

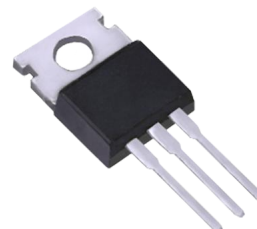
9A, 900V N-CHANNEL POWER MOSFET

■ DESCRIPTION

The UTC **9N90** uses UTC's advanced proprietary, planar stripe, DMOS technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

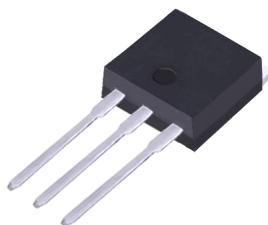
- * $R_{DS(ON)} \leq 1.2\Omega$ @ $V_{GS}=10V$, $I_D=4.5A$
- * Ultra Low Gate Charge (Typical 45 nC)
- * Low Reverse Transfer Capacitance ($CRSS =$ Typical 14 pF)
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness



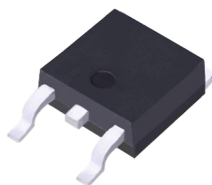
TO-220



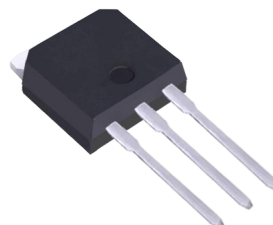
TO-220F



TO-262



TO-263



TO-251



TO-252

■ ABSOLUTE MAXIMUM RATING (T_C = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	900	V
Gate-Source Voltage		V _{GSS}	±30	V
Continuous Drain Current (T _C = 25°C)		I _D	9.0	A
Pulsed Drain Current (Note 2)		I _{DM}	36	A
Avalanche Current (Note 2)		I _{AR}	9.0	A
Avalanche Energy	Single Pulsed(Note 3)	E _{AS}	900	mJ
	Repetitive(Note 2)	E _{AR}	28	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.0	V/ns
Power Dissipation	TO-247	P _D	160	W
	TO-3P/TO-3PB		240	W
	TO-3PN			
	TO-220F1			
	TO-220F2			
Linear Derating Factor above T _C = 25°C	TO-247		1.28	
	TO-3P/TO-3PB		1.92	
	TO-3PN			
	TO-220F1		0.448	
	TO-220F2		0.464	
Junction Temperature		T _J	+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 = 21mH, I_{AS} = 9.0A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C

4. I_{SD} ≤ 9.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-247	θ _{JA}	50	°C/W
	TO-3P/TO-3PB		40	
	TO-3PN			
	TO-220F1/ TO-220F2		62.5	
Junction to Case	TO-247	θ _{JC}	0.78	°C/W
	TO-3P/TO-3PB		0.52	
	TO-3PN			
	TO-220F1		2.25	
	TO-220F2		2.15	

■ 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	900			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =900V, V _{GS} =0V			10	μA
Gate-Body Leakage Current	Forward	I _{GSSF}	V _{GS} =30V, V _{DS} =0V		100	nA
	Reverse	I _{GSSR}	V _{GS} =-30V, V _{DS} =0V		-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3.0		5.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =4.5A			1.2	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1870		pF
Output Capacitance	C _{OSS}			185		pF
Reverse Transfer Capacitance	C _{RSS}			21		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge(Note 1)	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A, I _G =100μA (Note1,2)		215		nC
Gate-Source Charge	Q _{GS}			17		nC
Gate-Drain Charge	Q _{GD}			44		nC
Turn-On Delay Time(Note 1)	t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note1,2)		100		ns
Turn-On Rise Time	t _R			170		ns
Turn-Off Delay Time	t _{D(OFF)}			410		ns
Turn-Off Fall Time	t _F			175		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				9.0	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				36	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	V _{GS} =0V, I _S =9.0A			1.4	V
Reverse Recovery Time (Note 1)	t _{rr}	V _{GS} =0V, I _S =9.0A, dI _F /dt=100A/μs (Note 1)		550		ns
Reverse Recovery Charge	Q _{rr}				6.5	

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

2. Essentially independent of operating temperature.

■ TYPICAL CHARACTERISTICS

