



18N50

Power MOSFET

18A, 500V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **18N50** is a N-channel enhancement mode power MOSFET using UTC's advanced planar stripe and DMOS technology to provide perfect performance.

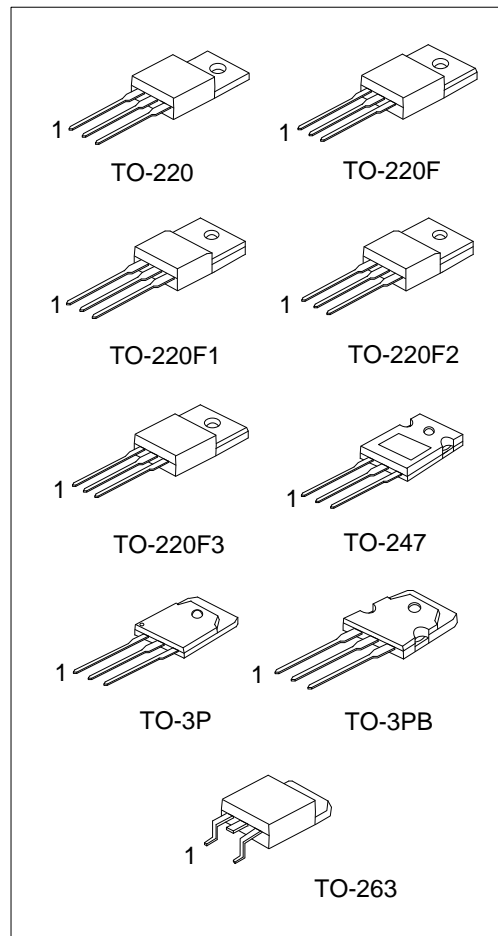
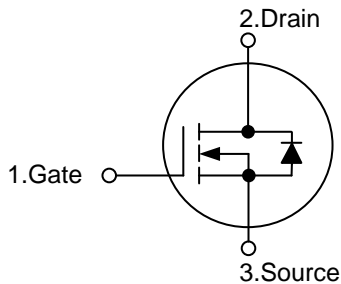
This technology can withstand high energy pulse in the avalanche and commutation mode. It can provide minimum on-state resistance and high switching speed.

This device is generally applied in active power factor correction and high efficient switched mode power supplies.

FEATURES

- * $R_{DS(ON)} \leq 0.32 \Omega @ V_{GS}=10V, I_D=9.0A$
- * High switching speed
- * 100% avalanche tested

SYMBOL



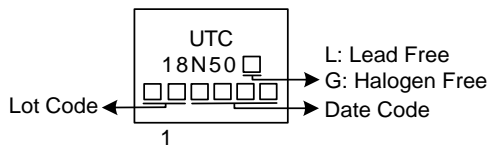
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
18N50L-TA3-T	18N50G-TA3-T	TO-220	G	D	S	Tube
18N50L-TF1-T	18N50G-TF1-T	TO-220F1	G	D	S	Tube
18N50L-TF2-T	18N50G-TF2-T	TO-220F2	G	D	S	Tube
18N50L-TF3T-T	18N50G-TF3T-T	TO-220F3	G	D	S	Tube
18N50L-TF3-T	18N50G-TF3-T	TO-220F	G	D	S	Tube
18N50L-T3B-T	18N50G-T3B-T	TO-3PB	G	D	S	Tube
18N50L-T3P-T	18N50G-T3P-T	TO-3P	G	D	S	Tube
18N50L-T47-T	18N50G-T47-T	TO-247	G	D	S	Tube
18N50L-TQ2-T	18N50G-TQ2-T	TO-263	G	D	S	Tube
18N50L-TQ2-R	18N50G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>18N50G-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, TF3T: TO-220F3, TF3: TO-220F, TQ2: TO-263, T3B: TO-3PB, T3P: TO-3P, T47: TO-247 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



