

15A, 500V N-CHANNEL POWER MOSFET

■ DESCRIPTION

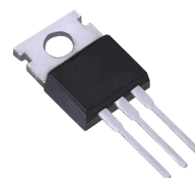
The UTC **15N50** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation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

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

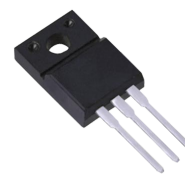
■ FEATURES

* $R_{DS(ON)} < 0.35\Omega$ @ $V_{GS} = 10V$

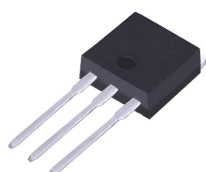
* High Switching Speed



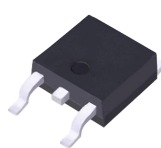
TO-220



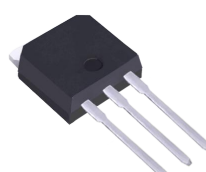
TO-220F



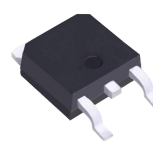
TO-262



TO-263



TO-251



TO-252

15N50

Power MOSFET

■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified.) (Note 5)

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain to Source Voltage		V_{DSS}	500	V	
Gate-Source Voltage		V_{GSS}	± 30	V	
Drain Current	Continuous	I_D	$T_C=25^\circ\text{C}$	15	A
			$T_C=100^\circ\text{C}$	9	A
	Pulsed (Note 2)		I_{DM}	60	A
Avalanche Current (Note 2)		I_{AR}	15	A	
Avalanche 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	
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220F1	P_D	48	W	
	TO-220F2		52		
Derate above 25°C	TO-220F1		0.384	W/ $^\circ\text{C}$	
	TO-220F2		0.416		
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. $L=6.5\text{mH}$, $I_{AS}=15\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

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

5. Drain current limited by maximum junction temperature

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220F1	θ_{JC}	2.6	$^\circ\text{C}/\text{W}$
	TO-220F2		2.4	

■ ELECTRICAL CHARACTERISTICS

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=250\mu A, V_{GS}=0V, T_J=25^\circ C$	500			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ C, I_D=250\mu A$		0.5		$V/^\circ C$
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=500V, V_{GS}=0V,$			1	μA
			$V_{DS}=320V, T_C=125^\circ C$			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		$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	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}	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$		2300	2600	pF
Output Capacitance		C_{OSS}			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		$t_{D(ON)}$	$V_{DD}=200V, I_D=15A, R_G=25\Omega$ (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		I_S				15	A
Maximum Body-Diode Pulsed Current		I_{SM}				60	A
Drain-Source Diode Forward Voltage		V_{SD}	$I_{SD}=15A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time		t_{rr}	$I_{SD}=15A, V_{GS}=0V, di_F/dt=100A/\mu s$		333		ns
Body Diode Reverse Recovery Charge		Q_{RR}	(Note 1)		3.24		μC

Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$; Duty Cycle $\leq 2\%$.

2. Essentially Independent of Operating Temperature Typical Characteristics

■ TYPICAL CHARACTERISTICS

