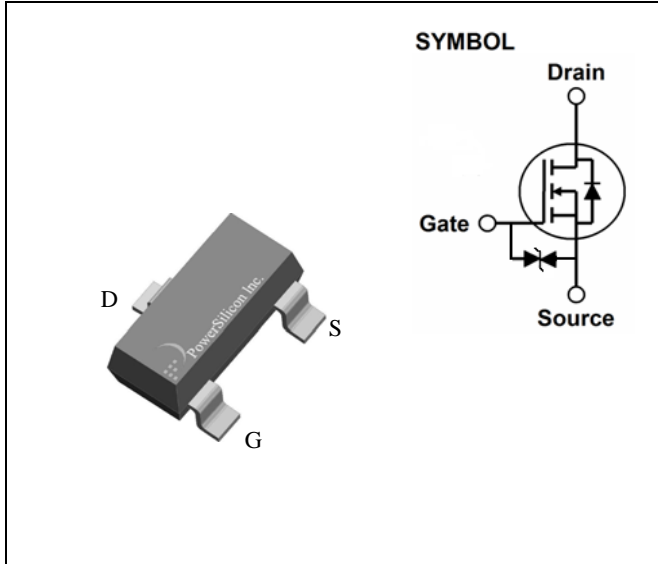


## N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR



### 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	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	90	$^{\circ}\text{C/W}$

**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:**

3. 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.
4. Pulse width limited by maximum junction temperature.

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

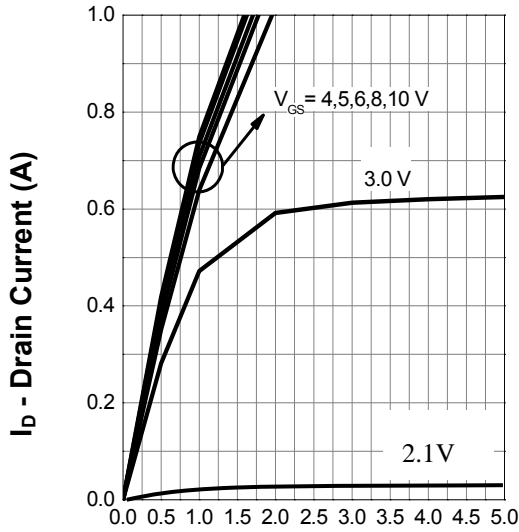
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 10\mu A$	60			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{GS} = 0V, V_{DS} = 60V, T_J = 25^\circ\text{C}$			1	$\mu A$
Gate- Source Leakage Current	$\pm I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$			$\pm 10$	$\mu A$
<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  $\leq 2\%$

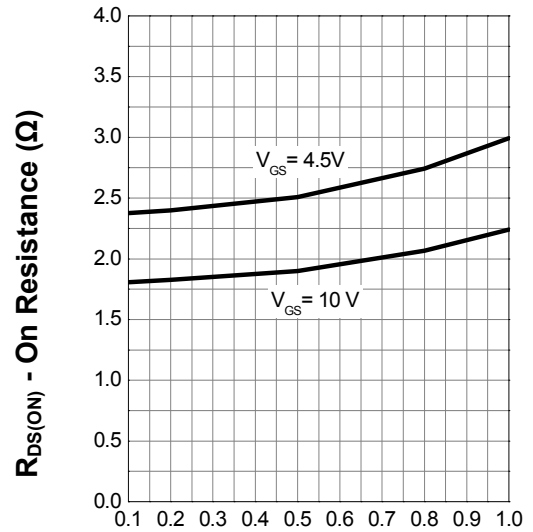
**TYPICAL PERFORMANCE CHARACTERISTICS**

**Output Characteristics**



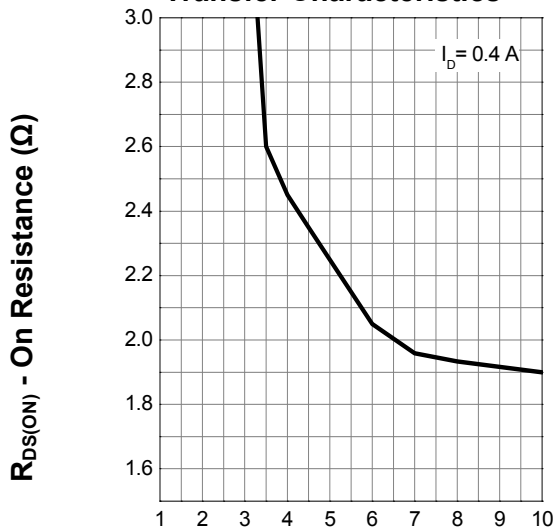
$V_{DS}$  - Drain-Source Voltage (V)

**Drain-Source On Resistance**



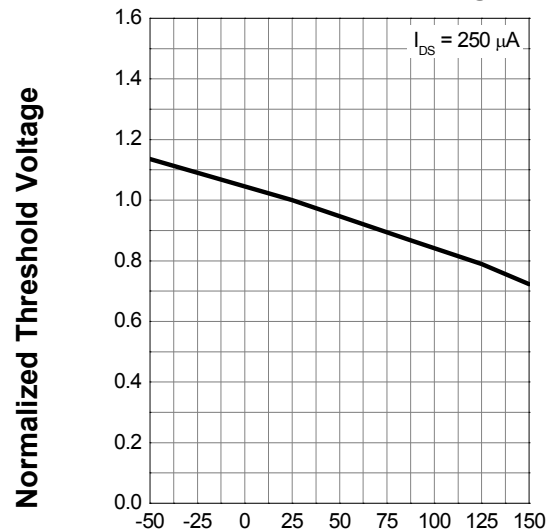
$I_D$  - Drain Current (A)

