



## 20N50

Power MOSFET

### 20A, 500V N-CHANNEL POWER MOSFET

#### DESCRIPTION

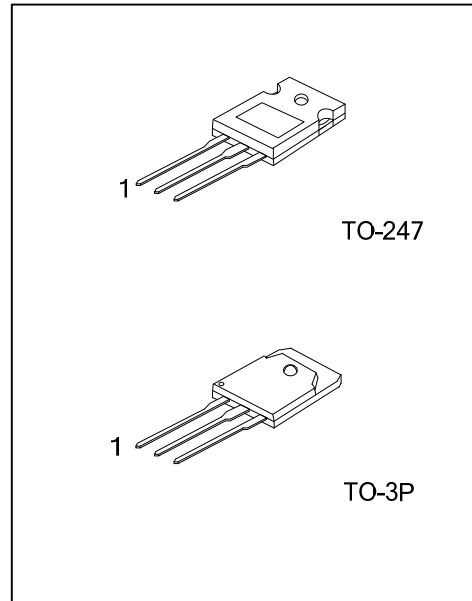
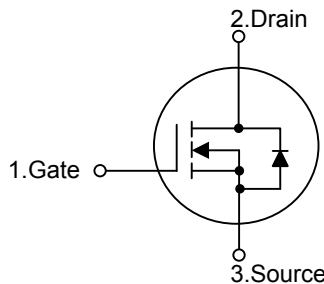
The UTC **20N50** is an N-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, high switching speed and low leakage current, etc.

The UTC **20N50** is suitable for switching regulator application, etc.

#### FEATURES

- \*  $R_{DS(on)} < 0.27\Omega @ V_{GS}=10V, I_D=10A$
- \* High switching speed
- \* Low leakage current

#### SYMBOL



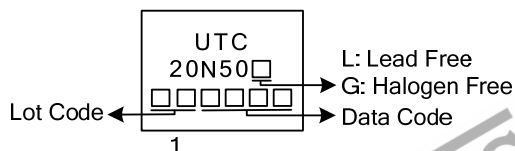
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
20N50L-T3P-T	20N50G-T3P-T	TO-3P	G	D	S	Tube
20N50L-T47-T	20N50G-T47-T	TO-247	G	D	S	Tube

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

<p>20N50L-T3P-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube</p> <p>(2) T3P: TO-3P, T47: TO-247</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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#### MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	500	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current (Note 2)	Continuous	$I_D$	20	A
	Pulsed	$I_{DM}$	80	A
Avalanche Current		$I_{AR}$	20	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	960	mJ
	Repetitive (Note 4)	$E_{AR}$	15	mJ
Power Dissipation ( $T_C=25^\circ\text{C}$ )	TO-247	$P_D$	367	W
	TO-3P		416	W
Channel Temperature		$T_{CH}$	150	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Notes: 1. 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.

2. Ensure that the channel temperature does not exceed  $150^\circ\text{C}$ .

3.  $V_{DD}=90\text{V}$ ,  $T_{ch}=25^\circ\text{C}$  (initial),  $L=4.08\text{mH}$ ,  $R_G=25\Omega$ ,  $I_{AR}=20\text{A}$ .

4. Repetitive rating: pulse width limited by maximum channel temperature This transistor is an electrostatic-sensitive device. Handle with care.

