



20N50

Power MOSFET

20A, 500V N-CHANNEL POWER MOSFET

■ DESCRIPTION

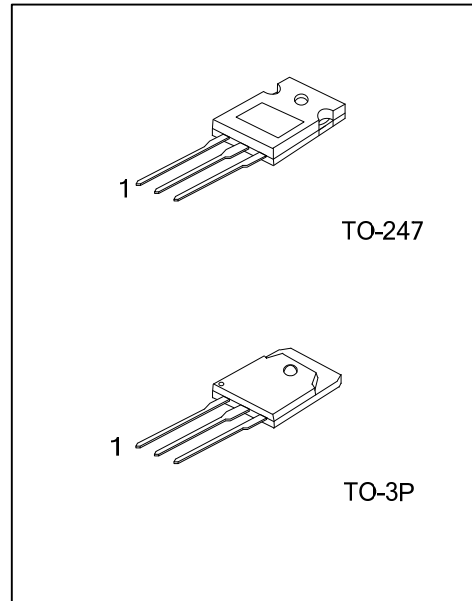
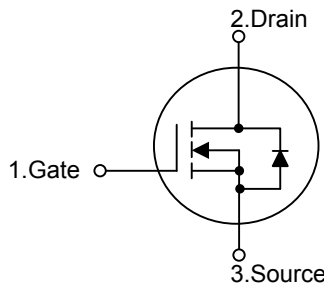
The UTC **20N50** is an N-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, high switching speed and low leakage current, etc.

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



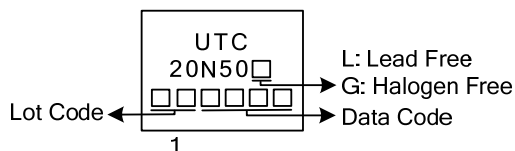
■ ORDERING INFORMATION

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}	± 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°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	θ_{JA}	40	$^\circ\text{C/W}$
	TO-3P		30	$^\circ\text{C/W}$
Junction to Case	TO-247	θ_{JC}	0.34	$^\circ\text{C/W}$
	TO-3P		0.3	$^\circ\text{C/W}$

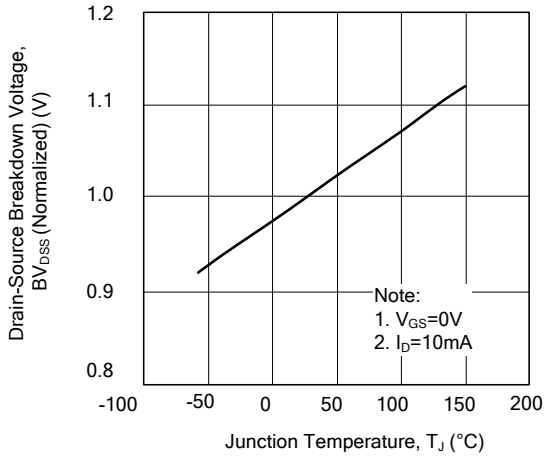
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =10mA, V _{GS} =0V	500			V	
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			100	μA	
Gate-Source Leakage Current	I _{GSS}	Forward			+10	μA	
		Reverse			-10	μA	
Gate-Source Breakdown Voltage	V _{(BR)GSS}	I _G =±10μA, V _{DS} =0V	±30			V	
ON CHARACTERISTICS							
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =10V, I _D =1mA	2.0		4.0	V	
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A		0.21	0.27	Ω	
DYNAMIC PARAMETERS							
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		3400		pF	
Output Capacitance	C _{OSS}			320		pF	
Reverse Transfer Capacitance	C _{RSS}			25		pF	
SWITCHING PARAMETERS							
Total Gate Charge	Q _G	V _{GS} =10V, V _{DD} ≈400V, I _D =20A		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>Duty ≤1%, t_w=10μs</p>		130		ns	
Rise Time	t _r				70		ns
Turn-OFF Delay Time	t _{D(OFF)}				280		ns
Fall-Time	t _f				70		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
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 =20A, V _{GS} =0V			1.7	V	
Body Diode Reverse Recovery Time	t _{RR}	I _S =20A, V _{GS} =0V, dI _{DR} /dt=100A/μs		1300		ns	
Body Diode Reverse Recovery Charge	Q _{RR}				20		μC

