T_J$	-55 to +150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^\circ\text{C}$

**Notes:**

- 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.
- Pulse width limited by maximum junction temperature.

**ELECTRICAL CHARACTERISTICS**
 $T_C = 25^\circ\text{C}$ , unless otherwise noted.

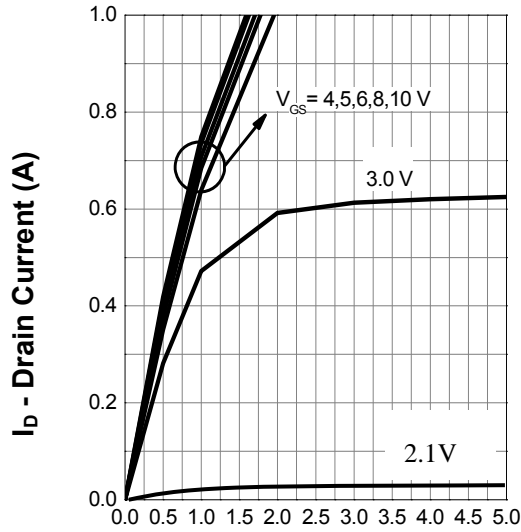
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 10\mu A$	60			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{GS} = 0V, V_{DS} = 60V, T_J = 25^\circ\text{C}$			1	$\mu A$
Gate- Source Leakage Current	$\pm I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$			$\pm 10$	$\mu A$
<b>ON CHARACTERISTICS</b> <sup>(Note 5)</sup>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.7	2.5	V
Static Drain-Source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 300mA$		2.0	3.0	$\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$			50	pF
Output Capacitance	$C_{oss}$				25	
Reverse Transfer Capacitance	$C_{rss}$				5.0	
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 200mA,$ $R_L = 150\Omega, V_{GEN} = 10V$ $R_{GEN} = 25\Omega$		6		nS
Turn-On Rise Time	$t_r$			5		
Turn-Off Delay Time	$t_{d(off)}$			25		
Turn-Off Fall Time	$t_f$			15		
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
Drain-source Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 300mA$		0.85	1.5	V
Transfer Admittance	$ Y_{fs} $	$I_D = 200mA, V_{DS} = 15V$	80			mS

**Notes:**

 5. Pulse test : Pulse width  $\leq 300\mu S$ , Duty cycle  $\leq 2\%$

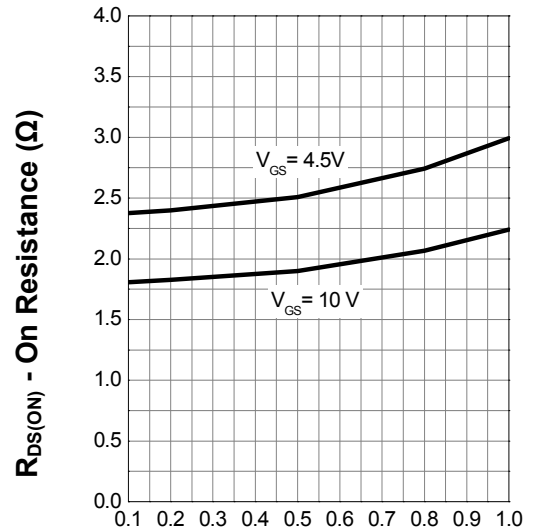
**TYPICAL PERFORMANCE CHARACTERISTICS**

**Output Characteristics**



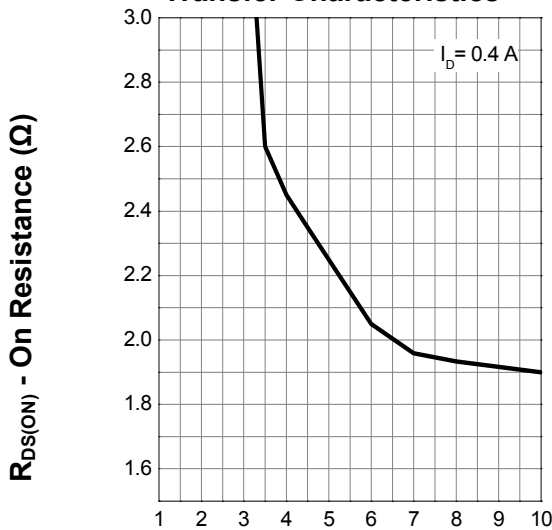
$V_{DS}$  - Drain-Source Voltage (V)

