



## 7N75

Preliminary

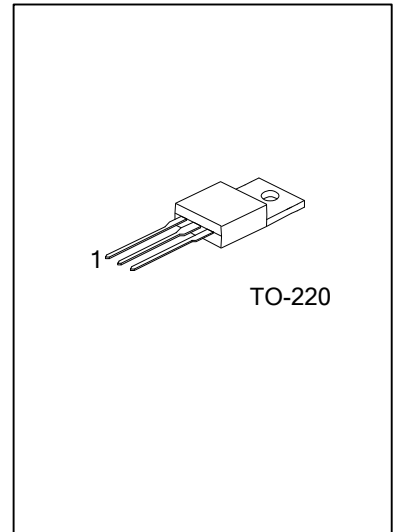
Power MOSFET

### 7.0A, 750V N-CHANNEL POWER MOSFET

#### DESCRIPTION

The UTC **7N75** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

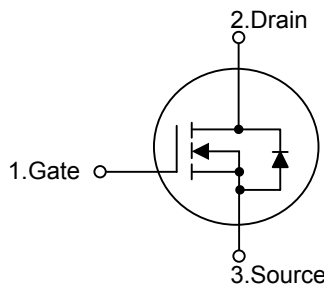
The UTC **7N75** is universally applied in high efficiency switch mode power supply.



#### FEATURES

- \*  $R_{DS(on)}=1.7\Omega @ V_{GS}=10V$
- \* High switching speed
- \* Improved dv/dt capability
- \* 100% avalanche tested

#### SYMBOL



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N75L-TA3-T	7N75G-TA3-T	TO-220	G	D	S	Tube

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

<p>7N75L - 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 ( $T_c=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	750	V
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	7
	Pulsed (Note 2)	$I_{DM}$	28
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	530
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.5	V/ns
Power Dissipation	$P_D$	142	W
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. Repetitive Rating: Pulse width limited by maximum junction temperature
3.  $L=19.5\text{mH}$ ,  $I_{AS}=7\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$
4.  $I_{SD}\leq 7\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	0.88	$^\circ\text{C}/\text{W}$

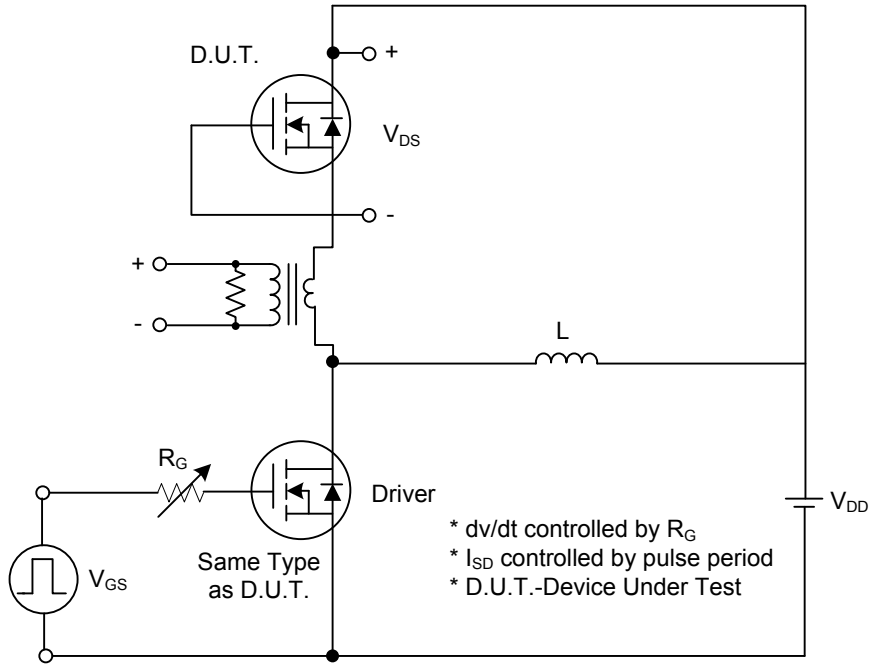
■ ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	750			V
Breakdown Voltage Temperature Coefficient		ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA, Referenced to 25°C		0.67		V/°C
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =750V, V <sub>GS</sub> =0V			1	μA
			V <sub>DS</sub> =600V, T <sub>C</sub> =125°C			1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =30V			100	nA
	Reverse		V <sub>DS</sub> =0V, V <sub>GS</sub> =-30V			-100	nA
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =3.5A		1.35	1.7	Ω
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance		C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		1200	1600	pF
Output Capacitance		C <sub>OSS</sub>			150	190	pF
Reverse Transfer Capacitance		C <sub>RSS</sub>			18	25	pF
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge		Q <sub>G</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =10V, I <sub>D</sub> =7A (Note 1,2)		30		nC
Gate-Source Charge		Q <sub>GS</sub>			6.5		nC
Gate-Drain Charge		Q <sub>GD</sub>			13		nC
Turn-ON Delay Time		t <sub>D(ON)</sub>	V <sub>DD</sub> =375V, I <sub>D</sub> =7A, R <sub>G</sub> =25Ω (Note 1,2)		35	80	ns
Turn-ON Rise Time		t <sub>R</sub>			79	165	ns
Turn-OFF Delay Time		t <sub>D(OFF)</sub>			80	160	ns
Turn-OFF Fall Time		t <sub>F</sub>			52	120	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current		I <sub>S</sub>				7.0	A
Maximum Body-Diode Pulsed Current		I <sub>SM</sub>				28	A
Drain-Source Diode Forward Voltage		V <sub>SD</sub>	I <sub>S</sub> =7A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time		t <sub>RR</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =7A,		320		ns
Body Diode Reverse Recovery Charge		Q <sub>RR</sub>	dI <sub>F</sub> /dt=100A/μs (Note 1)		2.4		μC

