

## 6.2A, 900V N-CHANNEL POWER MOSFET

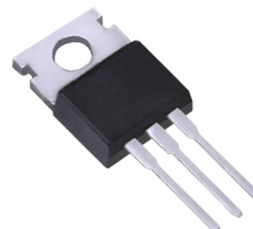
### ■ DESCRIPTION

The UTC **6N90** is a N-channel enhancement mode power MOSFET using UTC's advanced technology to provide costumers 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 **6N90** is generally applied in high efficiency switch mode power supplies.

### ■ FEATURES

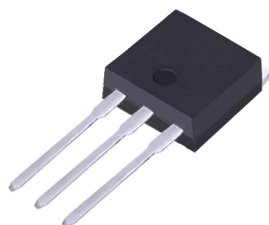
- \*  $R_{DS(ON)} \leq 2.3\Omega$  @  $V_{GS}=10V$ ,  $I_D=3.1A$
- \* Fast switching
- \* 100% avalanche tested
- \* Improved dv/dt capability



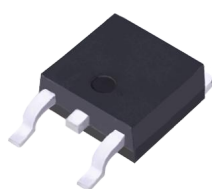
TO-220



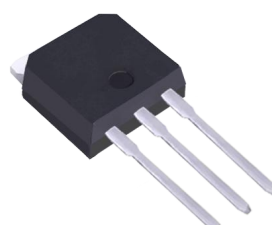
TO-220F



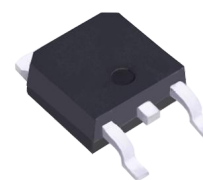
TO-262



TO-263



TO-251



TO-252

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	900	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	6.2	A
	Pulsed (Note 2)	$I_{DM}$	24	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	300	mJ
	Repetitive (Note 2)	$E_{AR}$	16.7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220/TO-262 TO-262ST/TO-263	$P_D$	167	W
	TO-220F/TO220F1 TO-220F4		50	W
	TO-3P		198	W
	TO-247		167	W
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.  $L = 16.6\text{mH}$ ,  $I_{AS} = 6\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 6\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO220F1/TO-220F4 TO-262/TO-262ST TO-263	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
	TO-3P		40	$^\circ\text{C}/\text{W}$
	TO-247		50	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220/TO-262 TO-262ST/TO-263	$\theta_{JC}$	0.75	$^\circ\text{C}/\text{W}$
	TO-220F/TO220F1 TO-220F4		2.5	$^\circ\text{C}/\text{W}$
	TO-3P		0.63	$^\circ\text{C}/\text{W}$
	TO-247		0.75	$^\circ\text{C}/\text{W}$

