



15N65

Preliminary

Power MOSFET

15 Amps, 650 Volts N-CHANNEL MOSFET

DESCRIPTION

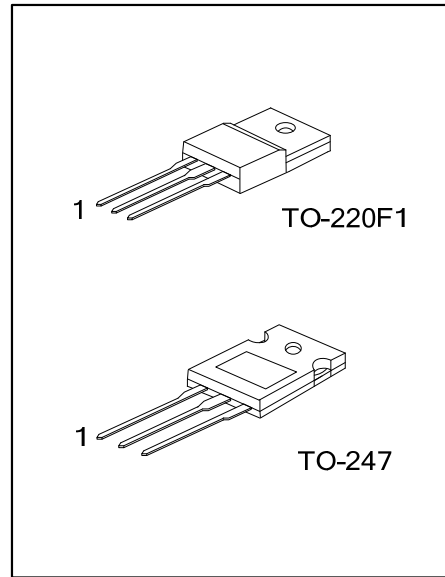
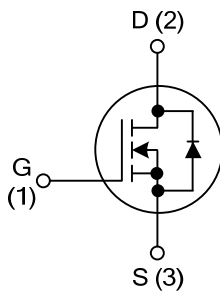
The UTC **15N65** is an N-channel mode Power FET using UTC's advanced technology to provide costumers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **15N65** is universally applied in active power factor correction and high efficient switched mode power supplies.

FEATURES

- * 15A, 650V, $R_{DS(ON)}=0.44\Omega @ V_{GS}=10V$
- * 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	
15N65L-TF1-T	15N65G-TF1-T	TO-220F1	G	D	S	Tube
15N65L-T47-T	15N65G-T47-T	TO-247	G	D	S	Tube

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

<p>15N65L - TF1 - T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3)Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TF1: TO-220F1, T47: TO-247</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 to Source Voltage		V_{DSS}	650	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	TO-220F1	P_D	37	W
	TO-247		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	PACKAGE	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1	θ_{JA}	62.5	$^\circ\text{C/W}$
	TO-247		40	$^\circ\text{C/W}$
Junction to Case	TO-220F1	θ_{JC}	3.3	$^\circ\text{C/W}$
	TO-247		0.4	$^\circ\text{C/W}$

