



2N7000

Power MOSFET

N-CHANNEL ENHANCEMENT MODE

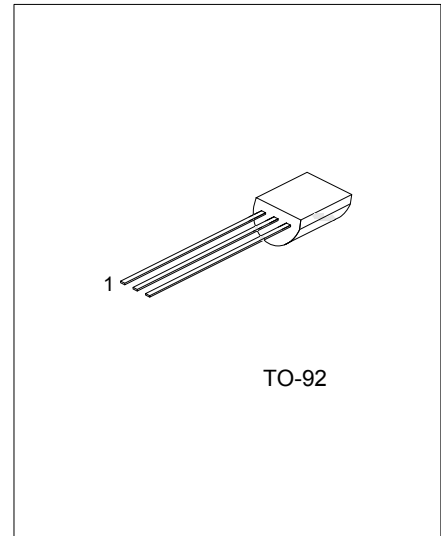
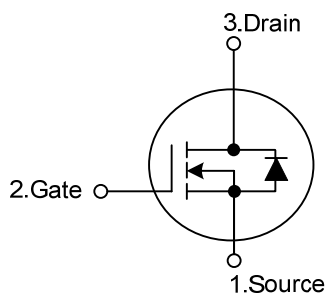
DESCRIPTION

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 _{DSS}	60	V
Drain-Gate Voltage (R _{GS} ≤1MΩ)		V _{DGR}	60	V
Gate -Source Voltage	Continuous	V _{GS}	±20	V
	Non Repetitive (tp<50μs)		±40	V
Maximum Drain Current	Continuous	I _D	115	mA
	Pulsed		800	mA
Maximum Power Dissipation		P _D	400	mW
Derated above 25°C			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

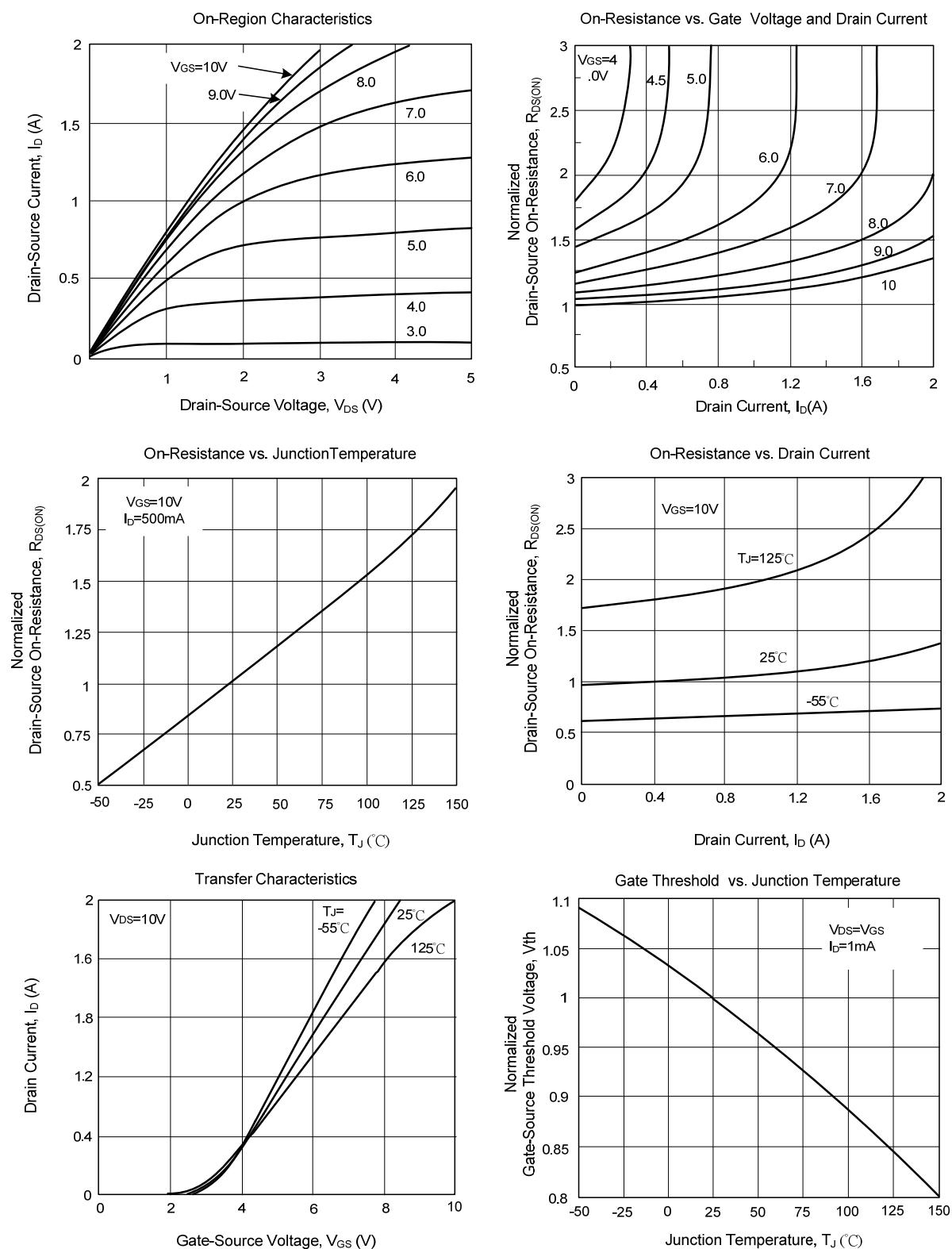
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	312.5	°C/W

