



# 20N60

*Power MOSFET*

## 20A, 600V N-CHANNEL POWER MOSFET

■ DESCRIPTION

The UTC **20N60** is an N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

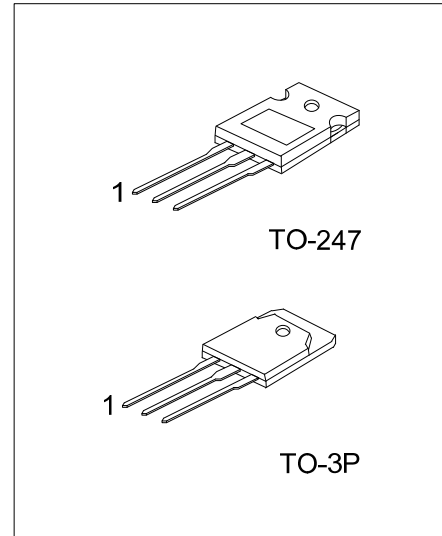
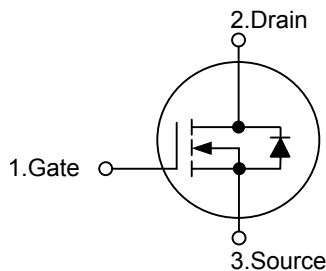
The UTC **20N60** is universally applied in motor control, UPS, DC choppers and switch-mode and resonant-mode power supplies.

■ FEATURES

\*  $R_{DS(ON)} < 0.45\Omega @ V_{GS}=10V, I_D=10A$

\* High switching speed

■ SYMBOL



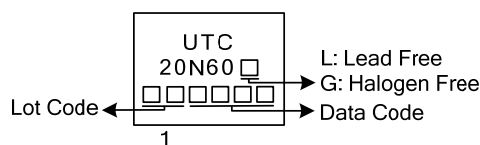
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
20N60L-T47-T	20N60G-T47-T	TO-247	G	D	S	Tube
20N60L-T3P-T	20N60G-T3P-T	TO-3P	G	D	S	Tube

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

<p>20N60L-T47-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube</p> <p>(2) T47: TO-247, T3P: TO-3P</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	600	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	20	A
	Pulsed	$I_{DM}$	80	A
Avalanche Energy	Single Pulsed(Note 2)	$E_{AS}$	1200	mJ
Power Dissipation	TO-247	$P_D$	370	W
	TO-3P		416	
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-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.  $V_{DD}=50\text{V}$ , Starting  $T_J=25^\circ\text{C}$ , Peak  $I_{AS}=20\text{A}$ ,  $L=6\text{mH}$

■ THERMAL DATA

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

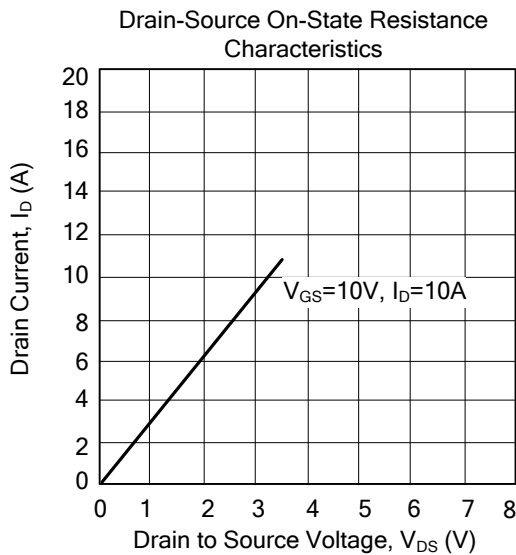
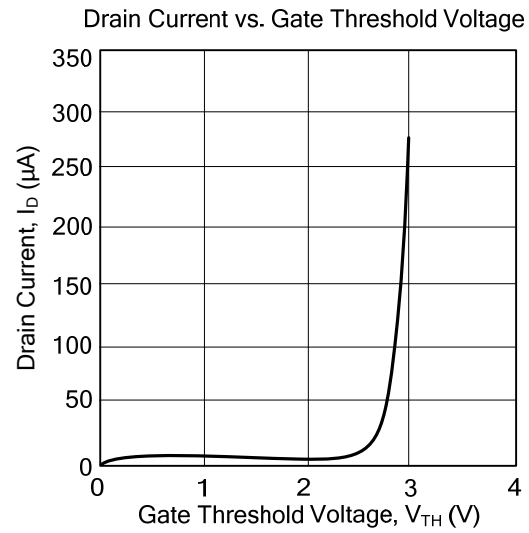
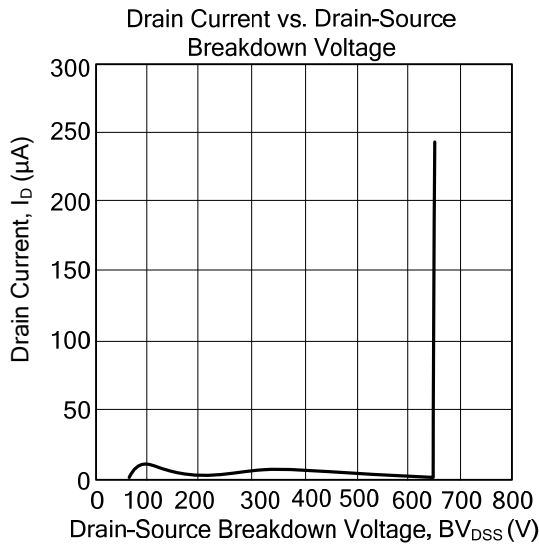
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	600			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=600\text{V}$ , $V_{GS}=0\text{V}$			10	$\mu\text{A}$
Gate- Source Leakage Current	$I_{GSS}$	Forward			+100	nA
		Reverse			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	2		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=10\text{A}$ , Pulse test, $t \leq 300\mu\text{s}$ , duty cycle $d \leq 2\%$		0.32	0.45	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1\text{MHz}$		4500		pF
Output Capacitance	$C_{OSS}$			330		pF
Reverse Transfer Capacitance	$C_{RSS}$			140		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}$ , $V_{DS}=300\text{V}$ , $I_D=10\text{A}$ (Note 1, 2)			170	nC
Gate to Source Charge	$Q_{GS}$				40	nC
Gate to Drain Charge	$Q_{GD}$				85	nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{GS}=10\text{V}$ , $V_{DS}=300\text{V}$ , $I_D=10\text{A}$ , $R_G=2\Omega$ , (Note 1, 2)		110	40	ns
Rise Time	$t_R$			130	60	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			800	90	ns
Fall-Time	$t_F$			170	60	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$	$V_{GS}=0\text{V}$			20	A
Maximum Body-Diode Pulsed Current	$I_{SM}$	Repetitive			80	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_F=I_S$ , $V_{GS}=0\text{V}$ , Pulse test, $t \leq 300\mu\text{s}$ , duty cycle $d \leq 2\%$			1.5	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F=I_S$ , $V_R=100\text{V}$ , $-di/dt=100\text{A}/\mu\text{s}$ (Note 1)		600		ns

Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$

2. Essentially independent of operating temperature

## TYPICAL CHARACTERISTICS



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