

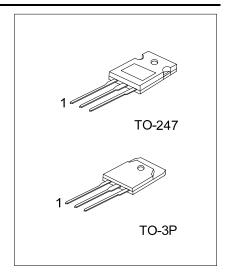
20N60 Power MOSFET

# 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.

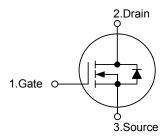
The UTC **20N60** is universally applied in motor control, UPS, DC choppers and switch-mode and resonant-mode power supplies.



#### **■ FEATURES**

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

#### ■ SYMBOL



### ■ ORDERING INFORMATION

Ordering Number		Daalaasa	Pin Assignment			Daaldaa	
Lead Free	Halogen Free	Package	1	2	3	Packing	
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) T3P: TO-3P, T47: TO-247 (3) G: Halogen Free, L: Lead Free

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## ■ ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> =25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		$V_{DSS}$	600	V	
Gate-Source Voltage		V <sub>GSS</sub>	±20	٧	
Drain Current	Continuous	I <sub>D</sub>	20	Α	
	Pulsed	I <sub>DM</sub>	80	Α	
Avalanche Energy	Single Pulsed(Note 2)	E <sub>AS</sub>	1200	mJ	
Power Dissipation	TO-3P		300	W	
	TO-247	P <sub>D</sub>	370		
Junction Temperature		TJ	+150	°C	
Storage Temperature		T <sub>STG</sub>	-55~+150	Ç	

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.

## **■ THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT	
lunction to Cons	TO-3P	0	0.42	°0/14/	
Junction to Case	TO-247	AlC	0.34	°C/W	

#### ■ **ELECTRICAL CHARACTERISTICS** (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	$I_D = 250 \mu A, V_{GS} = 0 V$				V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V			10	μΑ
Gate- Source Leakage Current Forward		$V_{GS}$ =+20V, $V_{DS}$ =0V			+100	nΑ
Reverse	I <sub>GSS</sub>	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu A$			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	Coss			420		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			140		pF
SWITCHING PARAMETERS						
Total Gate Charge	$Q_G$	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	$Q_GS$			29	40	nC
Gate to Drain Charge	$Q_GD$			60	85	nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	$V_{GS}$ =10V, $V_{DS}$ =300V, $I_{D}$ =10A, $R_{G}$ =2 $\Omega$ , (Note 1, 2)		20	40	ns
Rise Time	$t_R$			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	CHARACT	ERISTICS				•
Maximum Body-Diode Continuous Current	Is	V <sub>GS</sub> =0V			20	Α
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>	Repetitive			80	Α
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	٧
Body Diode Reverse Recovery Time	t <sub>rr</sub>	$I_F=I_S, V_R=100V, -di/dt=100A/\mu s(Note 1)$		600		ns

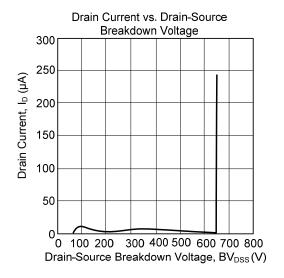
Notes: 1. Pulse Test: Pulse width ≤ 300µs, Duty cycle≤2%

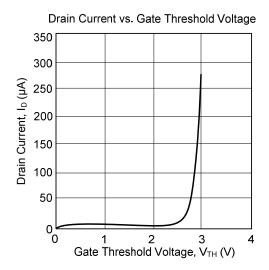
<sup>2.</sup> V<sub>DD</sub>=50V, Starting T<sub>J</sub>=25°C, Peak I<sub>AS</sub>=20A, L=6mH

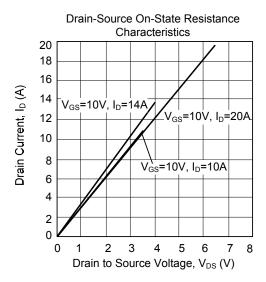
<sup>2.</sup> Essentially independent of operating temperature

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#### ■ TYPICAL CHARACTERISTICS







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