

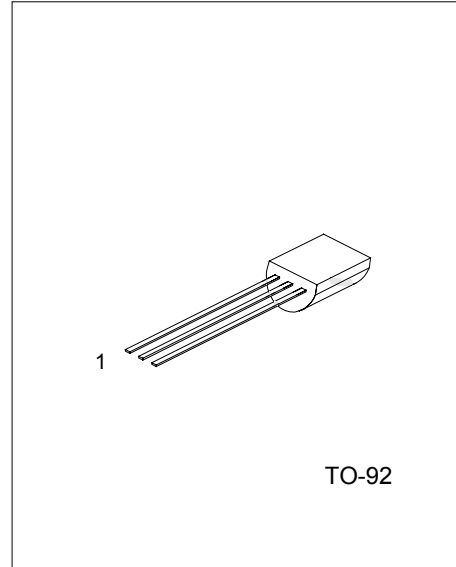
N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

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



1: SOURCE 2: GATE 3: DRAIN

ABSOLUTE MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DS}	60	V
Drain-Gate Voltage($R_{GS} \leq 1M\Omega$)	V_{DGR}	60	V
Gate -Source Voltage-Continuous	V_{GS}	± 20	V
-Non Repetitive ($t_p < 50\mu s$)		± 40	
Maximum Drain Current-Continuous	I_D	115	mA
-Pulsed		800	
Maximum Power Dissipation	P_D	400	mW
Derated above 25°C		3.2	mW/ $^{\circ}\text{C}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$
Maximum Lead Temperature for Soldering Purposes, 1/16" from Case for 10 Seconds	T_L	300	$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	312.5	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS (T_a =25°C, unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS.	MIN	TYP	MAX	UNITS
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =10 μA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V T _J =125°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 μA	1	2.1	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =500mA T _J =100°C		1.2	7.5	Ω
		V _{GS} =5.0V, I _D =50mA T _J =100°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} ≥2V _{DS(on)}	500	2700		mA
Forward Transconductance	g _{FS}	V _{DS} ≥2V _{DS(on)} , I _D =200mA	80	320		mS
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 Ω, I _D =200mA, V _{GS} =10V, R _{GEN} =25 Ω			20	ns
Turn-Off Time	t _{off}	V _{DD} =30V, R _L =150 Ω, I _D =200mA, V _{GS} =10V, R _{GEN} =25 Ω			20	ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				115	mA
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				0.8	A
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =115mA(Note)		0.88	1.5	V

