

# UNISONIC TECHNOLOGIES CO., LTD

UT30N07 Preliminary Power MOSFET

# 30A, 70V N-CHANNEL POWER MOSFET

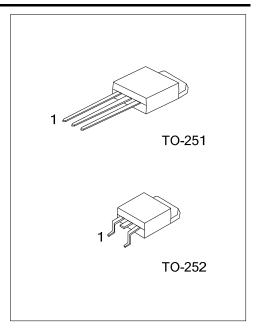
#### DESCRIPTION

The UTC **UT30N07** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect  $R_{\text{DS(ON)}}$  and high switching speed.

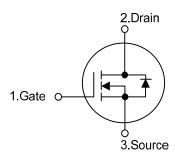
The UTC **UT30N07** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

#### FEATURES

- \*  $R_{DS(ON)} \le 19 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=15\text{A}$  $R_{DS(ON)} \le 23 \text{ m}\Omega$  @  $V_{GS}=4.5\text{V}$ ,  $I_D=15\text{A}$
- \* High Switching Speed



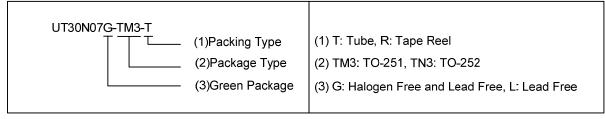
#### ■ SYMBOL



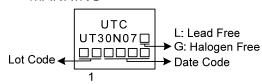
#### ORDERING INFORMATION

Ordering Number		Dealeana	Pin Assignment			Deaking	
Lead Free	Halogen Free	Package	1	2	3	Packing	
UT30N07L-TM3-T	UT30N07G-TM3-T	TO-251	G	D	S	Tube	
UT30N07L-TN3-R	UT30N07G-TN3-R	TO-252	G	D	S	Tape Reel	

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



#### ■ MARKING



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#### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		$V_{DSS}$	70	V	
Gate-Source Voltage		$V_{GSS}$	±20	V	
Drain Current	Continuous (V <sub>GS</sub> =10V)	I <sub>D</sub>	30	Α	
	Pulsed (Note 2)	I <sub>DM</sub>	60	Α	
Avalanche Energy	Single Pulsed (Note 3)	E <sub>AS</sub>	28.3	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.1	V/ns	
Power Dissipation		$P_{D}$	50	W	
Junction Temperature		TJ	+150	°C	
Storage Temperature		T <sub>STG</sub>	-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. Repetitive Rating: Pulse width limited by maximum junction temperature.
- 3. L=0.1mH,  $I_{AS}$ =23.8A,  $V_{DD}$ =50V,  $R_{G}$ =25 $\Omega$ , Starting  $T_{J}$ =25 $^{\circ}$ C
- 4.  $I_{SD} \le 30A$ , di/dt  $\le 200A/\mu s$ ,  $V_{DD} \le BV_{DSS}$ , Starting  $T_J = 25^{\circ}C$

# ■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT	
Junction to Ambient	$\theta_{JA}$	110	°C/W	
Junction to Case	θ <sub>JC</sub>	2.5 (Note)	°C/W	

Note: Device mounted on FR-4 substrate P<sub>C</sub> board, 2oz copper, with 1inch square copper plate.

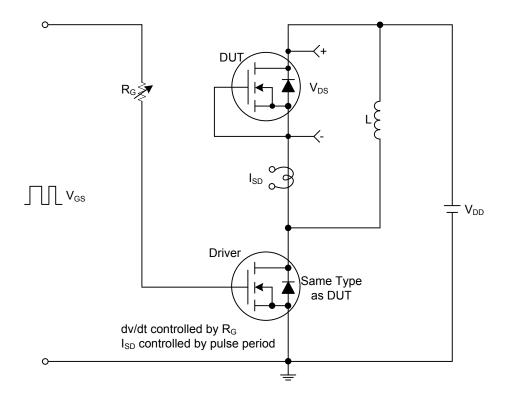
# ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