■ **ABSOLUTE MAXIMUM RATINGS** ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	18	A
	Pulsed (Note 2)	I_{DM}	72	A
Avalanche Current (Note 2)		I_{AR}	13	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	845	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.2	V/ns
Power Dissipation	TO-220/TO-263	P_D	235	W
	TO-220F/TO-220F1		40	W
	TO-220F2/TO-220F3			
	TO-3P/TO-3PB			
	TO-247			
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

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. $L=10\text{mH}$, $I_{AS}=13\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD}\leq 18\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL CHARACTERISTICS**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^\circ\text{C/W}$
	TO-220F1/TO-220F2			
	TO-220F3/TO-263			
	TO-3P/TO-3PB		30	$^\circ\text{C/W}$
	TO-247		40	$^\circ\text{C/W}$
Junction to Case	TO-220/TO-263	θ_{JC}	0.53	$^\circ\text{C/W}$
	TO-220F/TO-220F1		3.13	$^\circ\text{C/W}$
	TO-220F2/TO-220F3			
	TO-3P/TO-3PB		0.33	$^\circ\text{C/W}$
	TO-247		0.35	$^\circ\text{C/W}$

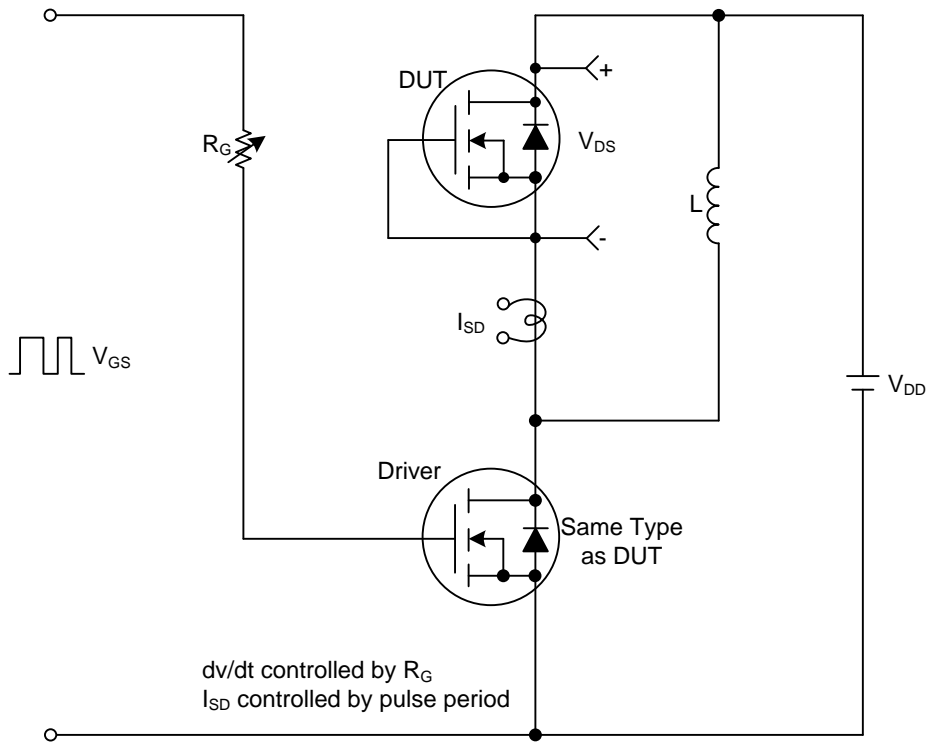
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	500			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	V _{GS} = 30 V, V _{DS} = 0 V			100	nA
	Reverse		V _{GS} = -30 V, V _{DS} = 0 V			
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =9.0A			0.32	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2550		pF
Output Capacitance	C _{OSS}			330		pF
Reverse Transfer Capacitance	C _{RSS}			47		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =100V, V _{GS} =10V, I _D =18A, I _D =1mA (Note 1, 2)		70		nC
Gate to Source Charge	Q _{GS}			13		nC
Gate to Drain Charge	Q _{GD}			25		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =18A, R _G =25Ω (Note 1, 2)		40		ns
Rise Time	t _R			38		ns
Turn-OFF Delay Time	t _{D(OFF)}			200		ns
Fall-Time	t _F			50		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				18	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				72	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =18A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =18A, V _{GS} =0V, dI _F /dt=100A/μs		380		nS
Body Diode Reverse Recovery Charge	Q _{rr}				5.4	