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

Figure 1. On-Region Characteristics

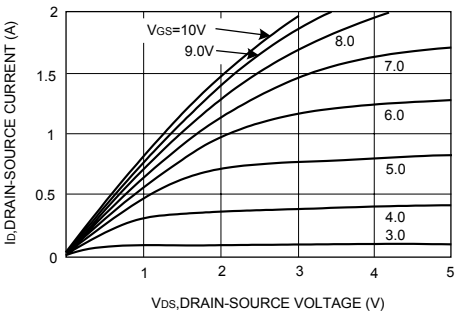


Figure 2. On-Resistance Variation with Gate Voltage and Drain Current

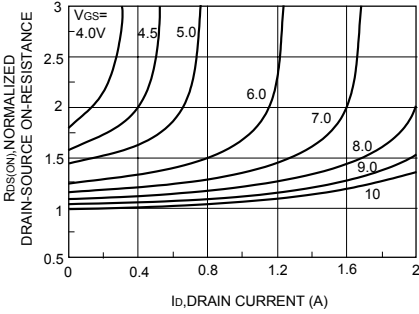


Figure 3. On-Resistance Variation with Temperature

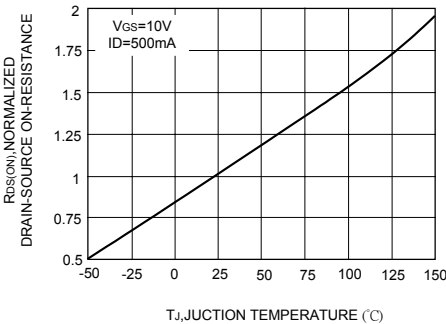


Figure 4. On-Resistance Variation with Drain Current and Temperature

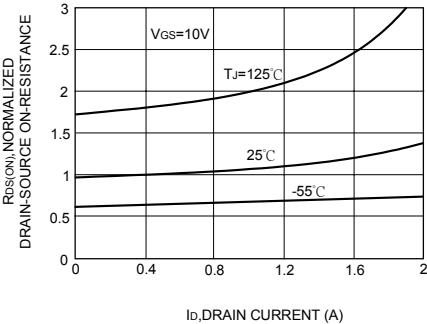


Figure 5. Transfer Characteristics

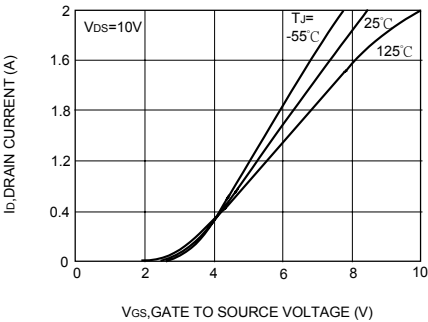


Figure 6. Gate Threshold Variation with Temperature

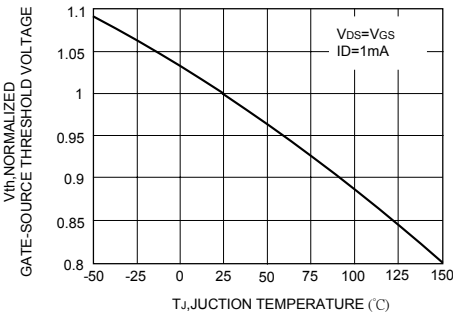


Figure7. Breakdown Voltage Variation with Temperature

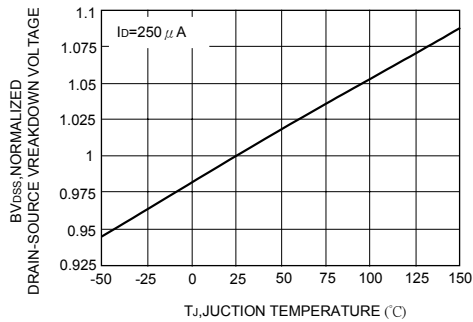


Figure 8. Body Diode Forward Voltage Variation with Temperature

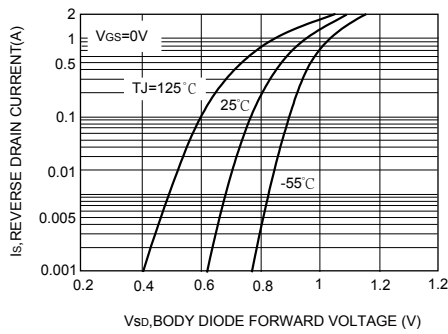


Figure9.Capacitance Characteristics

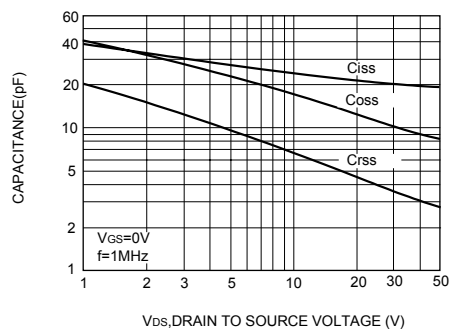


Figure10. Gate Charge Characteristics

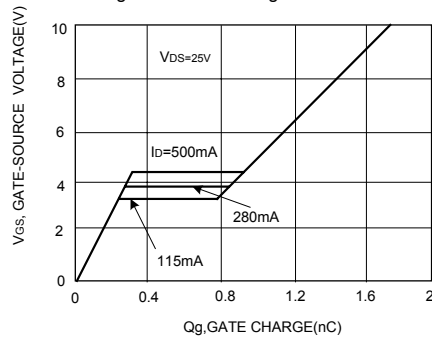


Figure11

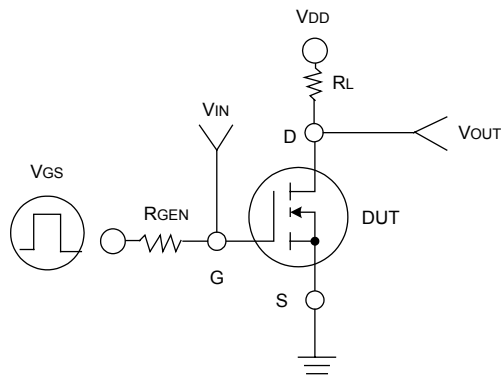
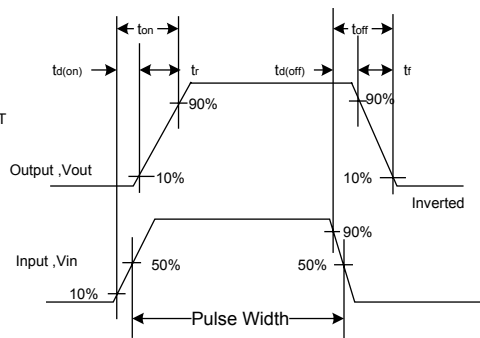


Figure12. Switching Waveforms



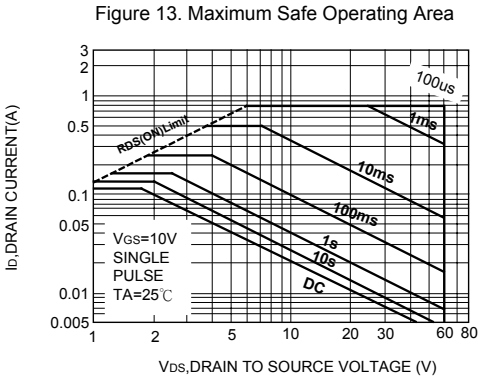
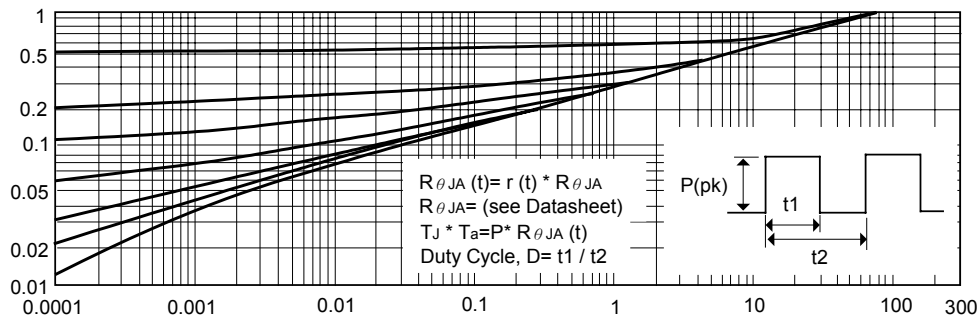


Figure 14. Transient Thermal Response Curve



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