MOSFET N 30V 15.0A 0.350 OHM

15N50 Power MOSFET

15A, 500V N-CHANNEL POWER MOSFET

■ DESCRIPTION

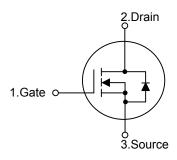
The UTC **15N50** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **15N50** is generally applied in high efficiency switch mode power supplies.

■ FEATURES

- * $R_{DS(ON)}$ <0.35 Ω @ V_{GS} =10V
- * High Switching Speed

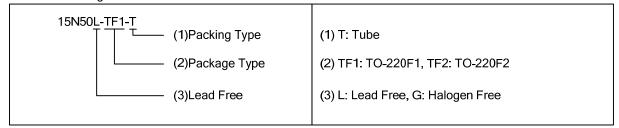
■ SYMBOL



■ ORDERING INFORMATION

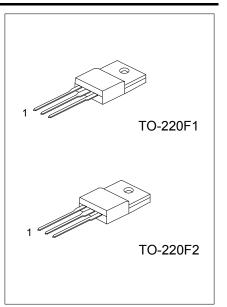
Ordering Number		Daalaaaa	Pin Assignment			Da alsia a	
Lead Free	Halogen Free	Package	1	2	3	Packing	
15N50L-TF1-T	15N50G-TF1-T	TO-220F1	G	D	S	Tube	
15N50L-TF2-T	15N50G-TF2-T	TO-220F2	G	D	S	Tube	

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



■ MARKING INFORMATION

PACKAGE	MARKING			
TO-220F1 TO-220F2	UTC 15N50 G: Halogen Free Lot Code Data Code			



■ **ABSOLUTE MAXIMUM RATINGS** (T_C=25°C, unless otherwise specified.) (Note 5)

PARAMETER		SYMBOL	RATINGS	UNIT		
Drain to Source Volt	ain to Source Voltage		V_{DSS}	500	V	
Gate-Source Voltage	ce Voltage		V_{GSS}	±30	V	
Drain Current	Continuous	T _C =25°C	- I _D	15	Α	
		T _C =100°C		9	Α	
	Pulsed (Note 2)		I _{DM}	60	Α	
Avalanche Current (Note 2)		I _{AR}	15	Α	
IAValanche Energy	Single Pulsed (Note 3)		E _{AS}	731	mJ	
	Repetitive (Note 2)		E _{AR}	17	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	15	V/ns		
, , ,		TO-220F1		48	١٨/	
Power Dissipation ((C=25°C)	TO-220F2	D	52	W	
Derate above 25°C		TO-220F1	P_D	0.384	W/°C	
		TO-220F2		0.416		
Junction Temperature		TJ	+150	°C		
Storage Temperature		T _{STG}	-55~+150	°C		

Notes: 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=6.5mH, I_{AS} =15A. V_{DD} =50V, R_{G} =25 Ω , Starting T_{J} =25 $^{\circ}C$
- 4. I_{SD} ≤15A, di/dt≤200A/ μ s, V_{DD} ≤B V_{DSS} , Starting T_J =25°C
- 5. Drain current limited by maximum junction temperature

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	°C/W
Junction to Case	TO-220F1	θ _{JC}	2.6	°C/M
	TO-220F2		2.4	°C/W

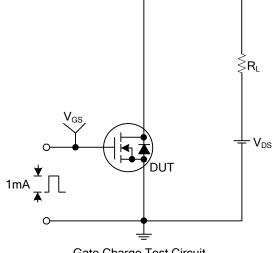
■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS N		TYP	MAX	UNIT		
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V, T _J =25°C	500			V		
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_{J}$	Reference to 25°C, I _D =250µA		0.5		V/°C		
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V, V _{DS} =320V, T _C =125°C			1 10	μA μA		
Gate- Source Leakage Current Reverse	I _{GSS}	V _{GS} =+30V, V _{DS} =0V V _{GS} =-30V , V _{DS} =0V			+100 -100	nA nA		
ON CHARACTERISTICS	60 1 , 50 1							
Gate Threshold Voltage	$V_{GS(TH)}$	V _{GS} =V _{DS} , I _D =250μA	2.0		4.0	V		
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =7.5A		0.3	0.35	Ω		
DYNAMIC PARAMETERS								
Input Capacitance	C_{ISS}			2300	2600	pF		
Output Capacitance	Coss	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		250	270	pF		
Reverse Transfer Capacitance	C_{RSS}			26	30	pF		
SWITCHING PARAMETERS								
Total Gate Charge	Q_G	V _{DS} =320V, V _{GS} =10V, I _D =15A (Note 1, 2)		210	240	nC		
Gate to Source Charge	Q_GS			35		nC		
Gate to Drain ("Miller") Charge	Q_GD			60		nC		
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD} =200V, I_{D} =15A, R_{G} =25 Ω (Note 1, 2)		100	120	ns		
Rise Time	t_R			150	170	ns		
Turn-OFF Delay Time	t _{D(OFF)}			460	500	ns		
Fall-Time	t_{F}			180	210	ns		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Maximum Body-Diode Continuous Current	Is				15	Α		
Maximum Body-Diode Pulsed Current	I _{SM}				60	Α		
Drain-Source Diode Forward Voltage	V_{SD}	I _{SD} =15A, V _{GS} =0V			1.4	V		
Body Diode Reverse Recovery Time	t _{rr}	I _{SD} =15A, V _{GS} =0V, dI _F /dt=100A/μs				ns		
Body Diode Reverse Recovery Charge	Q _{RR}	(Note 1)		3.24		μC		