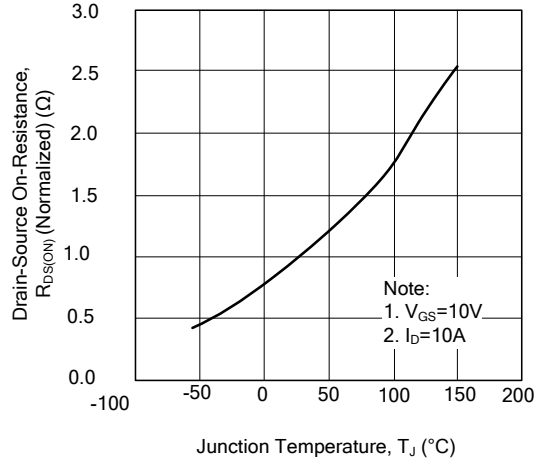
Note: Ensure that the channel temperature does not exceed 150°C.

TYPICAL CHARACTERISTICS

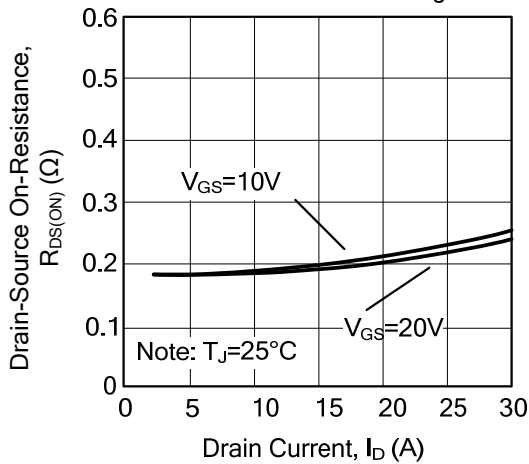
Breakdown Voltage Variation vs. Temperature



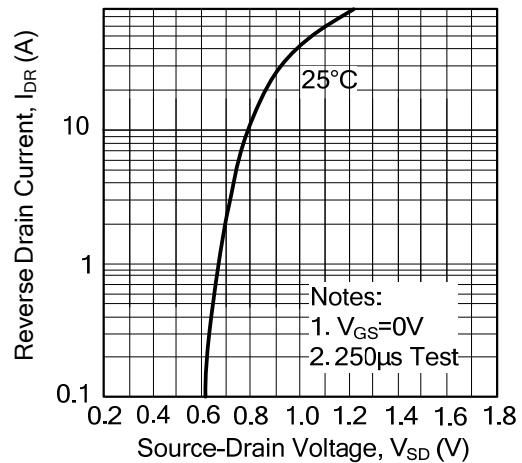
On-Resistance Junction Temperature



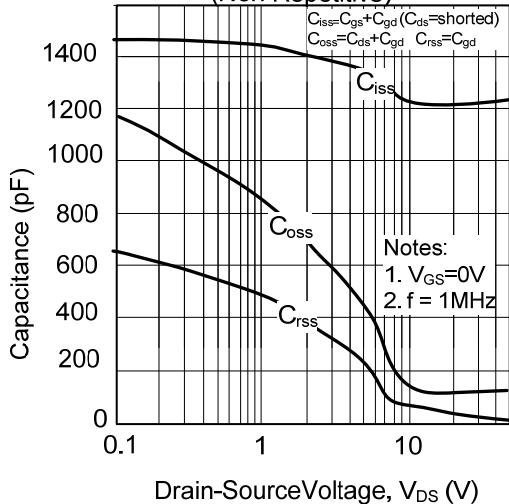
On-Resistance Variation vs. Drain Current and Gate Voltage