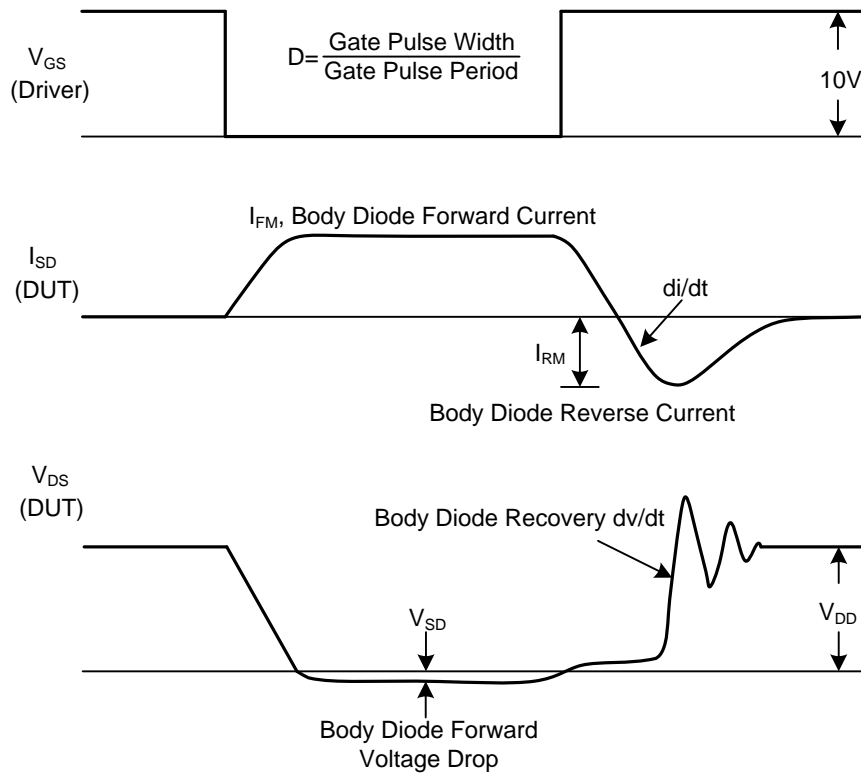
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

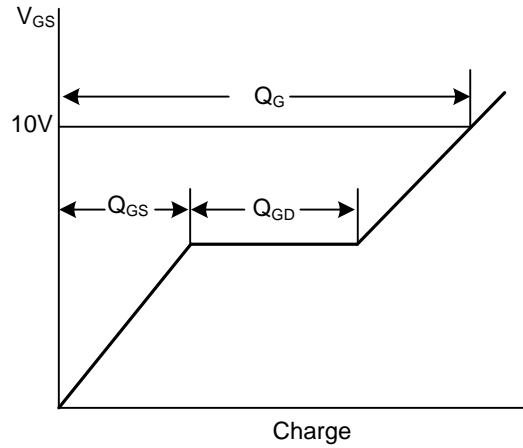
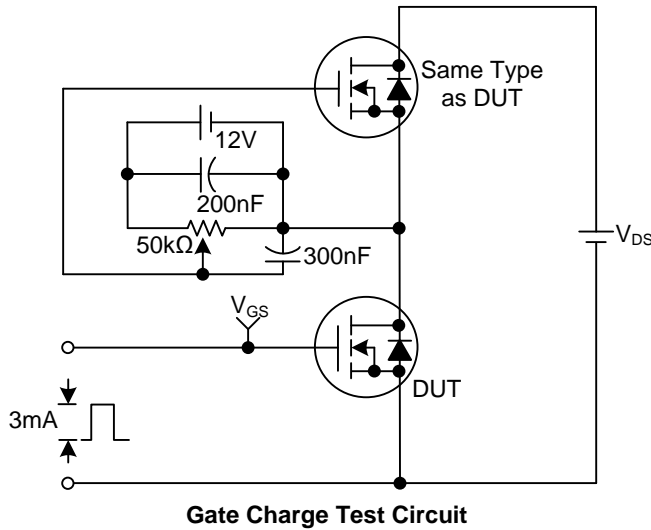
■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit & Waveforms

