



## 10N75

Preliminary

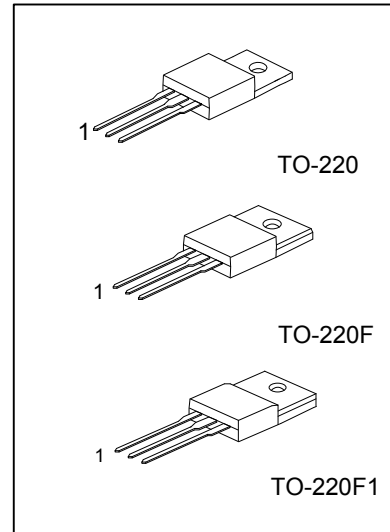
Power MOSFET

### 10A, 750V N-CHANNEL POWER MOSFET

#### DESCRIPTION

The UTC **10N75** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology 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.

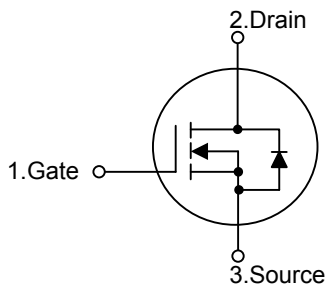
The UTC **10N75** is universally applied in high efficiency switch mode power supply, active power factor correction, electronic lamp based on half bridge topology.



#### FEATURES

- \*  $R_{DS(on)}=1.3\Omega @V_{GS}=10V$
- \* 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	
10N75L-TA3-T	10N75G-TA3-T	TO-220	G	D	S	Tube
10N75L-TF3-T	10N75G-TF3-T	TO-220F	G	D	S	Tube
10N75L-TF1-T	10N75G-TF1-T	TO-220F1	G	D	S	Tube

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

<p>10N75L - TA3 - T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) T: Tube (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1 (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	$I_D$	10	A
	Pulsed (Note 2)	$I_{DM}$	40	A
Avalanche Current (Note 2)		$I_{AR}$	10	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	920	mJ
	Repetitive (Note 2)	$E_{AR}$	24	mJ
Peak Diode Recovery $dv/dt$ (Note 4)		$dv/dt$	4.0	V/ns
Power Dissipation	TO-220	$P_D$	156	W
	TO-220F/TO-220F1		50	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.

2. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

3. Repetitive Rating: Pulse width limited by maximum junction temperature

4.  $L=17.3\text{mH}$ ,  $I_{AS}=10\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

5.  $I_{SD}\leq 10\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	$\theta_{JC}$	0.8	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.5	$^\circ\text{C}/\text{W}$

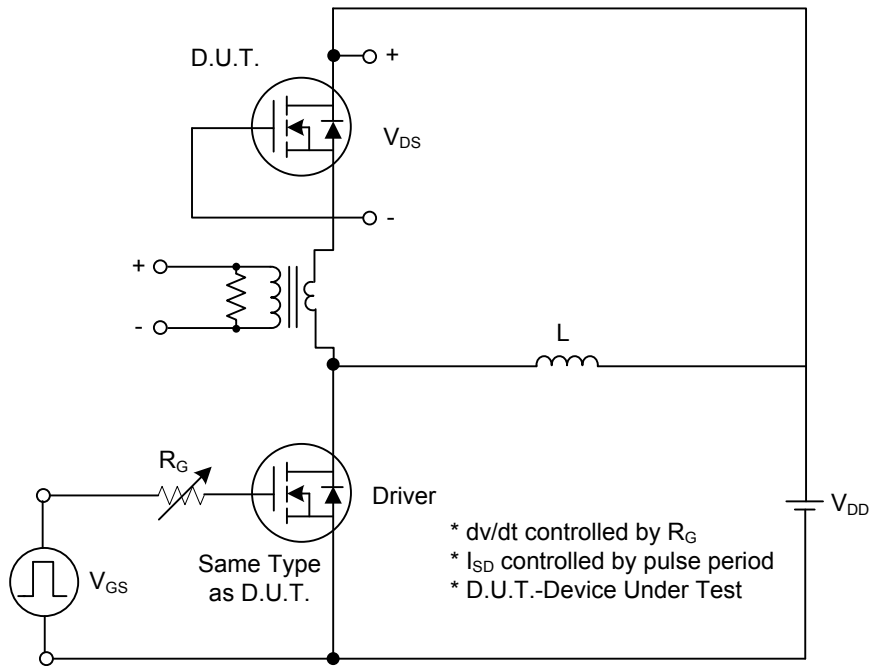
■ ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C, unless otherwise specified)