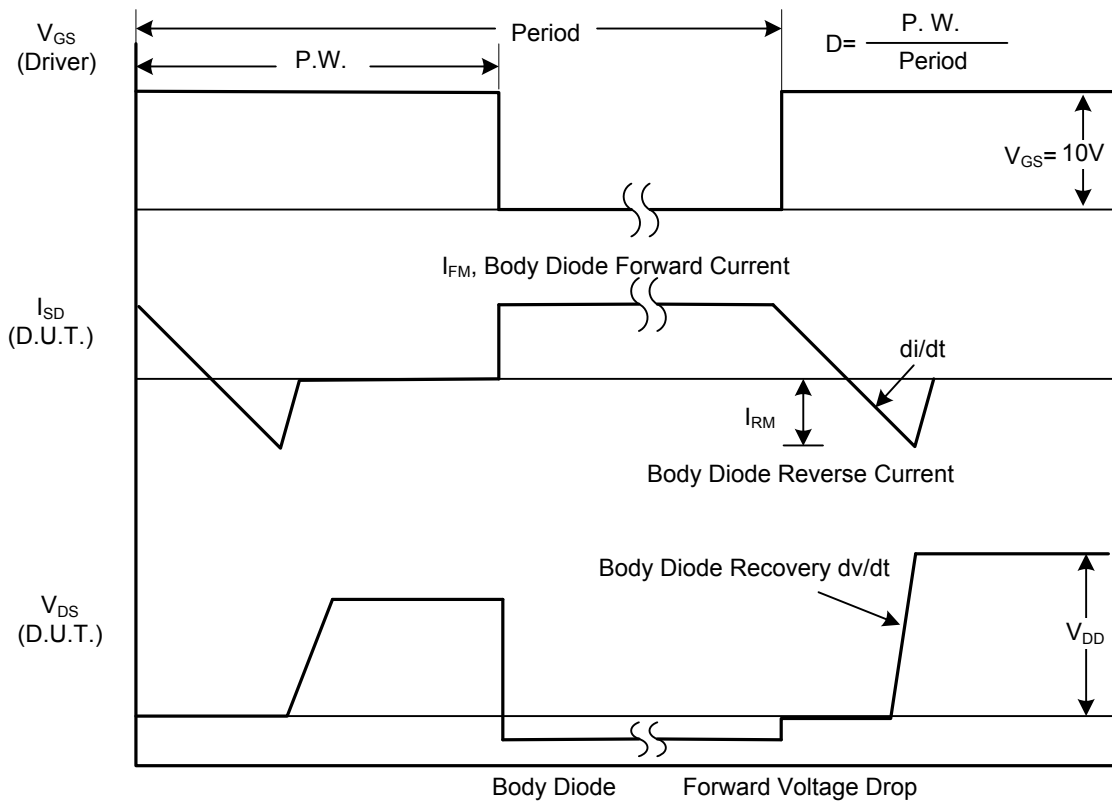
Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