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
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	μA
					0.5	mA
Gate-Body leakage, Forward	I_{GSSF}	$V_{GS}=20V, V_{DS}=0V$			100	nA
Gate-Body leakage Reverse	I_{GSSR}	$V_{GS}=-20V, V_{DS}=0V$			-100	nA
ON CHARACTERISTICS (Note)						
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	Ω
		$V_{GS}=5.0V, I_D=50mA$ $T_J=100^\circ C$		1.7	13.5	
				2.4	13.5	
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
DYNAMIC CHARACTERISTICS						
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
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
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

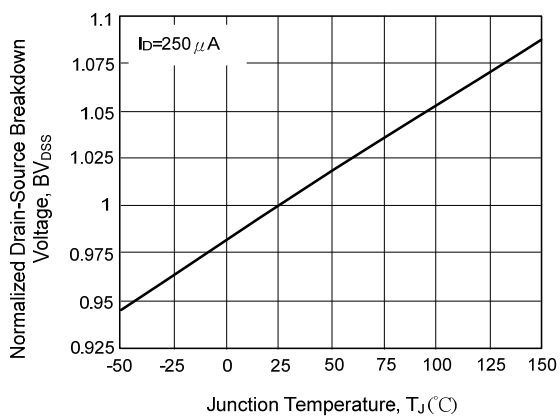
Note: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2.0\%$

■ TYPICAL CHARACTERISTICS

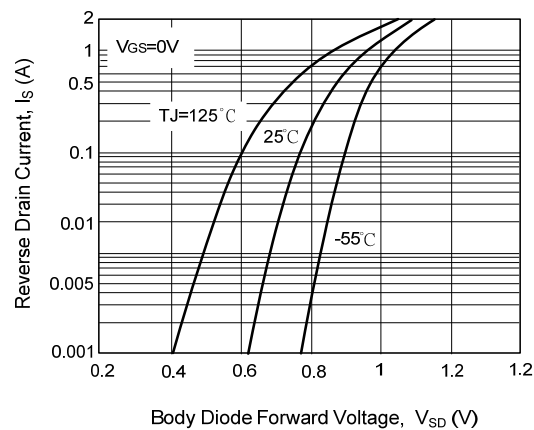


TYPICAL CHARACTERISTICS(Cont.)

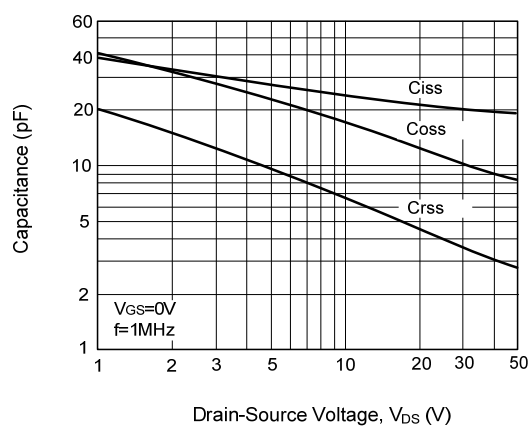
Breakdown Voltage vs. Junction Temperature



