



## 2N7000

Power MOSFET

### N-CHANNEL ENHANCEMENT MODE

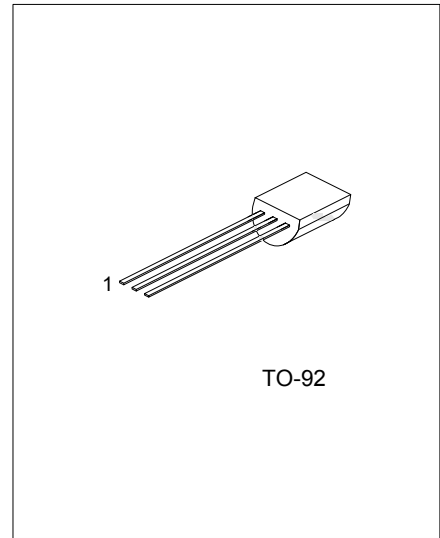
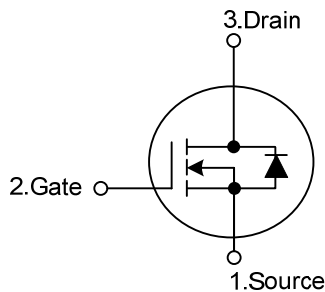
#### DESCRIPTION

The UTC **2N7000** has been designed to minimize on-state resistance while 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	
2N7000L-T92-B	2N7000G-T92-B	TO-92	S	G	D	Tape Box
2N7000L-T92-K	2N7000G-T92-K	TO-92	S	G	D	Bulk
2N7000L-T92-R	2N7000G-T92-R	TO-92	S	G	D	Tape Reel

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

<p>2N7000L-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 <sub>DSS</sub>	60	V
Drain-Gate Voltage (R <sub>GS</sub> ≤1MΩ)	V <sub>DGR</sub>	60	V
Gate -Source Voltage	V <sub>GS</sub>	±20	V
		±40	V
Maximum Drain Current	I <sub>D</sub>	115	mA
		800	mA
Maximum Power Dissipation Derated above 25°C	P <sub>D</sub>	400 3.2	mW mW/°C
Operating and Storage Temperature	T <sub>J</sub> ,T <sub>STG</sub>	-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

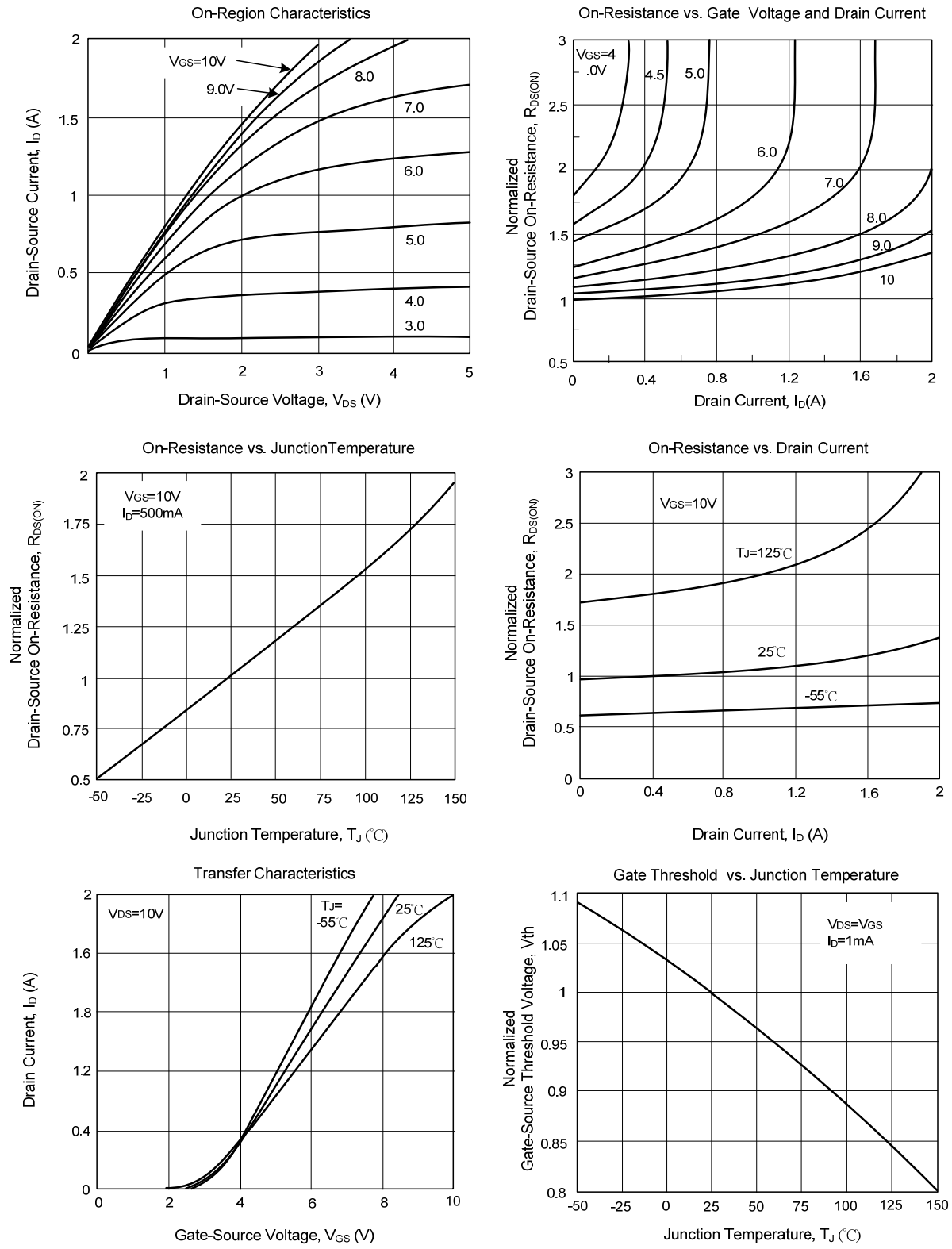
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ <sub>JA</sub>	312.5	°C/W