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		0.98		V/°C
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =750V, V <sub>GS</sub> =0V			10	μA
		V <sub>DS</sub> =640V, T <sub>C</sub> =125°C			100	μA
Gate-Source Leakage Current	Forward	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> =5A		0.93	1.3	Ω
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =5.0A (Note 1)		5.8		S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		2150	2800	pF
Output Capacitance	C <sub>OSS</sub>			180	230	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			15	20	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> =10A (Note 1, 2)		45	58	nC
Gate-Source Charge	Q <sub>GS</sub>			13.5		nC
Gate-Drain Charge	Q <sub>GD</sub>			17		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =350V, I <sub>D</sub> =10A, R <sub>G</sub> =25Ω V <sub>DS</sub> =10V (Note 1, 2)		50	110	ns
Turn-ON Rise Time	t <sub>R</sub>			130	270	ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			90	190	ns
Turn-OFF Fall Time	t <sub>F</sub>			80	170	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				10.0	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				40.0	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =10.0A, 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> =10.0A,		730		ns
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	di/dt=100A/μs (Note 1)		10.9		μC

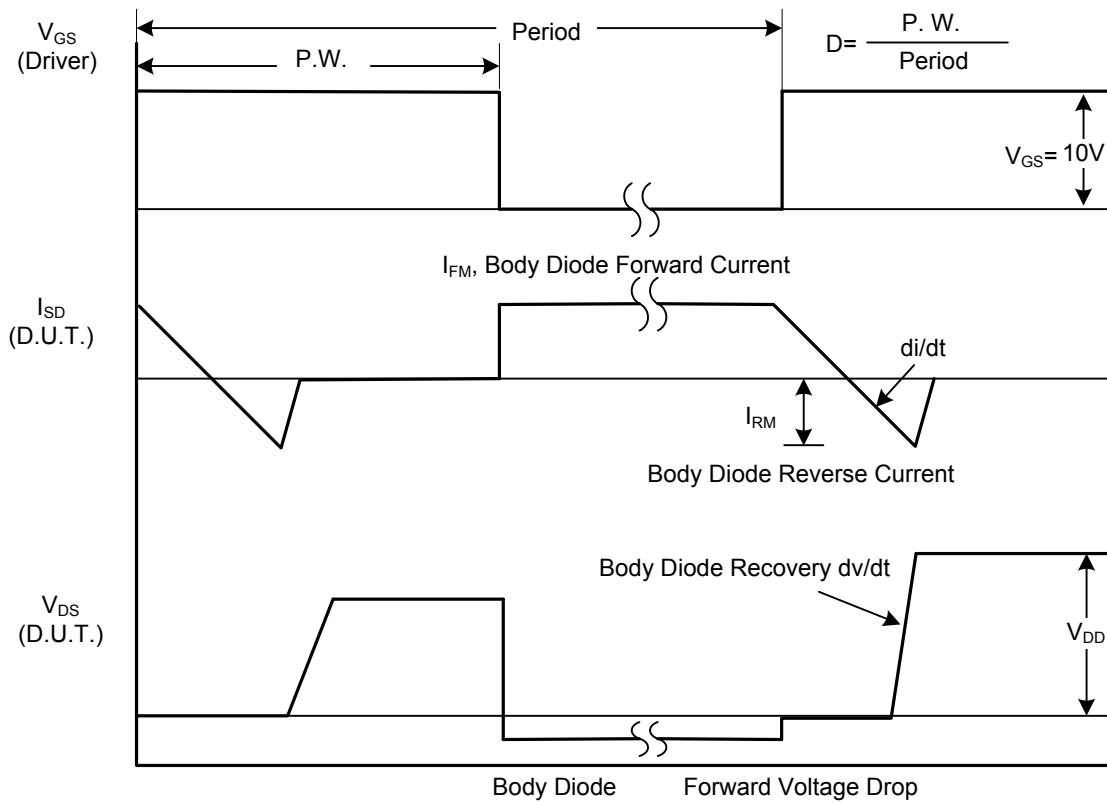
Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