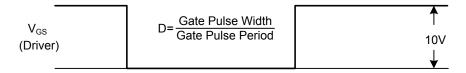
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	70			V	
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =70V, V <sub>GS</sub> =0V			1	μΑ	
Cata Source Leakage Current Forward		V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V			+100	nA	
Gate- Source Leakage Current Reverse	$I_{GSS}$	$V_{GS}$ =-20V, $V_{DS}$ =0V			-100	nA	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_{D}=250\mu A$	1.0		3.0	V	
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =15A			19	mΩ	
Static Drain-Source On-State Resistance		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A			23	mΩ	
DYNAMIC PARAMETERS							
Input Capacitance	C <sub>ISS</sub>			1263		pF	
Output Capacitance	Coss	$V_{GS}$ =0V, $V_{DS}$ =25V, f=1.0MHz		143		pF	
Reverse Transfer Capacitance	$C_{RSS}$			109.7		pF	
SWITCHING PARAMETERS							
Total Gate Charge	$Q_{G}$	V <sub>DS</sub> =56V, V <sub>GS</sub> =10V, I <sub>D</sub> =30A		39.6		nC	
Gate to Source Charge	$Q_{GS}$	$I_{G}$ =1mA (Note 2)		4.8		nC	
Gate to Drain Charge	$Q_GD$	IG-IIIA (Note 2)		11.2		nC	
Turn-ON Delay Time	t <sub>D(ON)</sub>			7.4		ns	
Rise Time	t <sub>R</sub>	$V_{DD}$ =70V, $V_{GS}$ =10V, $I_{D}$ =30A,		18.4		ns	
Turn-OFF Delay Time	t <sub>D(OFF)</sub>	$R_G=6\Omega$ , (Note 2)		36.4		ns	
Fall-Time	t <sub>F</sub>			20.9		ns	
SOURCE- DRAIN DIODE RATINGS AND O	CHARACTERI	STICS					
Maximum Continuous Drain-Source Diode	Is				30	Α	
Forward Current	ıs				30	^	
Maximum Pulsed Drain-Source Diode	I <sub>SM</sub>				60	Α	
Forward Current					00	^	
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =30A,V <sub>GS</sub> =0V			1.4	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =30A,V <sub>GS</sub> =0V, di/dt=100A/μs		36		ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	η-30Λ, VGS-0V, αναι-100Α/μ5		71.6		nC	

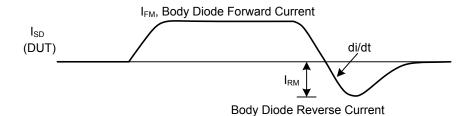
Notes: 1. Pulse Test : Pulse width  $\leq$  300 $\mu$ s, Duty cycle  $\leq$  2%.

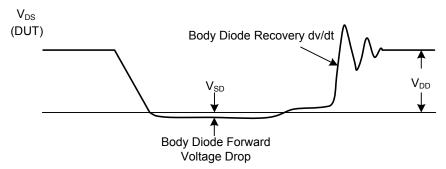
<sup>2.</sup> Essentially independent of operating ambient temperature.

# ■ TEST CIRCUITS AND WAVEFORMS



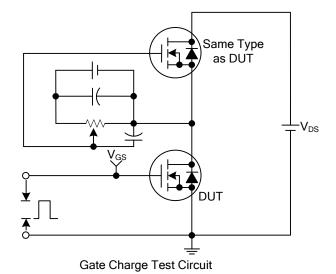


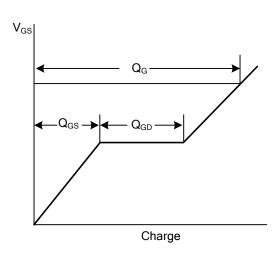




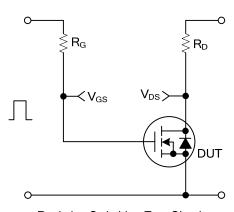
Peak Diode Recovery dv/dt Test Circuit and Waveforms

# TEST CIRCUITS AND WAVEFORMS

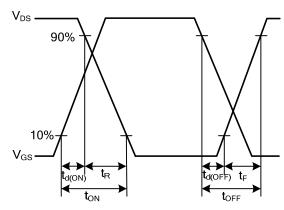




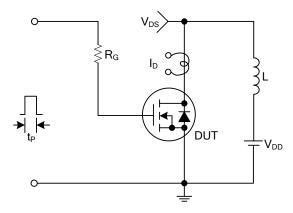
Gate Charge Waveforms



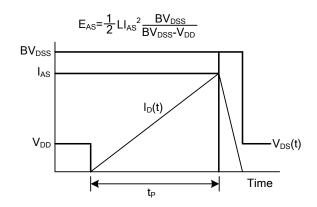




Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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