■ THERMAL DATA

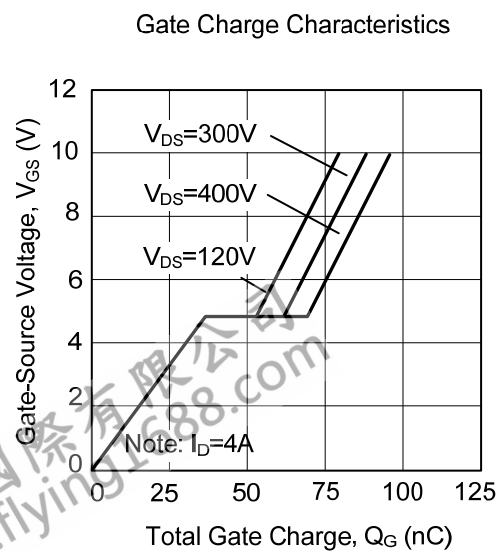
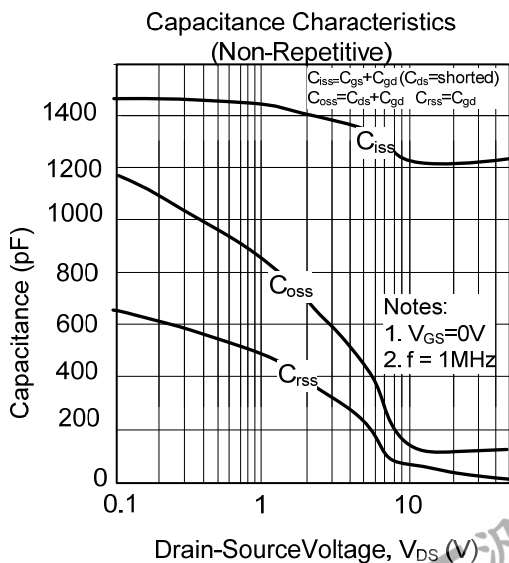
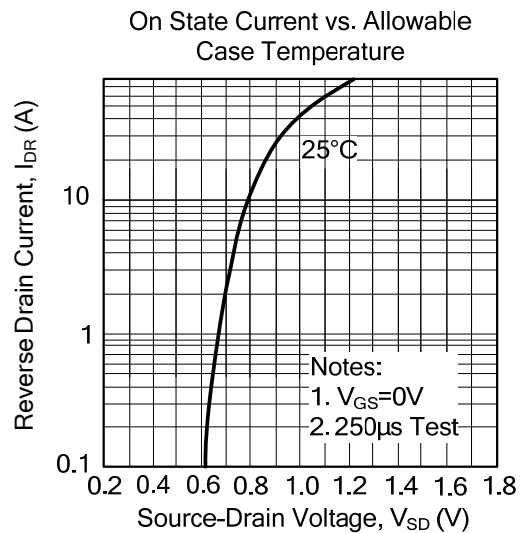
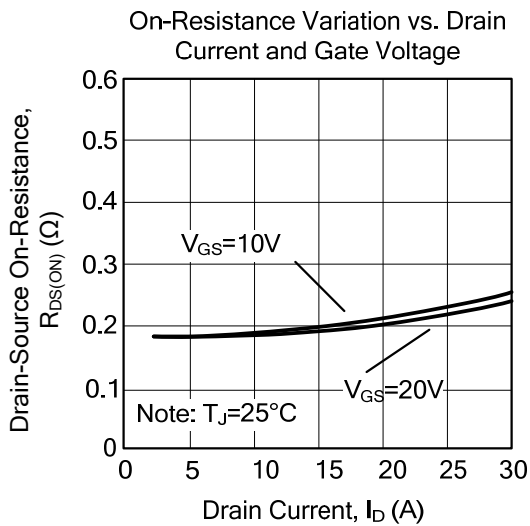
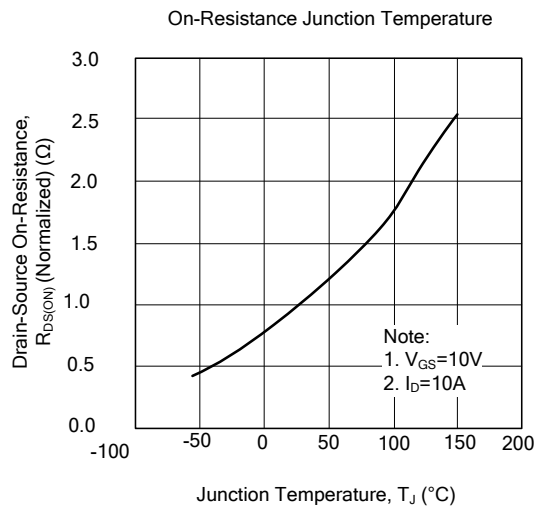
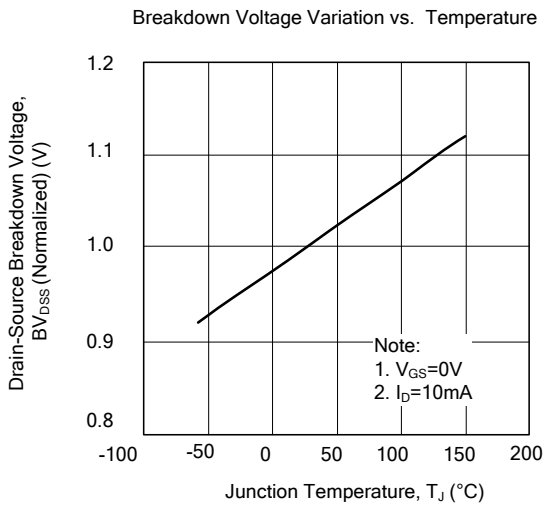
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-247	$\theta_{JA}$	40	$^\circ\text{C/W}$
	TO-3P		30	$^\circ\text{C/W}$
Junction to Case	TO-247	$\theta_{JC}$	0.34	$^\circ\text{C/W}$
	TO-3P		0.3	$^\circ\text{C/W}$

