



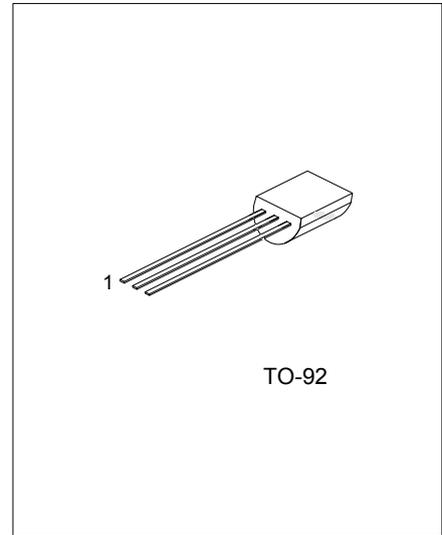
## 2N7000Z

Power MOSFET

### 115m Amps, 60 Volts N-CHANNEL ENHANCEMENT MODE MOSFET

#### DESCRIPTION

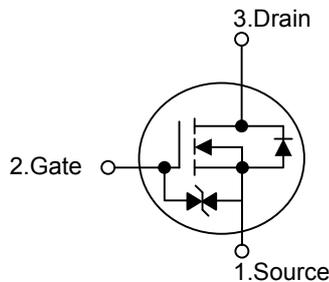
The UTC **2N7000Z** has been designed to minimize on-state resistance to provide rugged, reliable, and fast switching performance. It can be used in most applications requiring up to 400mA DC and can deliver pulsed currents up to 2A. The product is particularly suited for low voltage, low current applications, such as small servo motor control, power MOSFET gate drivers and other switching applications



#### FEATURES

- \*High density cell design for low  $R_{DS(ON)}$
- \*Voltage controlled small signal switch
- \*Rugged and reliable
- \*High saturation current capability

#### SYMBOL



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N7000ZL-T92-B	2N7000ZG-T92-B	TO-92	S	G	D	Tape Box
2N7000ZL-T92-K	2N7000ZG-T92-K	TO-92	S	G	D	Bulk
2N7000ZL-T92-R	2N7000ZG-T92-R	TO-92	S	G	D	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>2N7000ZL-T92-B</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) B: Tape Box, K: Bulk, R: Tape Reel (2) T92: TO-92 (3) G: Halogen Free, L: Lead Free</p>
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### ■ ABSOLUTE MAXIMUM RATINGS ( Ta=25°C )

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	60	V
Drain-Gate Voltage ( $R_{GS} \leq 1M\Omega$ )		$V_{DGR}$	60	V
Gate -Source Voltage	Continuous	$V_{GS}$	$\pm 20$	V
	Non Repetitive ( $t_p < 50\mu s$ )		$\pm 40$	V
Maximum Drain Current	Continuous	$I_D$	115	mA
	Pulsed		800	mA
Maximum Power Dissipation Derated above 25°C		$P_D$	400	mW
			3.2	mW/°C
Operating and Storage Temperature		$T_J, T_{STG}$	-55 ~ +150	°C

Note: 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.

### ■ THERMAL DATA

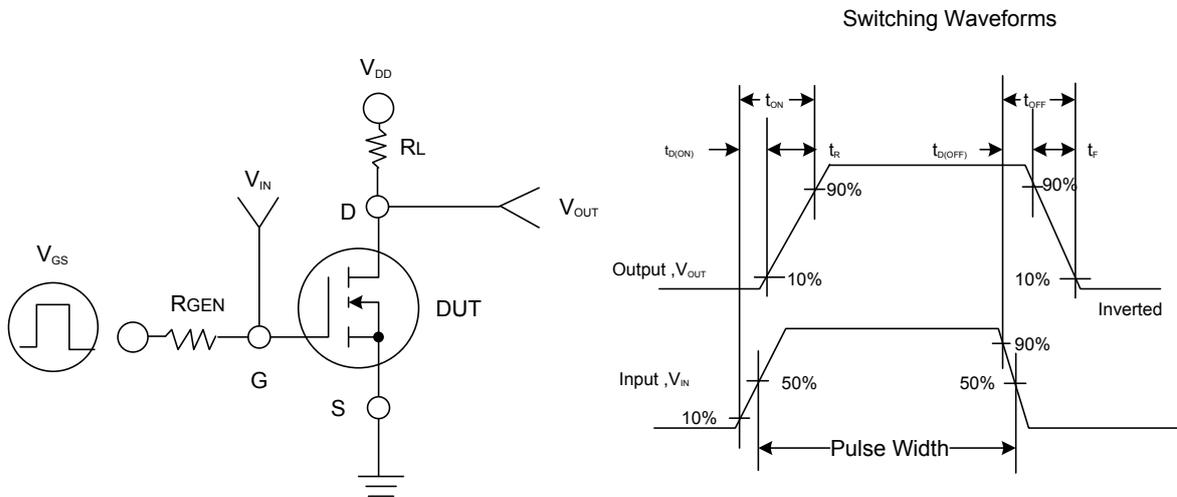
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	312.5	°C/W

### ■ ELECTRICAL CHARACTERISTICS (Ta =25°C, unless otherwise specified)

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	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$ $T_J=125^\circ C$			1	$\mu A$
					0.5	mA
Gate-Body leakage, Forward	$I_{GSSF}$	$V_{GS}=20V, V_{DS}=0V$			10	$\mu A$
Gate-Body leakage Reverse	$I_{GSSR}$	$V_{GS}=-20V, V_{DS}=0V$			-10	$\mu A$
<b>ON CHARACTERISTICS (Note)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2.1	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=500mA$ $T_J=100^\circ C$		1.2	7.5	$\Omega$
		$V_{GS}=5.0V, I_D=50mA$ $T_J=100^\circ C$		1.7	13.5	
				1.7	7.5	
Drain-Source On-Voltage	$V_{DS(ON)}$	$V_{GS}=10V, I_D=500mA$		0.6	3.75	V
		$V_{GS}=5.0V, I_D=50mA$		0.09	1.5	
On-State Drain Current	$I_{D(ON)}$	$V_{GS}=10V, V_{DS} \geq 2V_{DS(ON)}$	500	2700		mA
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$		20	50	pF
Output Capacitance	$C_{OSS}$			11	25	pF
Reverse Transfer Capacitance	$C_{RSS}$			4	5	pF
Turn-On Time	$t_{ON}$	$V_{DD}=30V, R_L=150\Omega,$ $I_D=200mA, V_{GS}=10V, R_{GEN}=25\Omega$			20	ns
Turn-Off Time	$t_{OFF}$	$V_{DD}=30V, R_L=150\Omega, I_D=200mA,$ $V_{GS}=10V, R_{GEN}=25\Omega$			20	ns
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=115mA(\text{Note})$		0.88	1.5	V
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				115	mA
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				0.8	A

Note: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$

## ■ TYPICAL CHARACTERISTICS



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