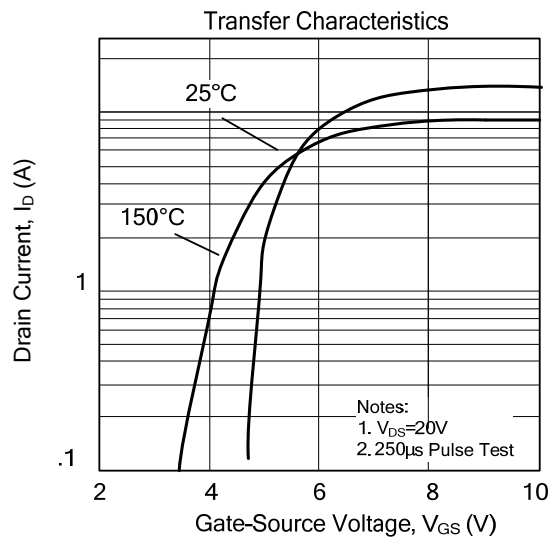
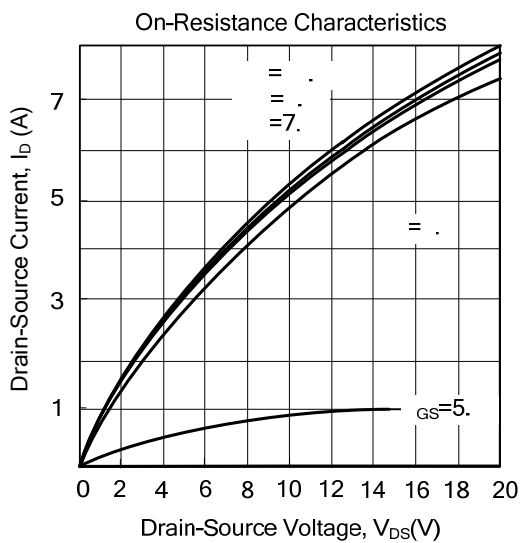
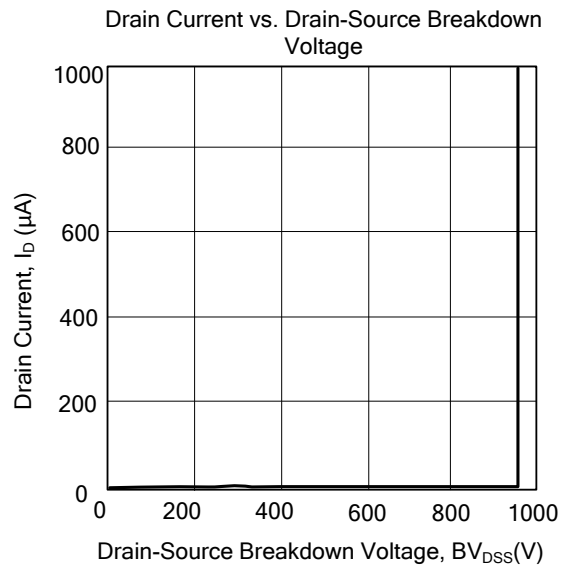
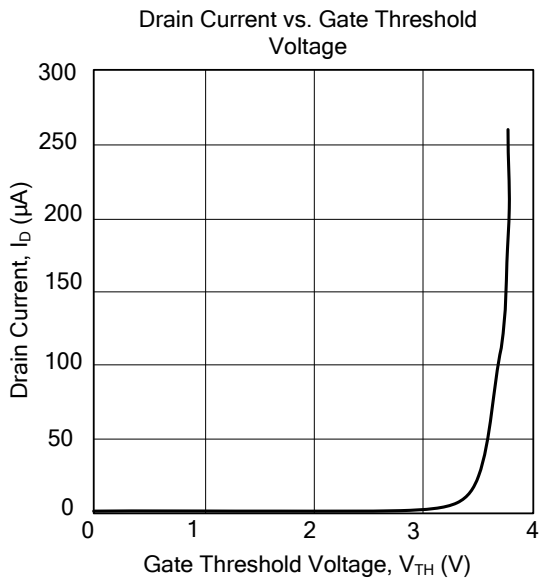
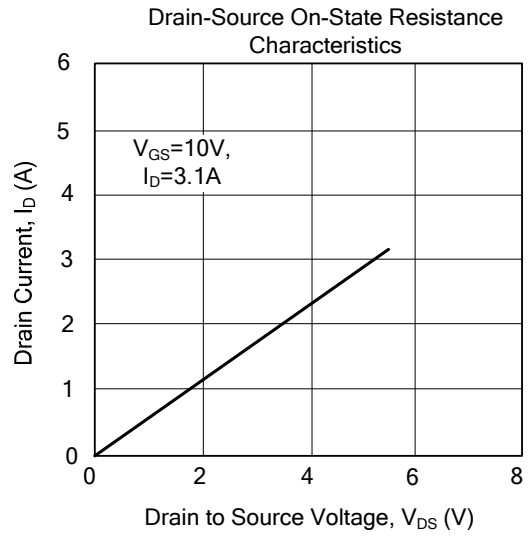
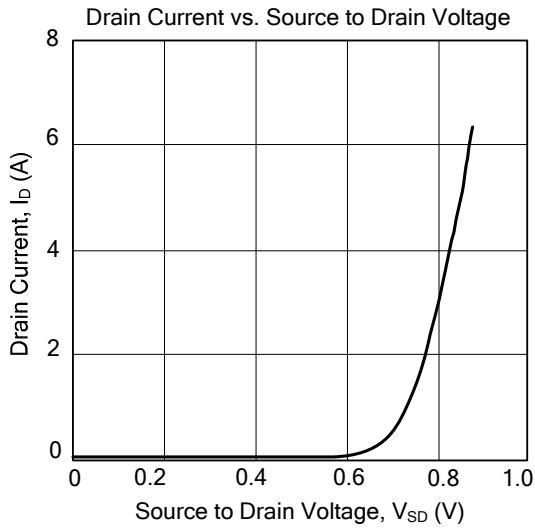
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	900			V
Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Reference to 25°C, I <sub>D</sub> =250μA		1.07		V/°C
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =900V, V <sub>GS</sub> =0V			10	μA
		V <sub>DS</sub> =720V, T <sub>C</sub> =125°C			100	
Gate- Source Leakage Current	Forward	V <sub>GS</sub> =+30V, V <sub>DS</sub> =0V			+100	nA
	Reverse	V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	3.0		5.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =3.1A		1.85	2.3	Ω
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =3.1A (Note 1)		5.5		S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		1260	1770	pF
Output Capacitance	C <sub>OSS</sub>			160	180	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			15	30	pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1, 2)	Q <sub>G</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, I <sub>D</sub> =1.3A (Note 1, 2)		40	50	nC
Gate to Source Charge	Q <sub>GS</sub>			9.6		nC
Gate to Drain Charge	Q <sub>GD</sub>			13		nC
Turn-ON Delay Time (Note 1, 2)	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =1A, R <sub>G</sub> =25Ω (Note 1, 2)		75	80	ns
Rise Time	t <sub>R</sub>			152	190	ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			200	240	ns
Fall-Time	t <sub>F</sub>			110	150	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				6.0	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				24	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =6.2A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =6.2A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/μs		630		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	(Note 1)		6.9		μC

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

2. Essentially independent of operating temperature.

## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)