■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

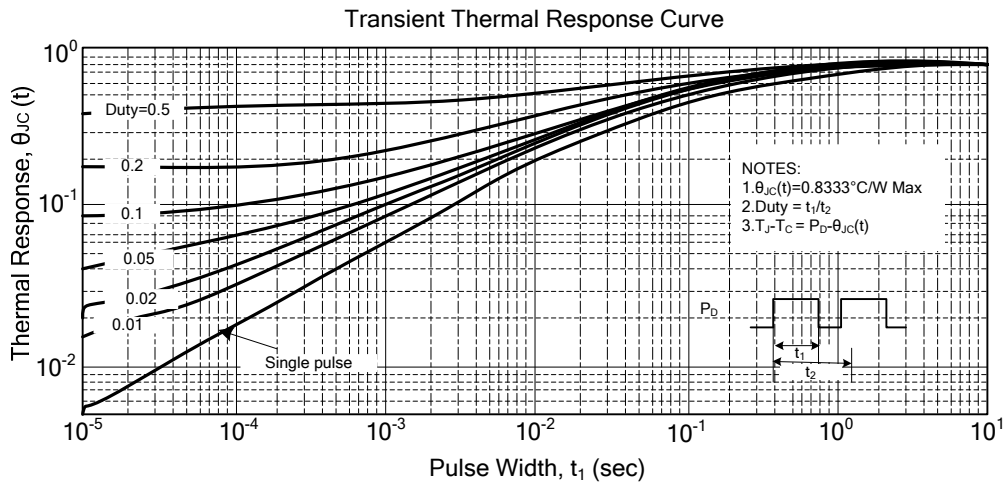
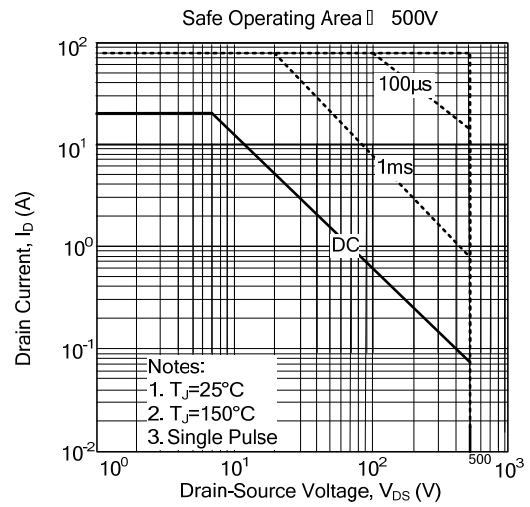
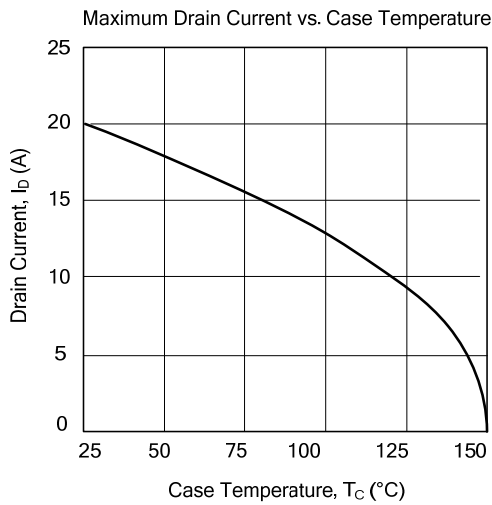
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=10\text{mA}$ , $V_{GS}=0\text{V}$	500			V	
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=500\text{V}$ , $V_{GS}=0\text{V}$			100	$\mu\text{A}$	
Gate-Source Leakage Current	Forward	$I_{GSS}$			+10	$\mu\text{A}$	
							Reverse
					-10	$\mu\text{A}$	
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G=\pm 10\mu\text{A}$ , $V_{DS}=0\text{V}$	$\pm 30$			V	
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=10\text{V}$ , $I_D=1\text{mA}$	2.0		4.0	V	
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=10\text{A}$		0.21	0.27	$\Omega$	
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		3400		pF	
Output Capacitance	$C_{OSS}$				320		pF
Reverse Transfer Capacitance	$C_{RSS}$				25		pF
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}$ , $V_{DD}\approx 400\text{V}$ , $I_D=20\text{A}$		70		nC	
Gate to Source Charge	$Q_{GS}$				45		nC
Gate to Drain Charge	$Q_{GD}$				25		nC
Turn-ON Delay Time	$t_{D(ON)}$	<p><math>V_{GS}</math> 10V 0V <math>I_b=10\text{A}</math> Output <math>R_L=20\Omega</math> <math>V_{DD}\approx 200\text{V}</math> Duty <math>\leq 1\%</math>, <math>t_w=10\mu\text{s}</math></p>		130		ns	
Rise Time	$t_R$				70		ns
Turn-OFF Delay Time	$t_{D(OFF)}$				280		ns
Fall-Time	$t_F$				70		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current (Note)	$I_S$				20	A	
Maximum Body-Diode Pulsed Current (Note)	$I_{SM}$				80	A	
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=20\text{A}$ , $V_{GS}=0\text{V}$			1.7	V	
Body Diode Reverse Recovery Time	$t_{RR}$	$I_S=20\text{A}$ , $V_{GS}=0\text{V}$ , $dI_{DR}/dt=100\text{A}/\mu\text{s}$		1300		ns	
Body Diode Reverse Recovery Charge	$Q_{RR}$				20		$\mu\text{C}$

Note: Ensure that the channel temperature does not exceed  $150^\circ\text{C}$ .

## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS (Cont.)



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