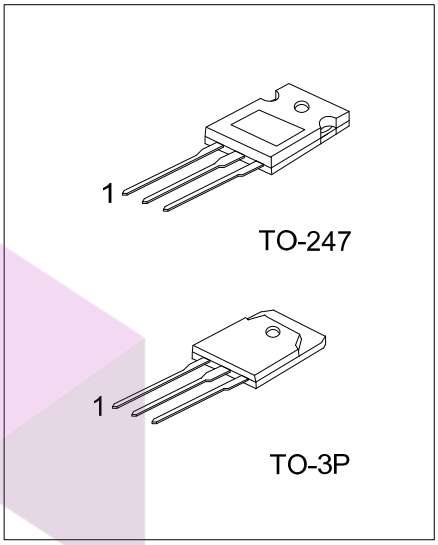
20A, 600V N-CHANNEL POWER MOSFET



■ DESCRIPTION

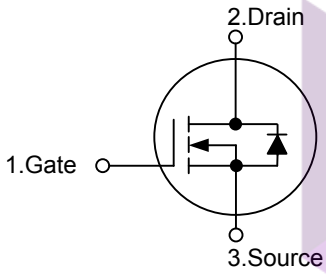
The UTC **20N60** is an N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse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

* $R_{DS(ON)}$ < 0.45Ω @ V_{GS}=10V, I_D=10A
* High switching speed

■ SYMBOL



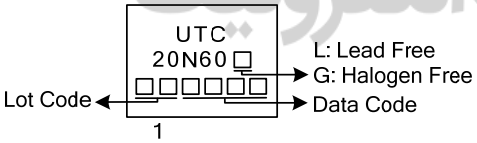
■ ORDERING INFORMATION

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

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

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±30	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	°C
Storage Temperature		T_{STG}	-55 ~ +150	°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}=50V, Starting T_J=25°C, Peak I_{AS}=20A, L=6mH

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-247	θ_{JA}	40	°C/W
	TO-3P		30	
Junction to Case	TO-247	θ_{JC}	0.34	°C/W
	TO-3P		0.3	

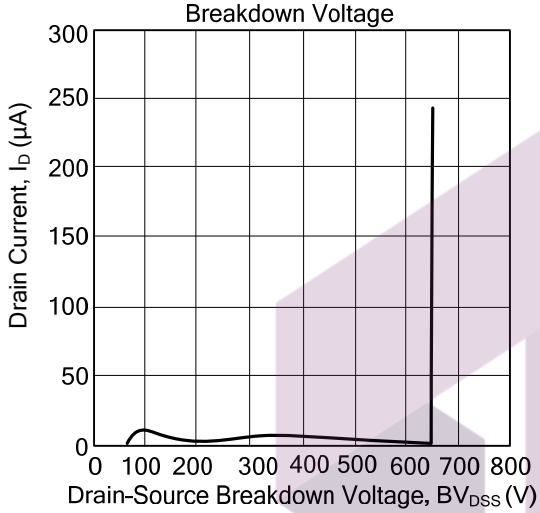
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	600			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=600V, V_{GS}=0V			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+30V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-30V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=10A, Pulse test, t≤300μs, duty cycle d≤2%		0.32	0.45	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1MHz		4500		pF
Output Capacitance		C_{OSS}			330		pF
Reverse Transfer Capacitance		C_{RSS}			140		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{GS}=10V, V_{DS}=300V, I_D=10A (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}=10V, V_{DS}=300V, I_D=10A,R_G=2Ω, (Note 1, 2)		110		ns
Rise Time		t_R			130		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			800		ns
Fall-Time		t_F			170		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S	V_{GS}=0V			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}=0V, Pulse test, t≤300μs, duty cycle d≤2%			1.5	V
Body Diode Reverse Recovery Time		t_{rr}	I_F=I_S,V_R=100V,-di/dt=100A/μs(Note 1)		600		ns

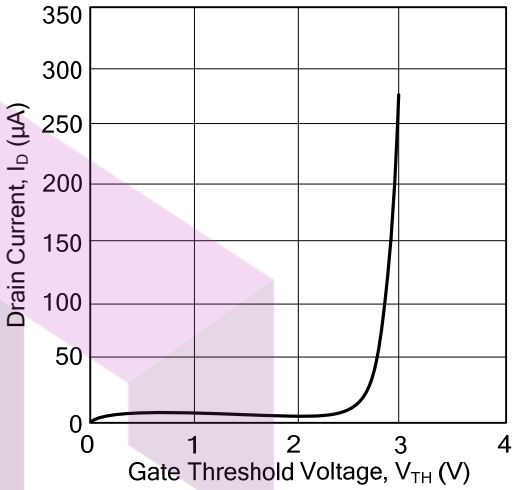
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle≤2%
2. Essentially independent of operating temperature

■ TYPICAL CHARACTERISTICS

Drain Current vs. Drain-Source Breakdown Voltage



Drain Current vs. Gate Threshold Voltage



Drain-Source On-State Resistance Characteristics