### ■ 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 <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =10 μA	60			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V T <sub>J</sub> =125°C			1	μA
					0.5	mA
Gate-Body leakage, Forward	I <sub>GSSF</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V			100	nA
Gate-Body leakage Reverse	I <sub>GSSR</sub>	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-100	nA
<b>ON CHARACTERISTICS (Note)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	2.1	2.5	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =500mA T <sub>J</sub> =100°C		1.2	7.5	Ω
		V <sub>GS</sub> =5.0V, I <sub>D</sub> =50mA T <sub>J</sub> =100°C		1.7	13.5	
				1.7	7.5	
Drain-Source On-Voltage	V <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =500mA		0.6	3.75	V
		V <sub>GS</sub> =5.0V, I <sub>D</sub> =50mA		0.09	1.5	
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> ≥2V <sub>DS(ON)</sub>	500	2700		mA
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		20	50	pF
Output Capacitance	C <sub>OSS</sub>			11	25	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			4	5	pF
Turn-On Time	t <sub>ON</sub>	V <sub>DD</sub> =30V, R <sub>L</sub> =150Ω, I <sub>D</sub> =200mA, V <sub>GS</sub> =10V, R <sub>GEN</sub> =25Ω			20	ns
Turn-Off Time	t <sub>OFF</sub>	V <sub>DD</sub> =30V, R <sub>L</sub> =150Ω, I <sub>D</sub> =200mA, V <sub>GS</sub> =10V, R <sub>GEN</sub> =25Ω			20	ns
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =115mA(Note )		0.88	1.5	V
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				115	mA
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				0.8	A

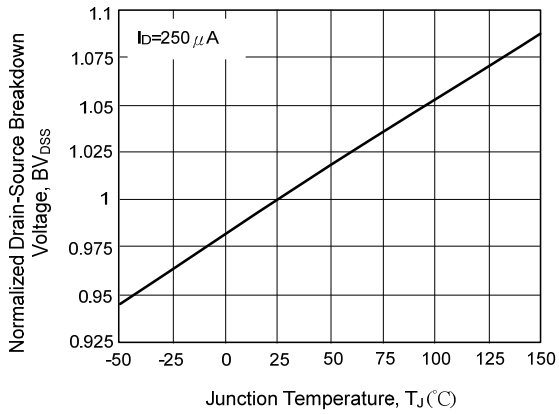
Note: Pulse Test: Pulse Width≤300μs, Duty Cycle≤2.0%

■ TYPICAL CHARACTERISTICS

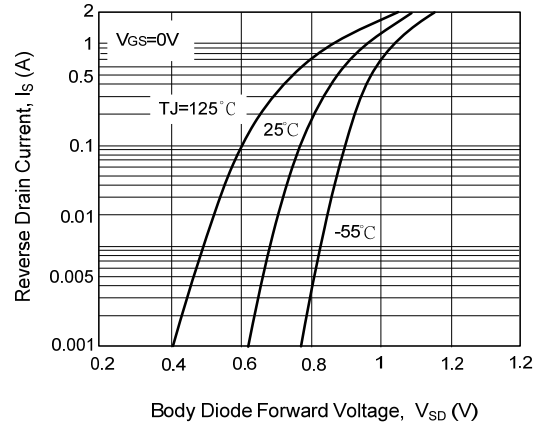


## ■ TYPICAL CHARACTERISTICS(Cont.)

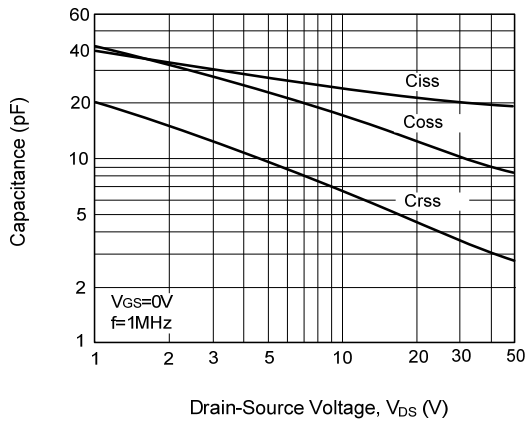
Breakdown Voltage vs. Junction Temperature