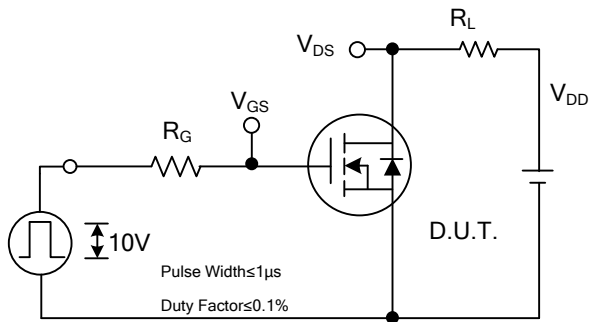


Peak Diode Recovery dv/dt Test Circuit

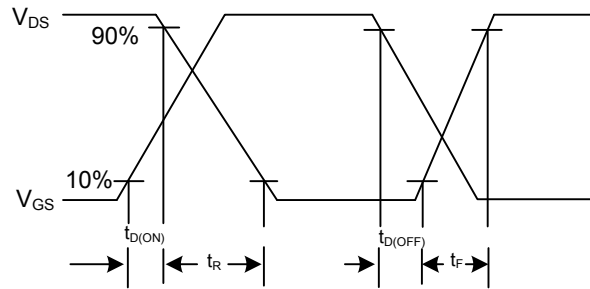


Peak Diode Recovery dv/dt Waveforms

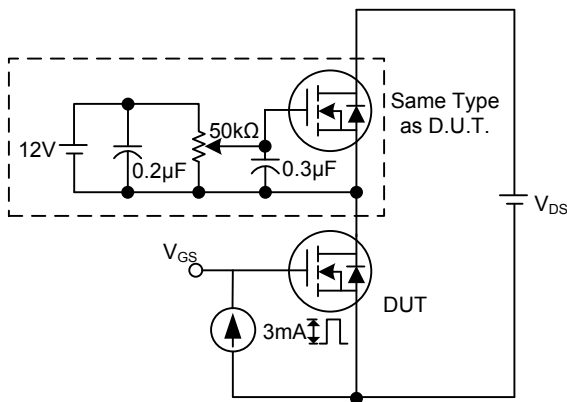
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



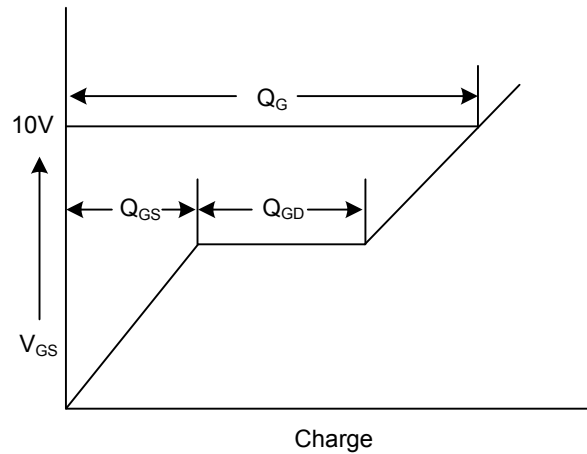
Switching Test Circuit



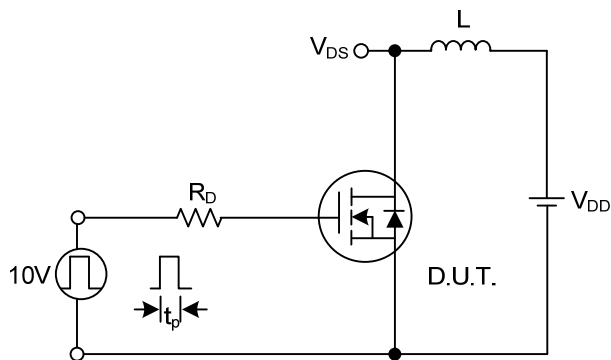
Switching Waveforms



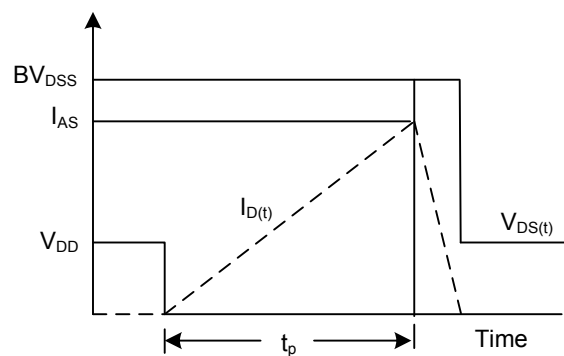
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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