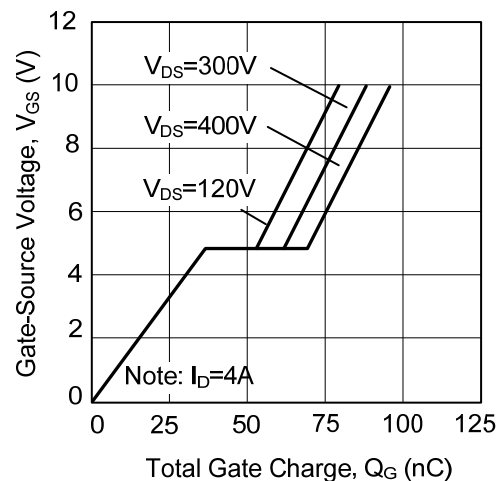
On State Current vs. Allowable Case Temperature



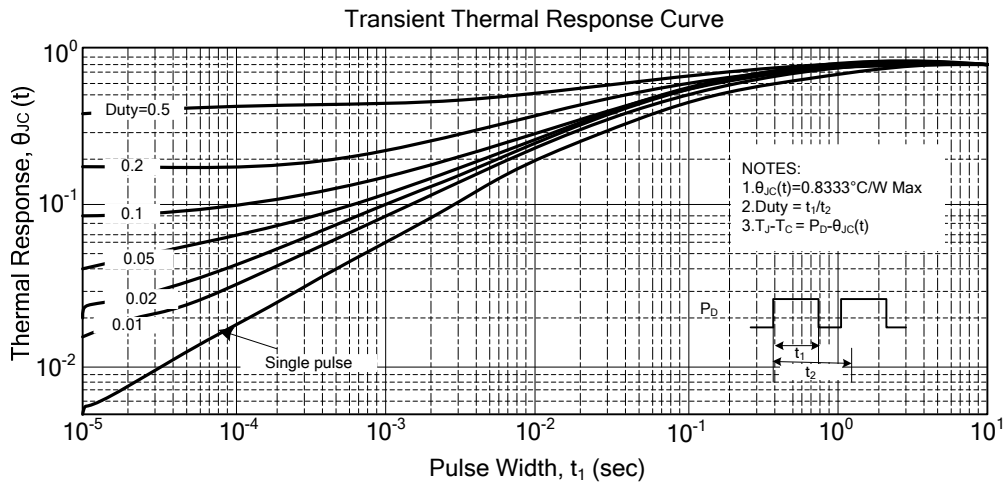
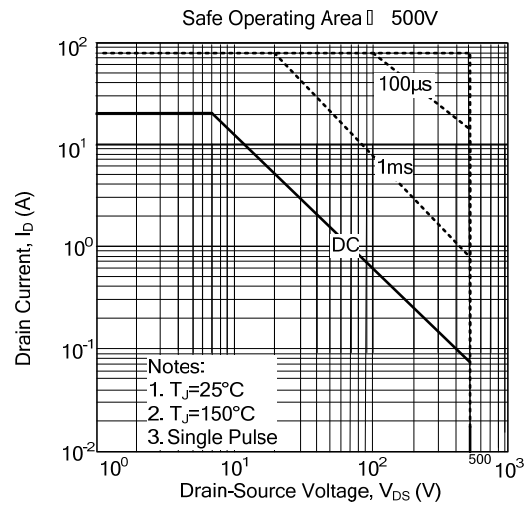
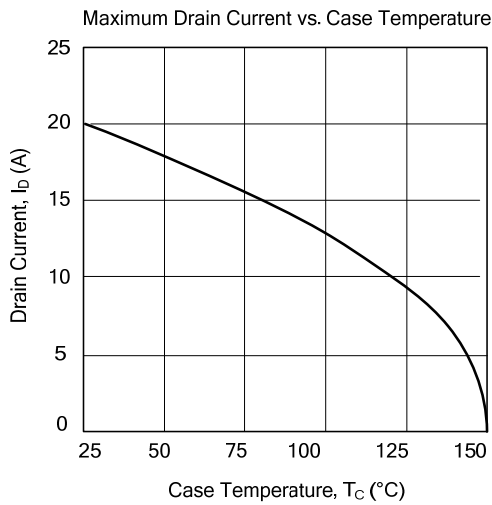
Capacitance Characteristics (Non-Repetitive)



Gate Charge Characteristics



■ TYPICAL CHARACTERISTICS (Cont.)



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