**Drain-Source On Resistance**



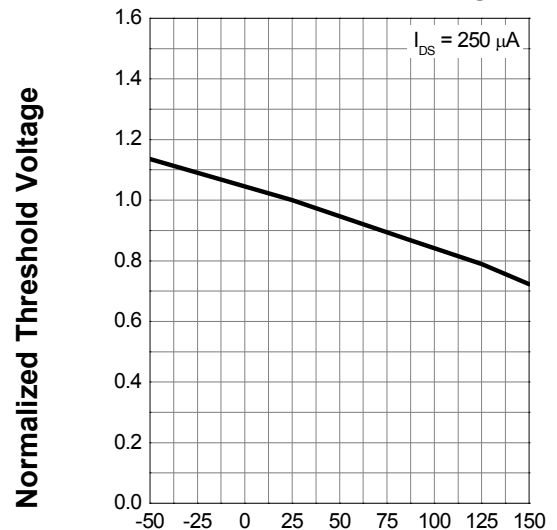
$I_D$  - Drain Current (A)

**Transfer Characteristics**



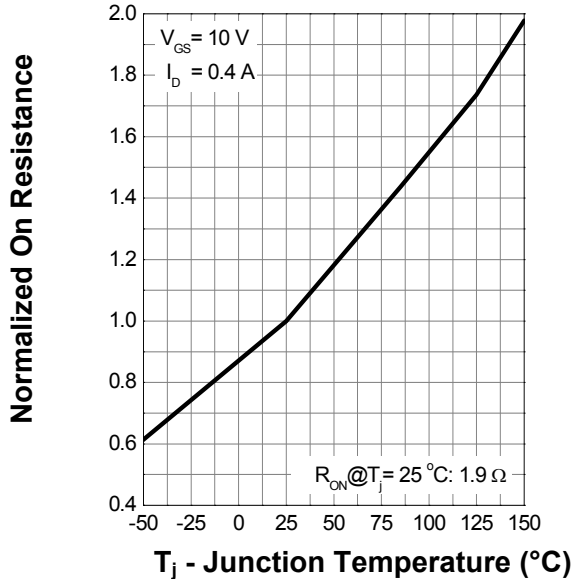
$V_{GS}$  - Gate-Source Voltage (V)

**Gate Threshold Voltage**

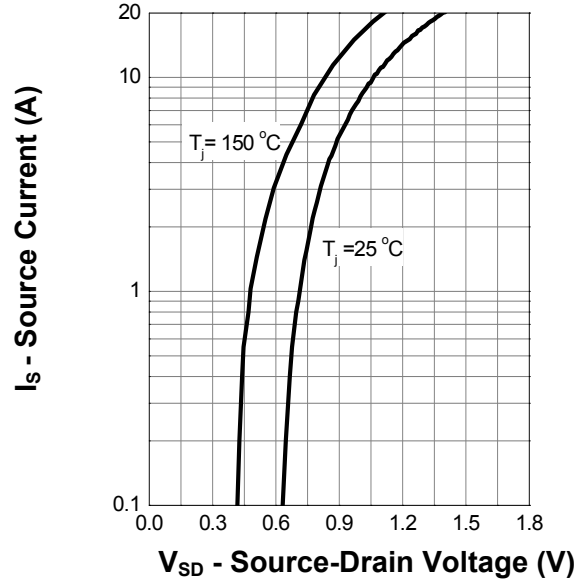


$T_j$  - Junction Temperature ( $^{\circ}C$ )

