



60N05

Preliminary

Power MOSFET

**60A, 50V N-CHANNEL
POWER MOSFET**

■ DESCRIPTION

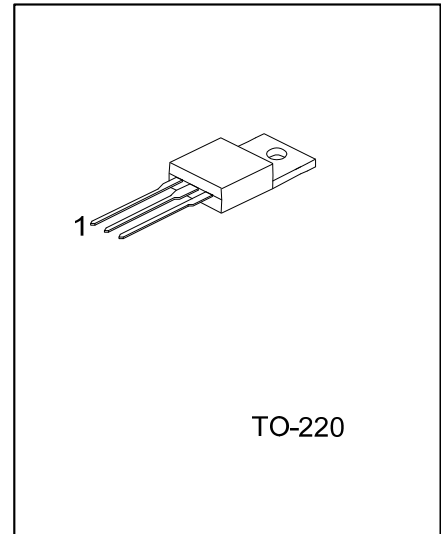
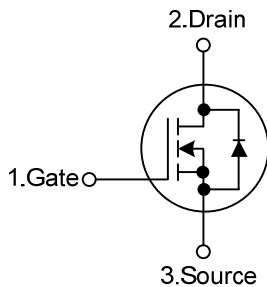
The UTC **60N05** is an N-channel power MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

The UTC **60N05** is suitable for motor control, AC-DC or DC-DC converters and audio amplifiers, etc.

■ FEATURES

- * $R_{DS(ON)}=12m\Omega @ V_{GS}=10V, I_D=30A$
- * High Switching Speed
- * High Current Capacity
- * Low Gate Charge(typical 130nC)

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
60N05L-TA3-T	60N05G-TA3-T	TO-220	G	D	S	Tube

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

<p>60N05L-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage ($V_{GS}=0$)		V_{DSS}	50	V
Drain-Gate Voltage ($R_{GS}=20k\ \Omega$)		V_{DGR}	50	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	$T_C=25^\circ\text{C}$	60	A
		$T_C=100^\circ\text{C}$	50	A
	Pulsed (Note 1)		I_{DM}	240
Avalanche Current		I_{AR}	60	A
Avalanche Energy		E_{AS}	600	mJ
		E_{AR}	150	mJ
Power Dissipation		P_D	125	W
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. Pulse width limited by safe operating area

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	θ_{JC}	1	$^\circ\text{C/W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	60			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=\text{Max Rating}$, $V_{GS}=0\text{V}$			250	μA
Gate-Source Leakage Current	I_{GSS}	Forward			+100	nA
		Reverse			-100	nA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2	3	4	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=30\text{A}$		0.012	0.014	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		3900		pF
Output Capacitance	C_{OSS}			950		pF
Reverse Transfer Capacitance	C_{RSS}			250		pF

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{GS}=10\text{V}, V_{DD}=40\text{V}, I_D=60\text{A}$		130	170	nC
Gate to Source Charge	Q_{GS}			26		nC
Gate to Drain Charge	Q_{GD}			55		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=25\text{V}, I_D=30\text{A}, R_G=4.7\Omega,$ $V_{GS}=10\text{V}$		30		ns
Rise Time	t_R			180		ns
Fall-Time	t_F	$V_{DD}=40\text{V}, I_D=60\text{A}, R_G=4.7\Omega,$ $V_{GS}=10\text{V}$		35		ns
Off-Voltage Rise Time	$t_{R(OFF)}$			135		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S	(Note 1)			60	A
Maximum Body-Diode Pulsed Current	I_{SM}				240	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_{SD}=60\text{A}, V_{GS}=0\text{V}$ (Note 2)			1.6	V
Body Diode Reverse Recovery Time	t_{rr}	$I_{SD}=60\text{A}, V_{DD}=30\text{V}, T_J=150^\circ\text{C},$ $di/dt=100\text{A}/\mu\text{s}$		150		ns
Body Diode Reverse Recovery Charge	Q_{RR}			0.56		μC

Notes: 1. Pulse width limited by safe operating area

2. Pulsed: Pulse duration=300 μs , Duty cycle 1.5%

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