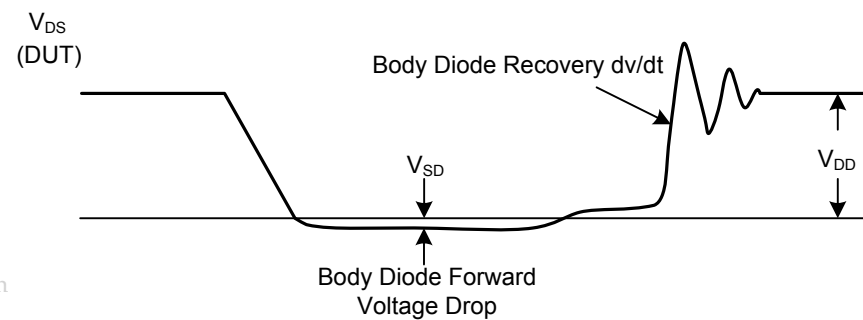
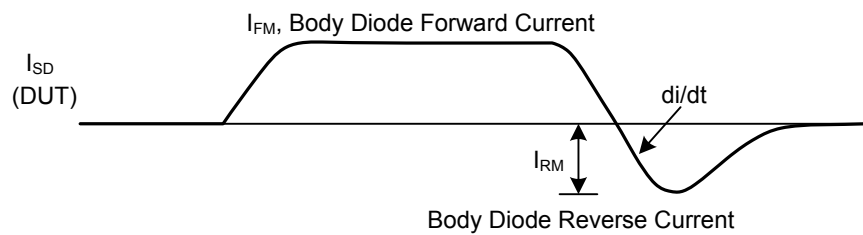
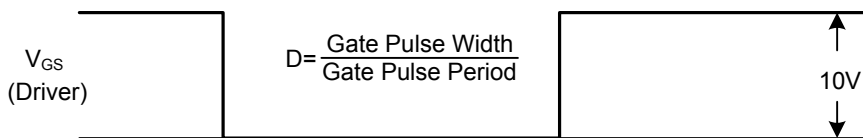
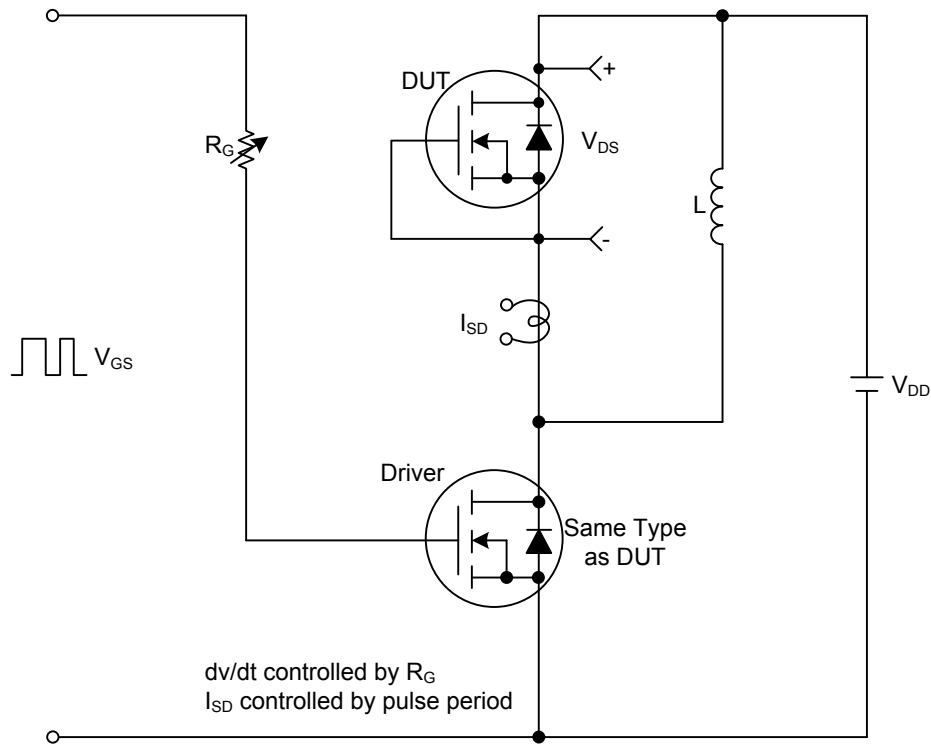
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

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	650			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} =650V, V _{GS} =0V			1	μA
		V _{DS} =520V, T _C =125°C			10	μA
Gate- Source Leakage Current	Forward	I _{GSS}			+100	nA
	Reverse					
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=5.23mH, I_{AS}=15A, V_{DD}= 50V, R_G=25Ω, Starting T_J=25°C
 3. I_{SD} ≤15A, di/dt ≤200A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C
 4. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
 5. Essentially independent of operating temperature
 6. Drain current limited by maximum junction temperature

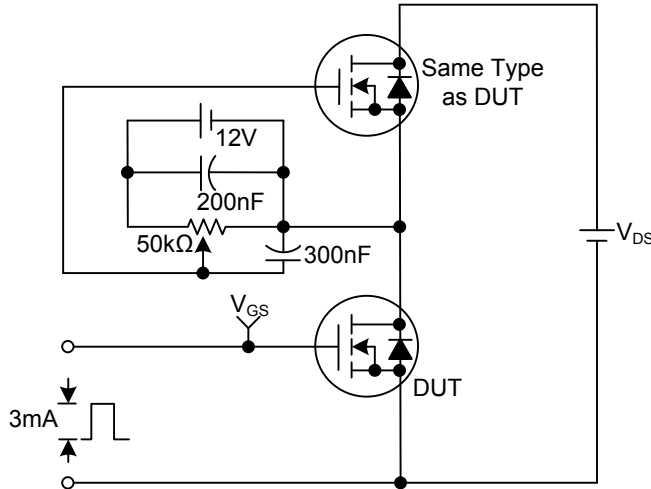
- TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