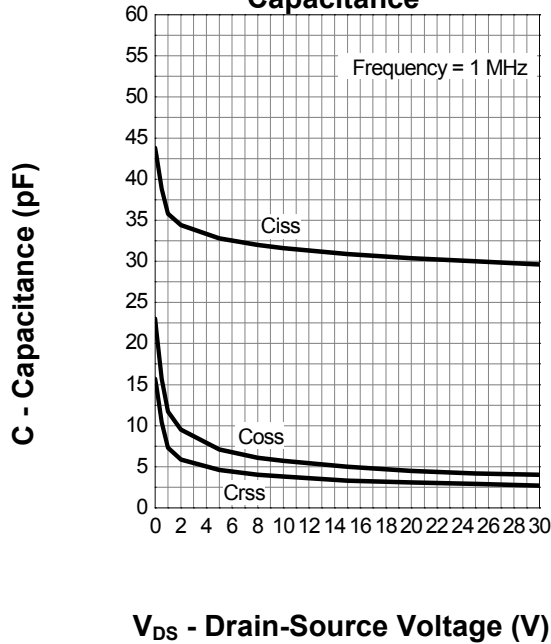
**Drain-Source On Resistance**



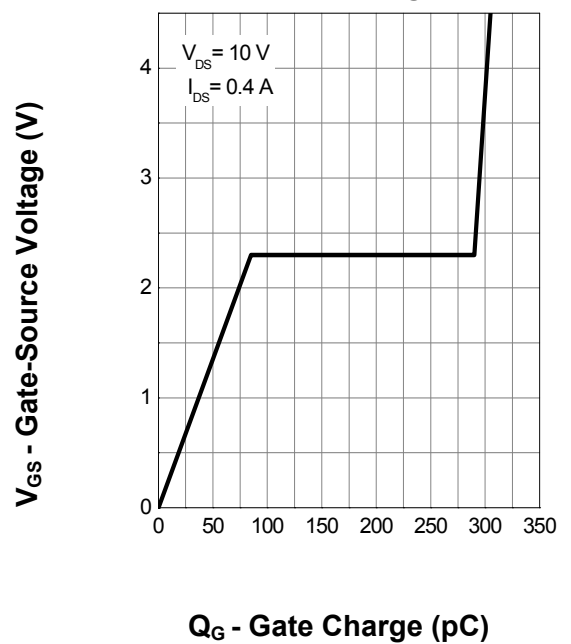
**Source-Drain Diode Forward**



**Capacitance**

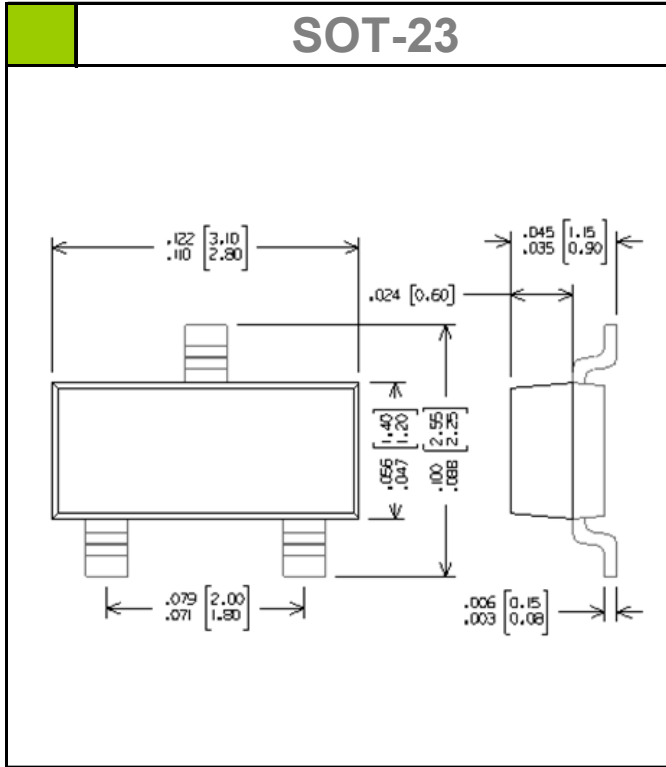


**Gate Charge**



**PHYSICAL DIMENSION**

Unit : Inch (Millimeter)



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