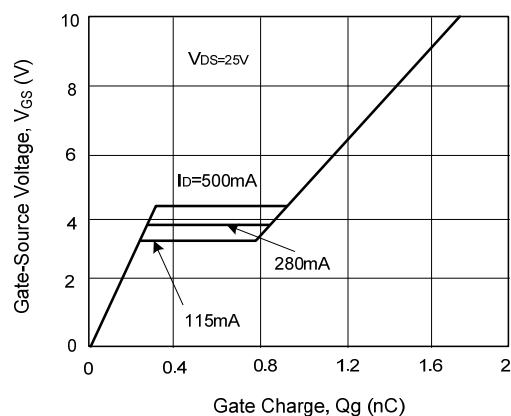
Reverse Drain Current vs. Body Diode Forward Voltage



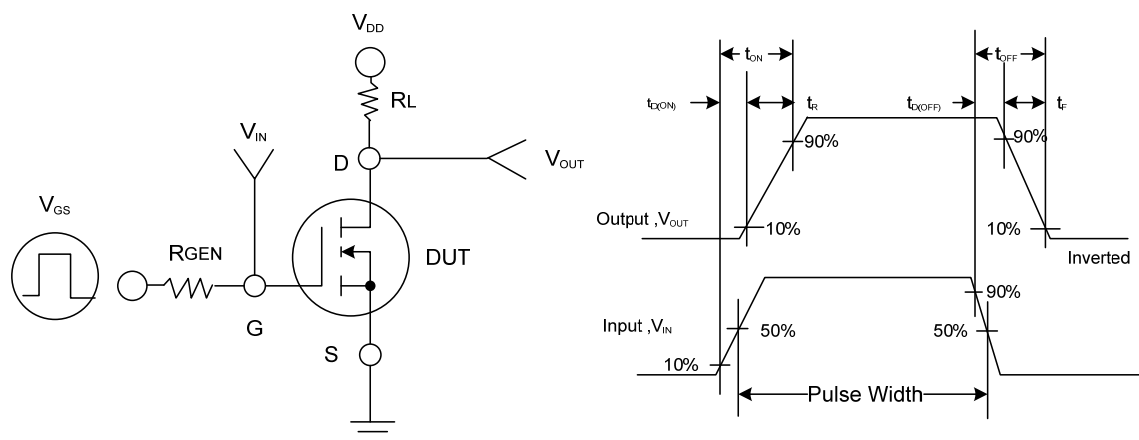
Capacitance Characteristics



Gate Charge Characteristics

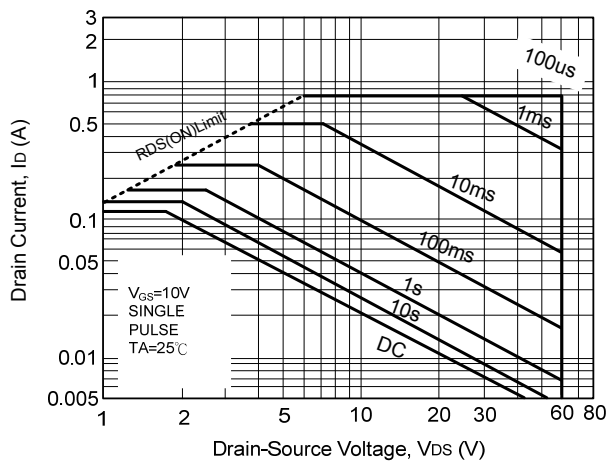


Switching Waveforms

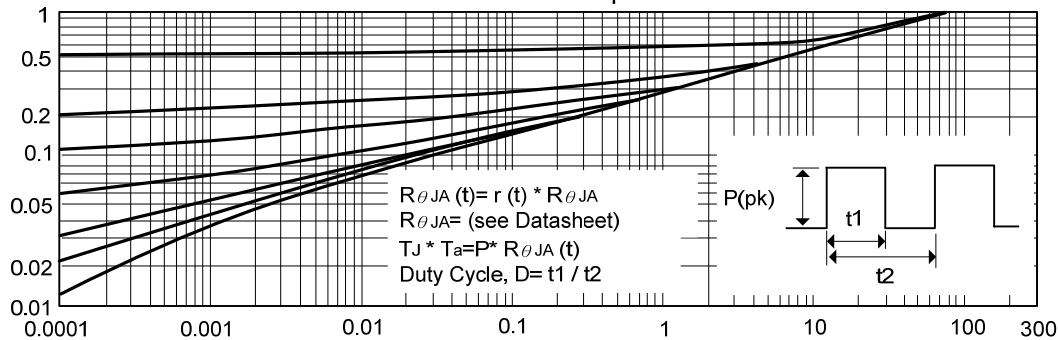


TYPICAL CHARACTERISTICS(Cont.)

Maximum Safe Operating Area



Transient Thermal Response Curve



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