



15N60

Preliminary

Power MOSFET

15 Amps, 600 Volts N-CHANNEL MOSFET

DESCRIPTION

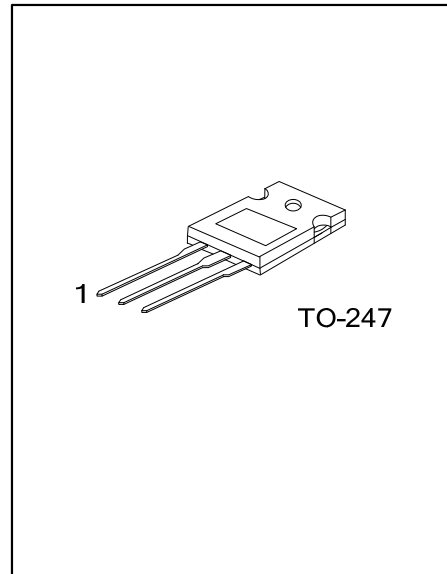
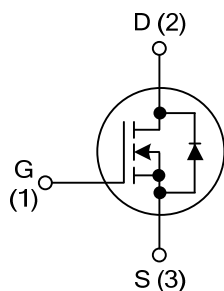
The UTC **15N60** is an N-channel mode Power FET using UTC's advanced technology to provide costumers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **15N60** is universally applied in active power factor correction and high efficient switched mode power supplies.

FEATURES

- * 15A, 600V, $R_{DS(ON)}=0.44\Omega$ @ $V_{GS}=10V$
- * Typically 23.6pF low C_{RSS}
- * High switching speed
- * Improved dv/dt capability

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
15N60L-T47-T	15N60G-T47-T	TO-247	G	D	S	Tube

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

15N60L-T47-T (1) Packing Type (2) Package Type (3)Lead Free	(1) T: Tube (2) T47: TO-247 (3) G: Halogen Free, L: Lead Free
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■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		V_{DSS}	600	V
Gate to Source Voltage		V_{GSS}	± 30	V
Avalanche Current (Note 1)		I_{AR}	15	A
Continuous Drain Current	Continuous	I_D	15	A
	Pulsed (Note 1)	I_{DM}	60	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	637	mJ
	Repetitive (Note 1)	E_{AR}	25.0	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Power Dissipation		P_D	312	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Note : 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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	40	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.4	$^{\circ}\text{C}/\text{W}$

■ 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}	V _{GS} =0V, I _D =250μA, T _J =25°C	600			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.65		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =600V, V _{GS} =0V			1	μA
			V _{DS} =520V, T _C =125°C			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	3.0		5.0	V
Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =7.5A		0.36	0.44	Ω
Forward Transconductance		g _{FS}	V _{DS} =40V, I _D =7.5A (Note 4)		19.2		S
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2380	3095	pF
Output Capacitance		C _{OSS}			295	385	pF
Reverse Transfer Capacitance		C _{RSS}			23.6	35.5	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =520V, V _{GS} =10V, I _D =15A (Note 4,5)		48.5	63.0	nC
Gate-Source Charge		Q _{GS}			14.0		nC
Gate-Drain Charge		Q _{GD}			21.2		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =325V, I _D =15A, R _G =21.7Ω (Note 4,5)		65	140	ns
Turn-ON Rise Time		t _R			125	260	ns
Turn-OFF Delay Time		t _{D(OFF)}			105	220	ns
Turn-OFF Fall Time		t _F			65	140	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				15	A
Maximum Body-Diode Pulsed Current		I _{SM}				60	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =15A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{RR}	V _{GS} =0V, I _S =15A,		496		ns
Body Diode Reverse Recovery Charge		Q _{RR}	dI _F /dt=100A/μs (Note 4)		5.69		μC

Notes : 1. Repetitive Rating : Pulse width limited by maximum junction temperature

2. $L=5.23\text{mH}$, $I_{AS}=15A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

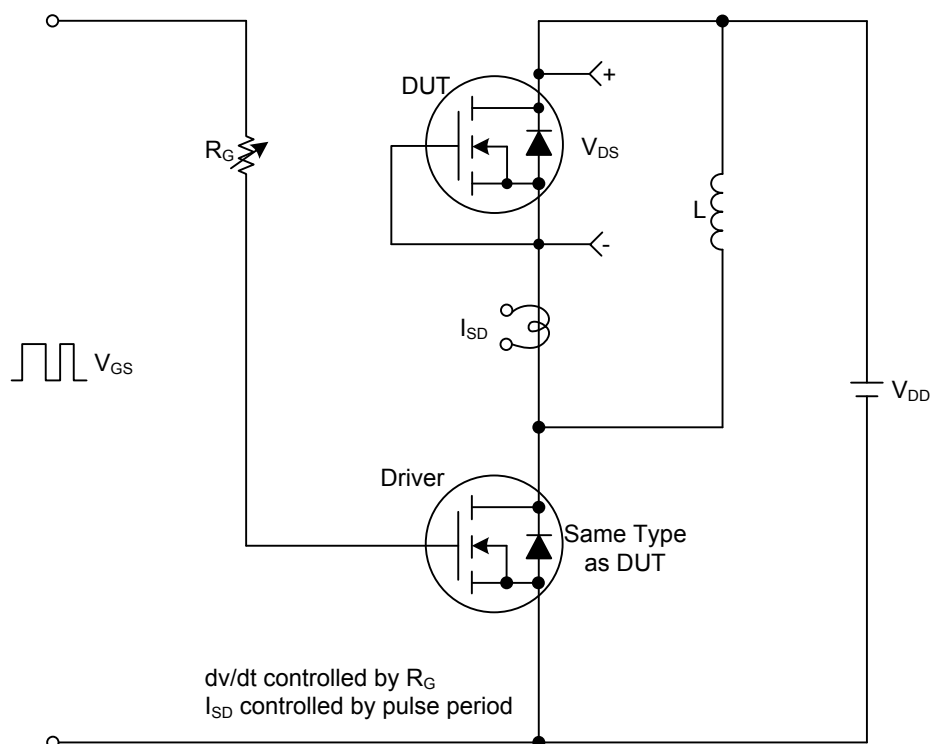
3. $I_{SD} \leq 15A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