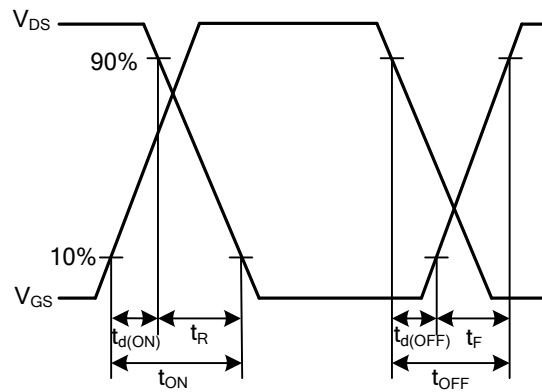
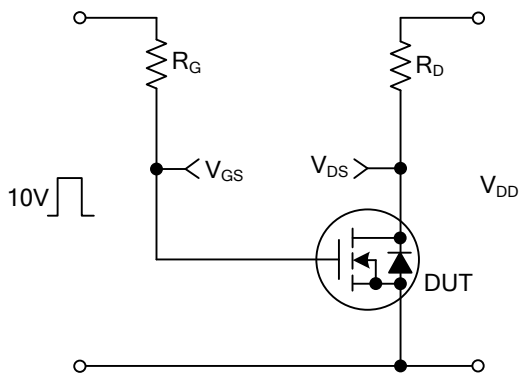


TEST CIRCUITS AND WAVEFORMS



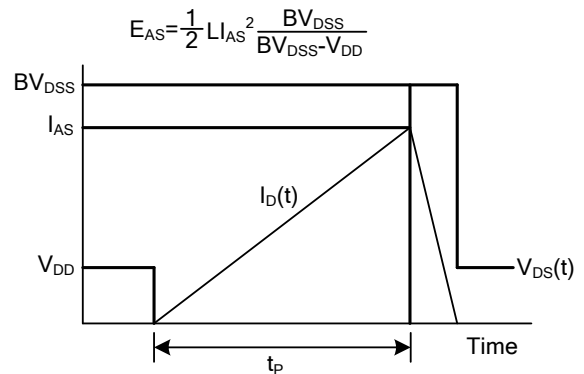
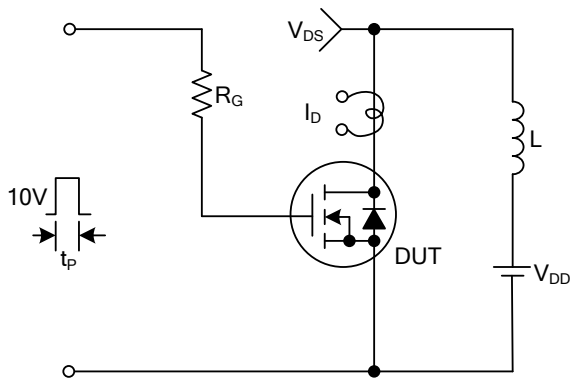
Gate Charge Test Circuit