**Transfer Characteristics**



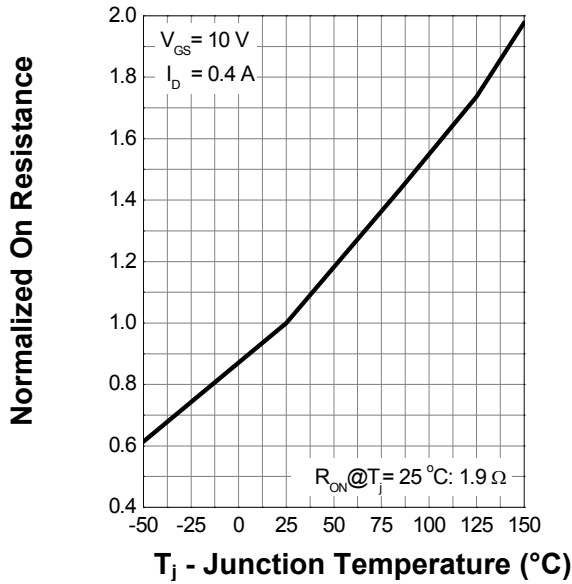
$V_{GS}$  - Gate-Source Voltage (V)

**Gate Threshold Voltage**

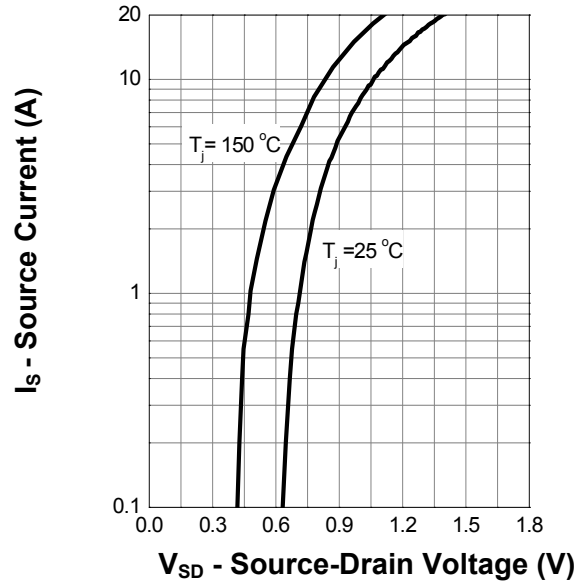


$T_j$  - Junction Temperature ( $^{\circ}C$ )

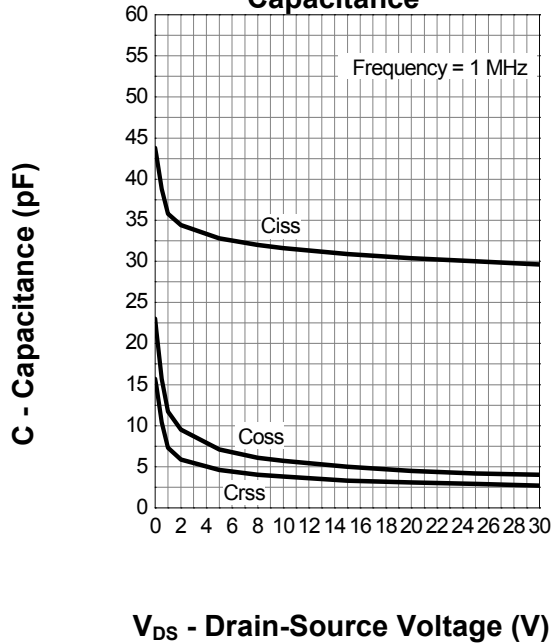
**Drain-Source On Resistance**



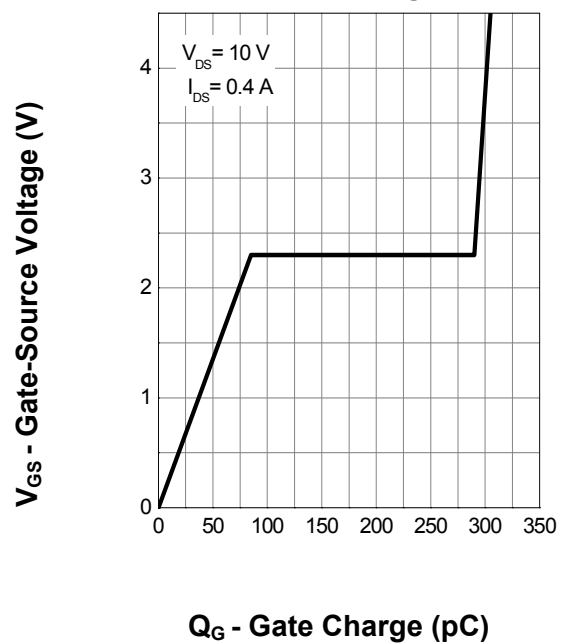
**Source-Drain Diode Forward**



**Capacitance**



**Gate Charge**



**PHYSICAL DIMENSION**

Unit : Inch (Millimeter)