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

5. Essentially independent of operating temperature

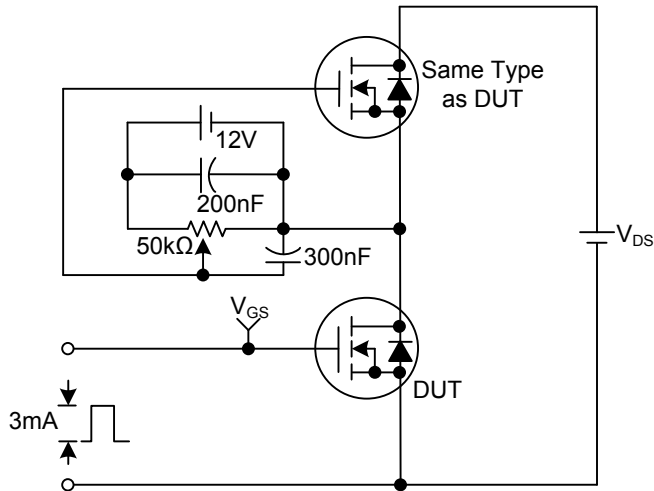
6. Drain current limited by maximum junction temperature

■ TEST CIRCUITS AND WAVEFORMS

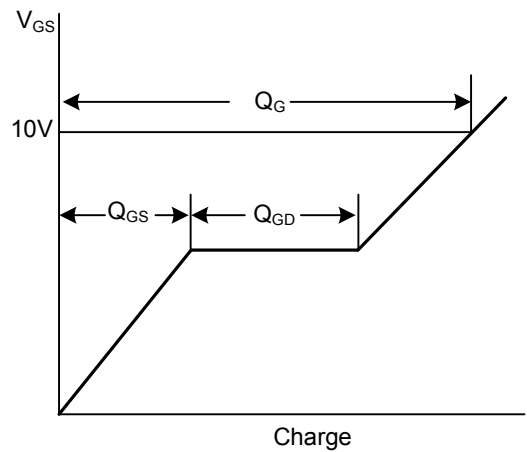
Peak Diode Recovery dv/dt Test Circuit & Waveforms



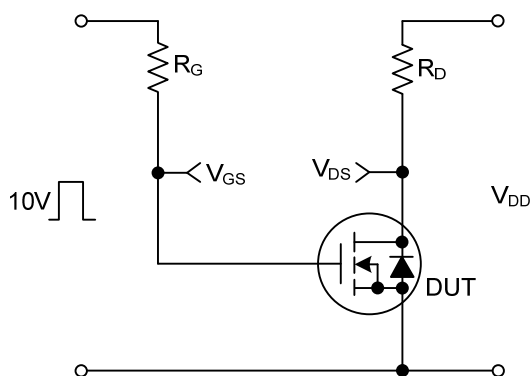
Gate Charge Test Circuit



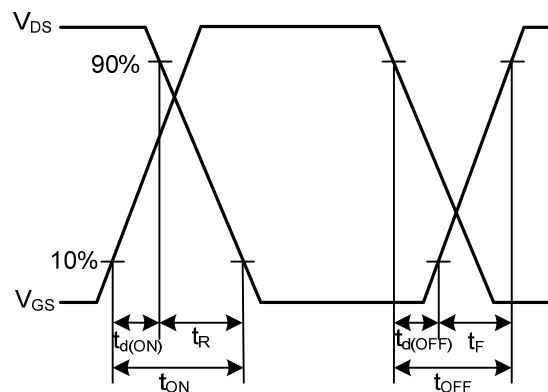
Gate Charge Waveforms



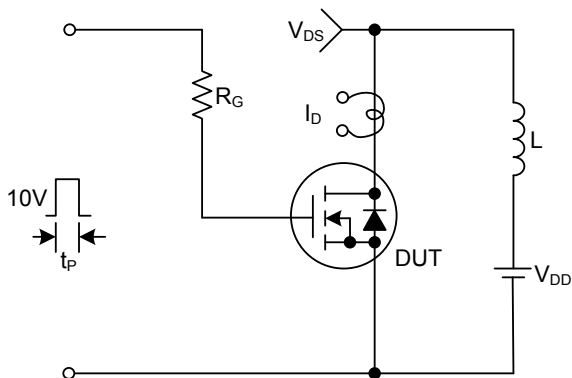
Resistive Switching Test Circuit



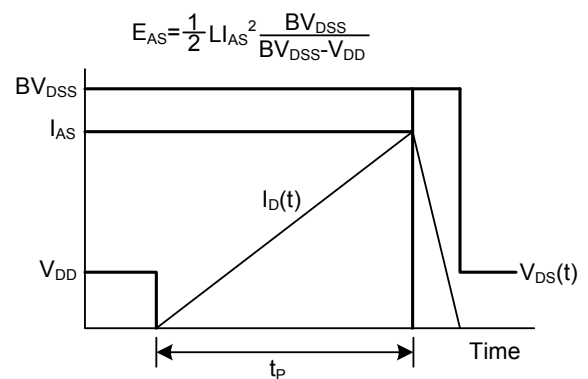
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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