Gate Charge Waveforms



Resistive Switching Test Circuit

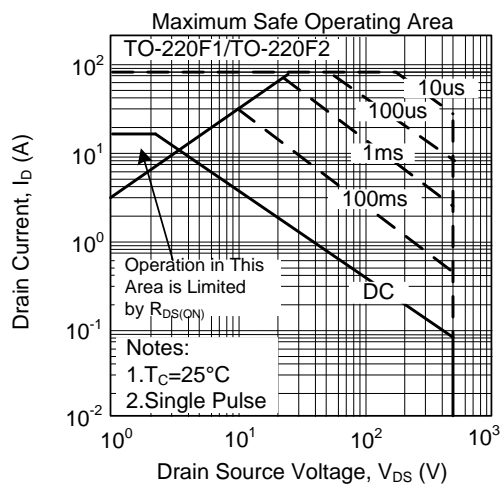
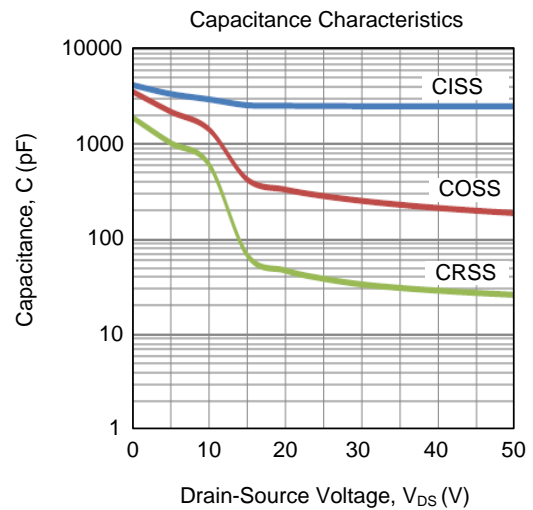
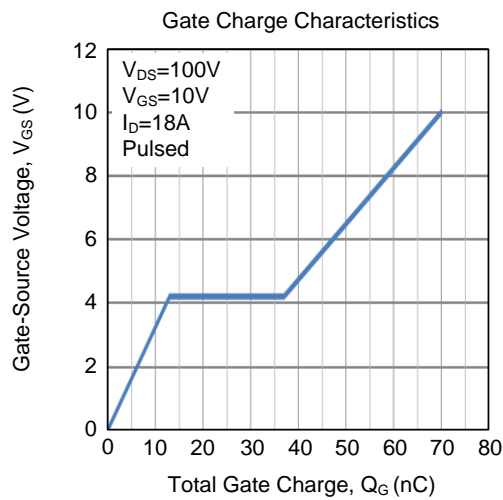
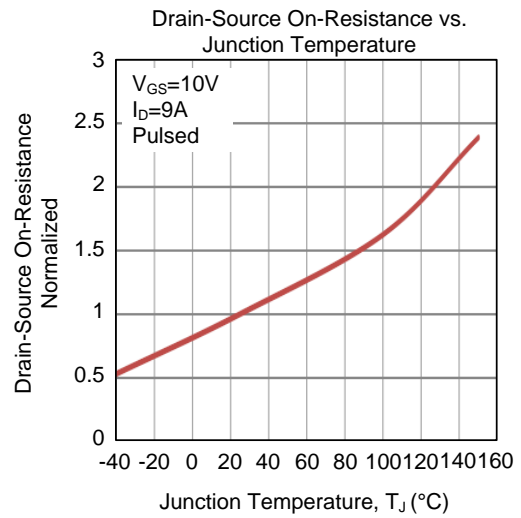
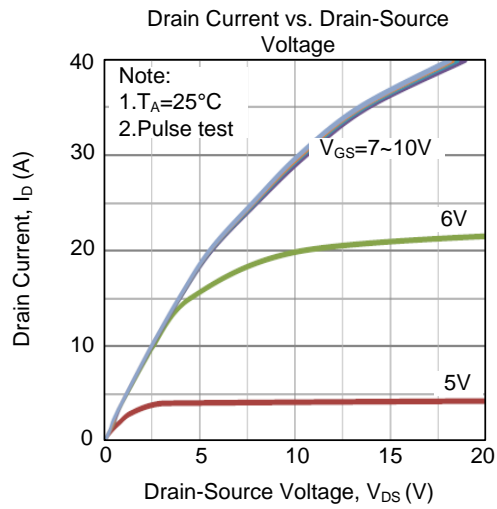
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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