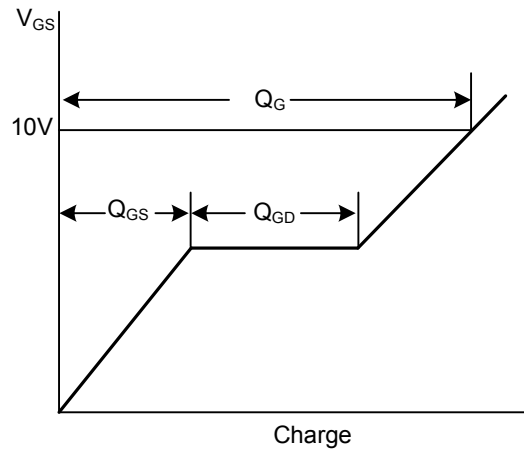


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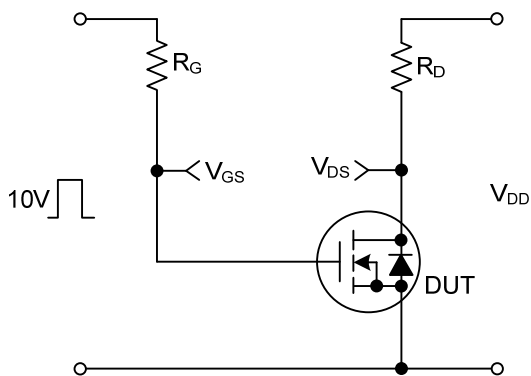
Gate Charge Test Circuit



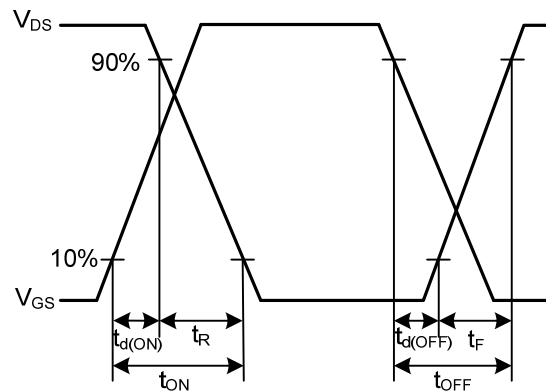
Gate Charge Waveforms



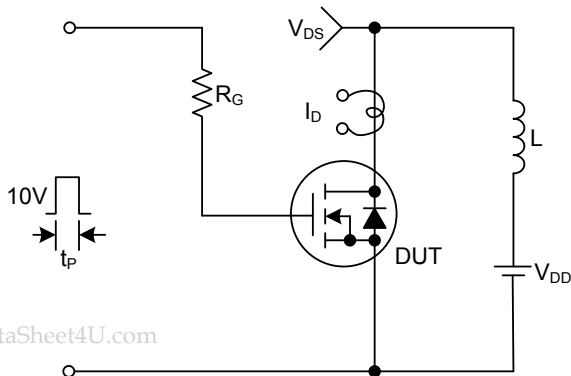
Resistive Switching Test Circuit



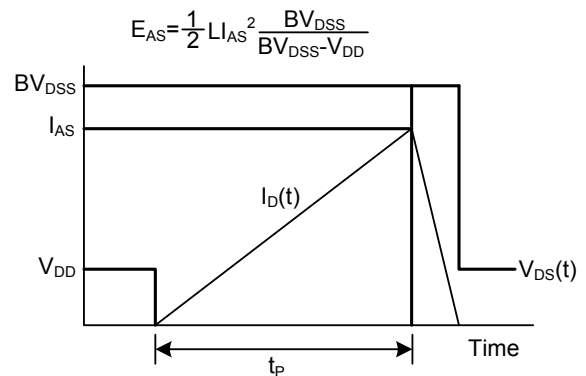
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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