



## 20N60

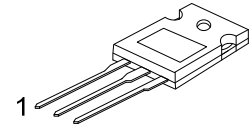
Power MOSFET

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

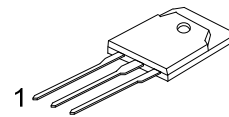
#### DESCRIPTION

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.



TO-247



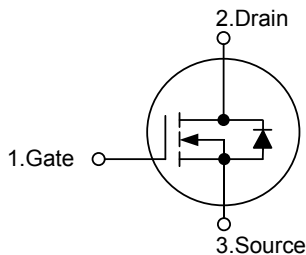
TO-3P

#### FEATURES

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

\* High switching speed

#### SYMBOL



#### ORDERING INFORMATION

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

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

20N60L-T3P-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) T3P: TO-3P, T47: TO-247
	(3)Lead Free	(3) G: Halogen Free, L: Lead Free

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DS}$	600	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	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-3P	$P_D$	300	W
	TO-247		370	
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55~+150	$^\circ\text{C}$

Note: 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 Case	TO-3P	$\theta_{JC}$	0.42	$^\circ\text{C/W}$
	TO-247		0.34	

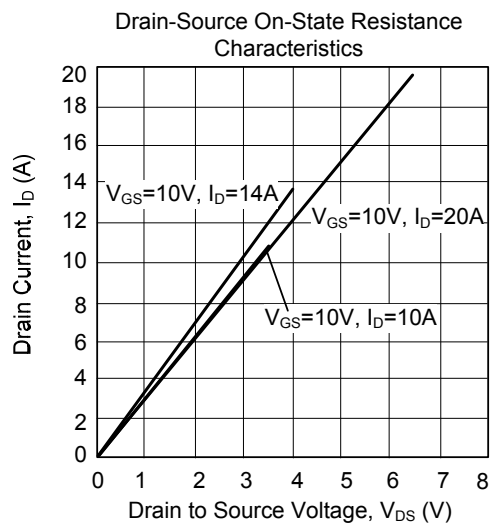
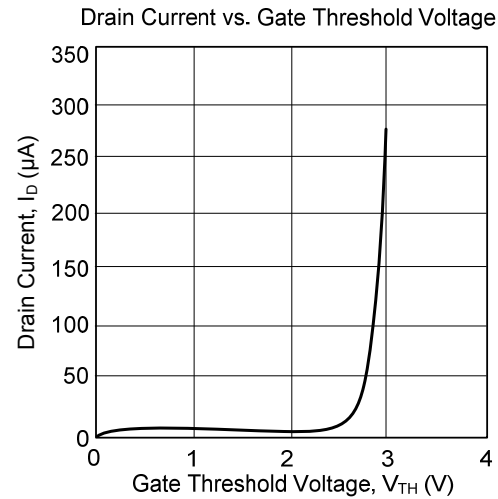
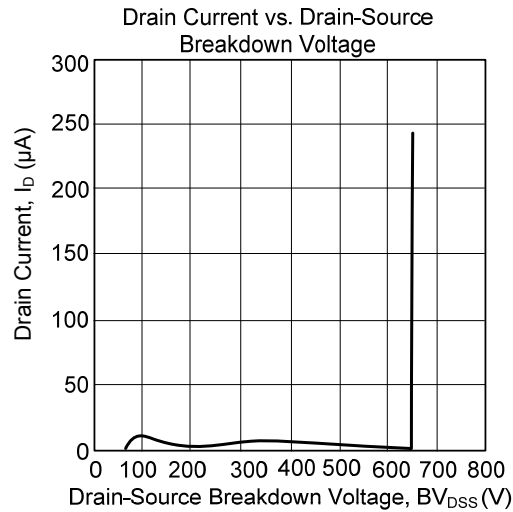
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	600			V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V			10	μA
Gate- Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V			+100	nA
	Reverse		V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2		4.0	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A, Pulse test, t≤300μs, duty cycle d≤2%		0.32	0.45	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz		4500		pF
Output Capacitance		C <sub>OSS</sub>			420		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>			140		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q <sub>G</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =300V, I <sub>D</sub> =10A (Note 1, 2)		150	170	nC
Gate to Source Charge		Q <sub>GS</sub>			29	40	nC
Gate to Drain Charge		Q <sub>GD</sub>			60	85	nC
Turn-ON Delay Time		t <sub>D(ON)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =300V, I <sub>D</sub> =10A,R <sub>G</sub> =2Ω, (Note 1, 2)		20	40	ns
Rise Time		t <sub>R</sub>			43	60	ns
Turn-OFF Delay Time		t <sub>D(OFF)</sub>			70	90	ns
Fall-Time		t <sub>F</sub>			40	60	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I <sub>S</sub>	V <sub>GS</sub> =0V			20	A
Maximum Body-Diode Pulsed Current		I <sub>SM</sub>	Repetitive			80	A
Drain-Source Diode Forward Voltage		V <sub>SD</sub>	I <sub>F</sub> =I <sub>S</sub> , V <sub>GS</sub> =0V, Pulse test, t≤300μs, duty cycle d≤2%			1.5	V
Body Diode Reverse Recovery Time		t <sub>rr</sub>	I <sub>F</sub> =I <sub>S</sub> , V <sub>R</sub> =100V, -di/dt=100A/μs(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



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.