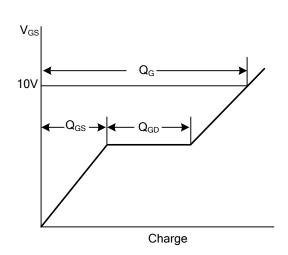
Notes: 1. Pulse Test: Pulse width≤300µs; Duty Cycle≤2%.

^{2.} Essentially Independent of Operating Temperature Typical Characteristics

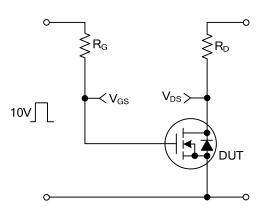
TEST CIRCUITS AND WAVEFORMS



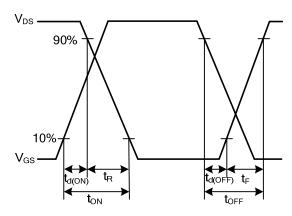
Gate Charge Test Circuit



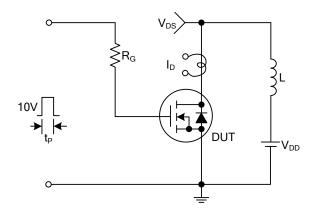
Gate Charge Waveforms



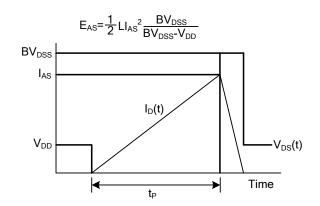
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



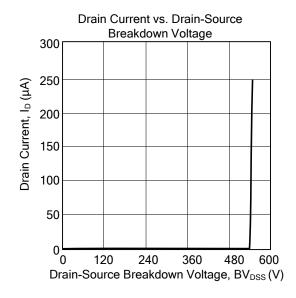
Unclamped Inductive Switching Waveforms

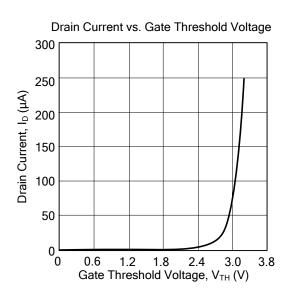
■ TEST CIRCUITS AND WAVEFORMS(Cont.)

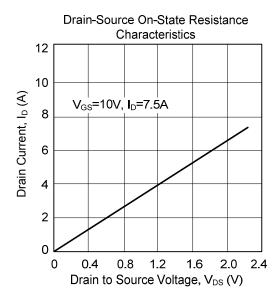
Peak Diode Recovery dv/dt Test Circuit & Waveforms DUT $V_{\text{DD}} \\$ Driver Same Type as DUT dv/dt controlled by R_G I_{SD} controlled by pulse period Gate Pulse Width V_{GS} Gate Pulse Period 10V (Driver) I_{FM} , Body Diode Forward Current I_{SD} (DUT) di/dt Body Diode Reverse Current $V_{\text{DS}} \\$ (DUT) Body Diode Recovery dv/dt Body Diode Forward

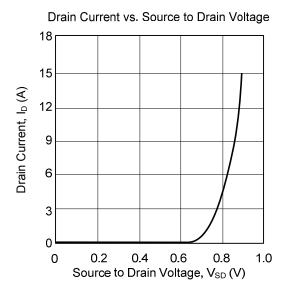
Voltage Drop

■ TYPICAL CHARACTERISTICS









UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.