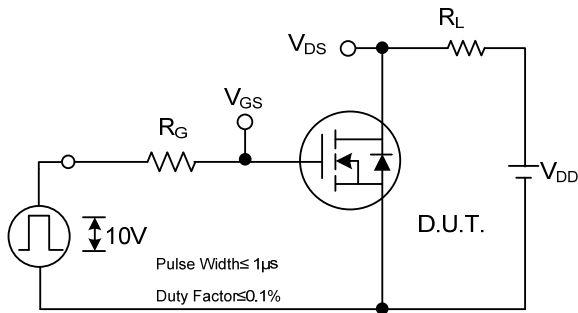


Peak Diode Recovery  $dv/dt$  Test Circuit

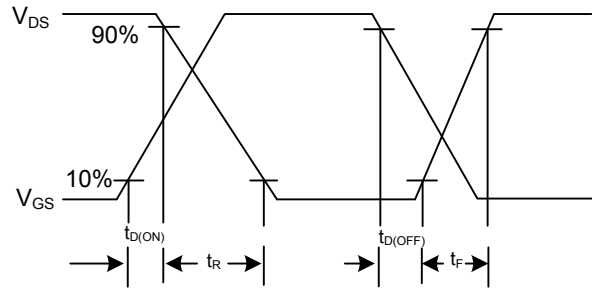


Peak Diode Recovery  $dv/dt$  Waveforms

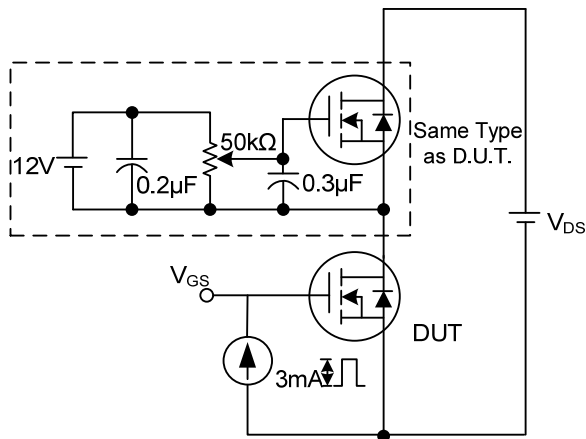
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



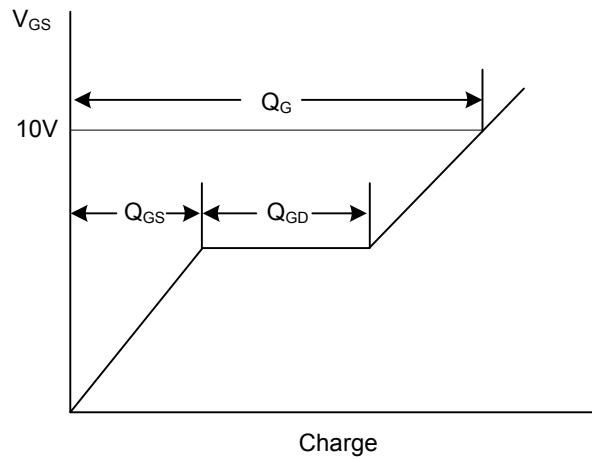
Switching Test Circuit



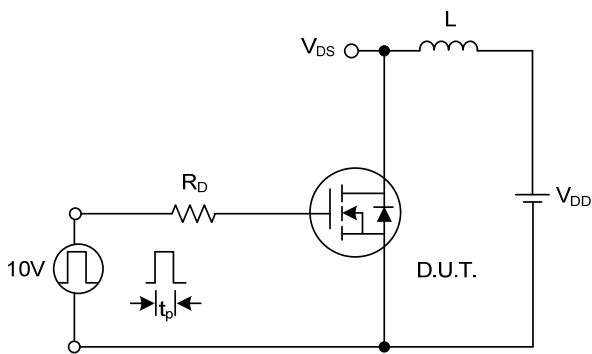
Switching Waveforms



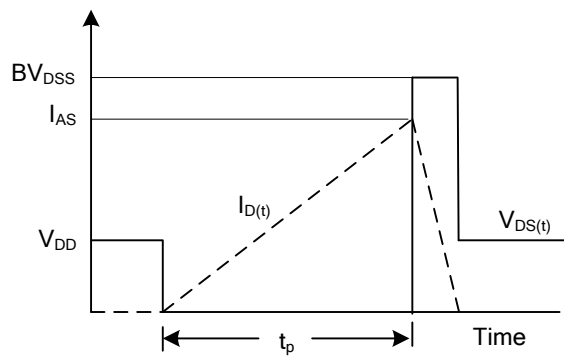
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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