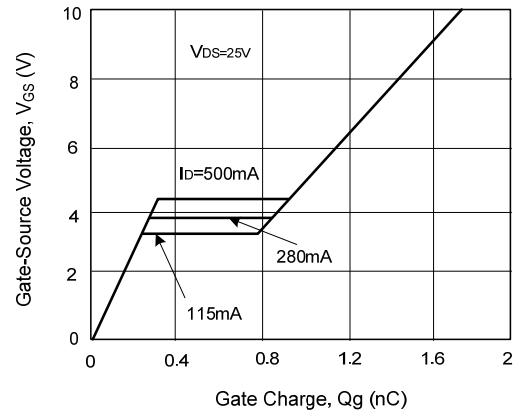
Reverse Drain Current vs. Body Diode Forward Voltage



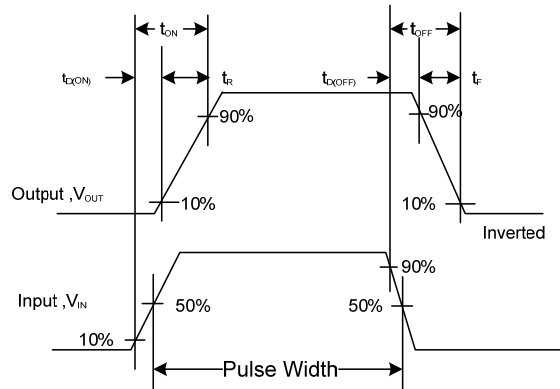
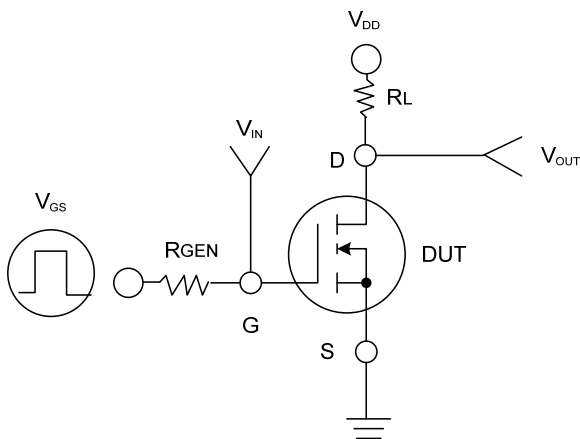
Capacitance Characteristics



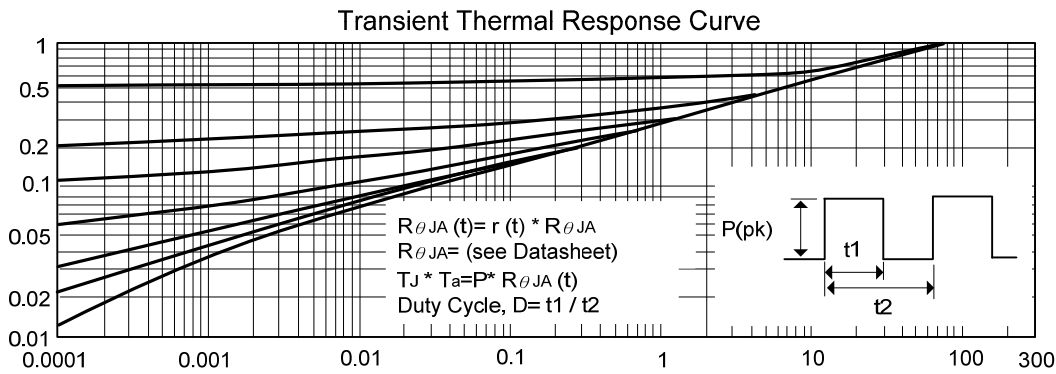
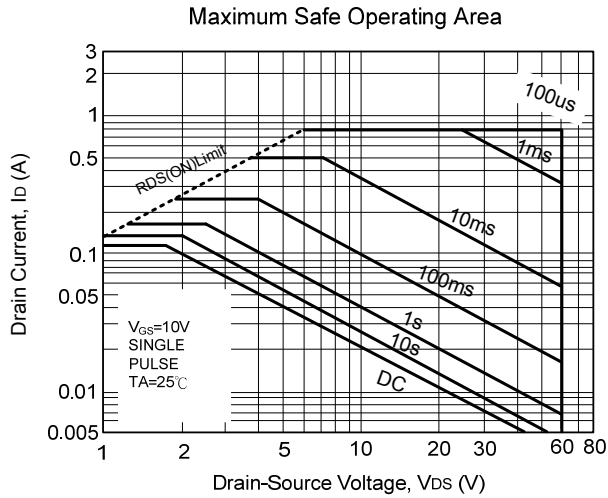
Gate Charge Characteristics



Switching Waveforms



■ TYPICAL CHARACTERISTICS(Cont.)



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