



15N60

Preliminary

Power MOSFET

15 Amps, 600 Volts N-CHANNEL MOSFET

DESCRIPTION

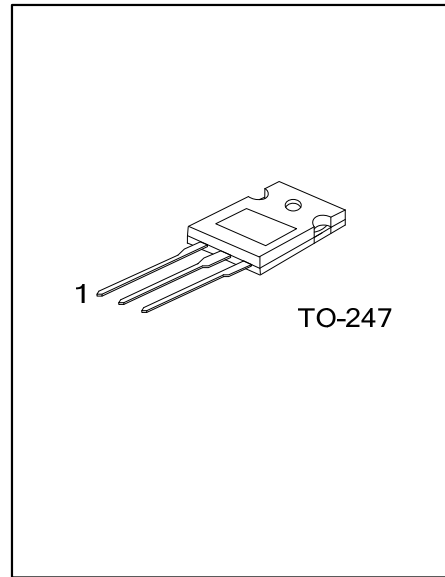
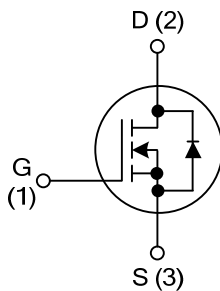
The UTC **15N60** is an N-channel mode Power FET using UTC's advanced technology to provide costumers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche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

<p>15N60L-T47-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube</p> <p>(2) T47: TO-247</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS (T_c=25°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	°C
Storage Temperature		T _{STG}	-55 ~ +150	°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	°C/W
Junction to Case	θ _{JC}	0.4	°C/W

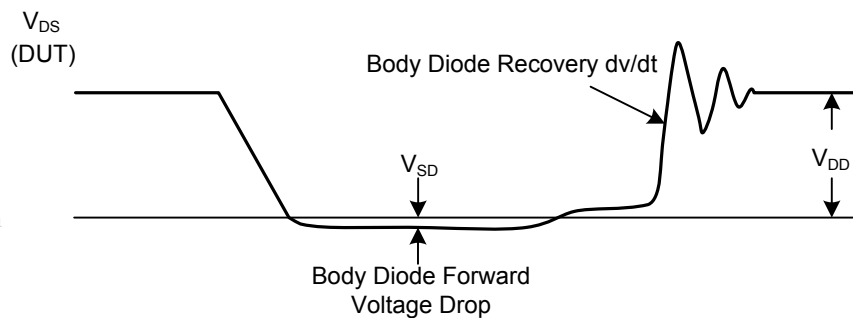
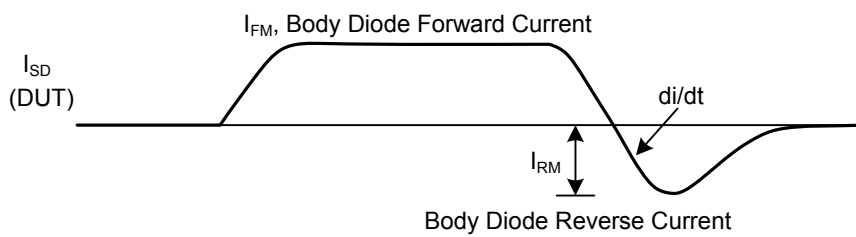
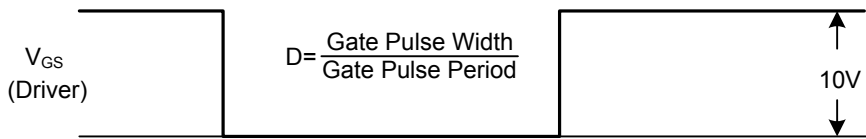
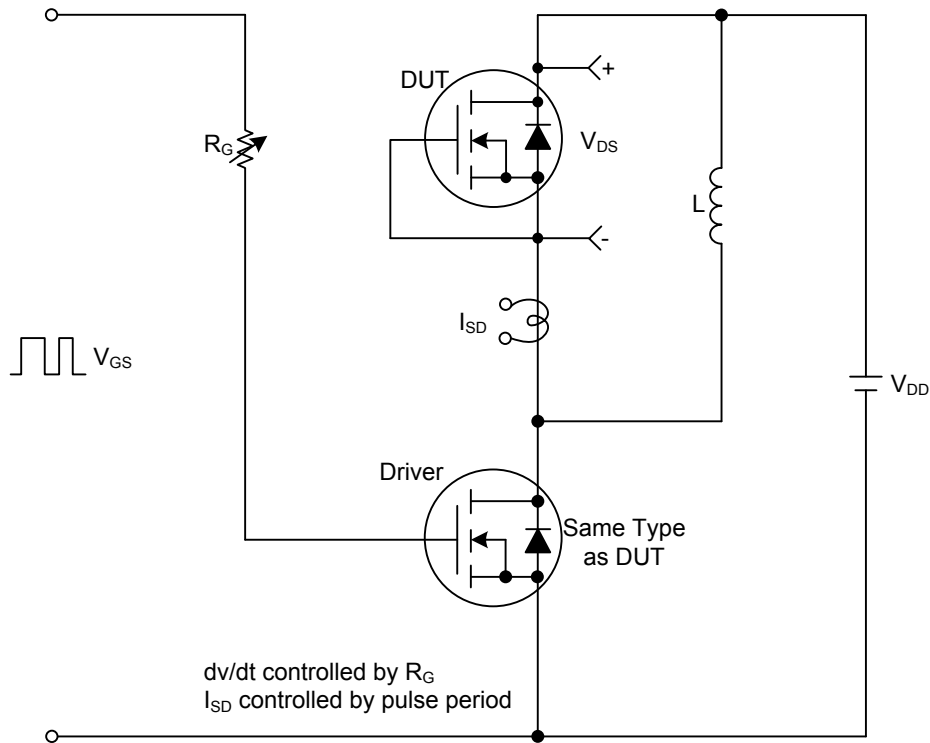
■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A, T_J=25^\circ\text{C}$	600			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, Referenced to 25°C		0.65		$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$			1	μA
		$V_{DS}=520V, T_C=125^\circ\text{C}$			10	μA
Gate- Source Leakage Current	Forward	$V_{GS}=+30V, V_{DS}=0V$			+100	nA
	Reverse	$V_{GS}=-30V, V_{DS}=0V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	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}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{MHz}$		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	$t_{D(ON)}$	$V_{DD}=325V, I_D=15A$, $R_G=21.7\Omega$ (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}	$di_F/dt=100A/\mu s$ (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

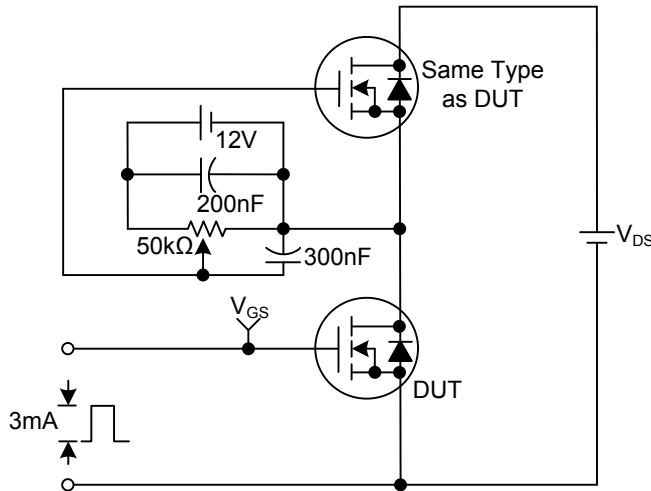
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

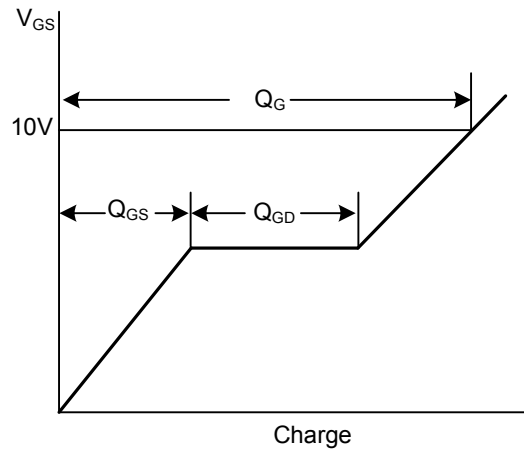


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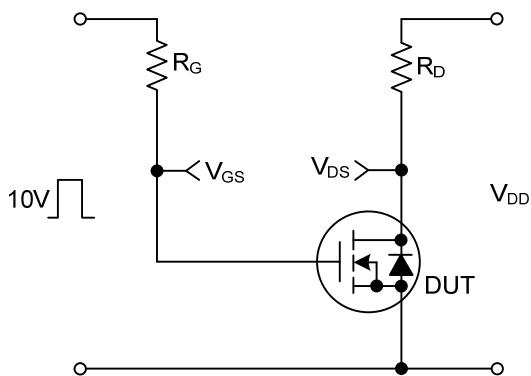
Gate Charge Test Circuit



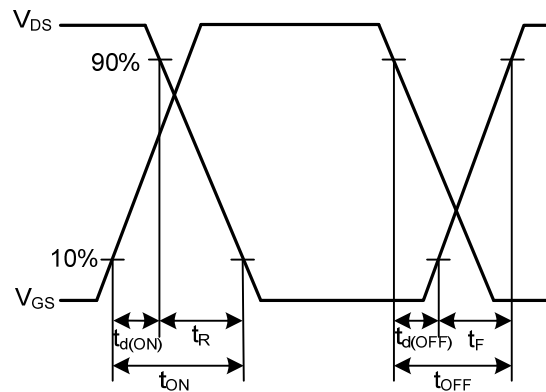
Gate Charge Waveforms



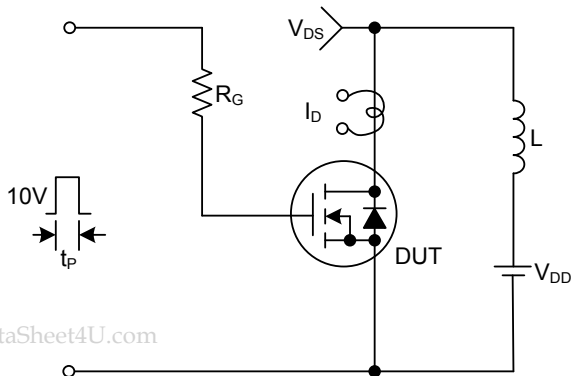
Resistive Switching Test Circuit



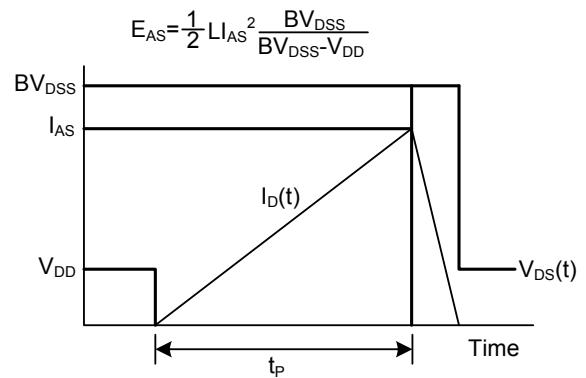
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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