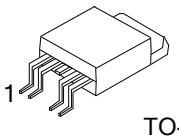
N AND P-CHANNEL ENHANCEMENT MODE FIELD DFFECT TRANSISTOR



TO-252-4

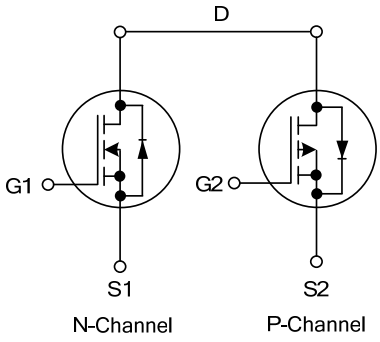
■ DESCRIPTION

The UTC **UT22NP04** is an N and P-channel enhancement mode field dffect transistor, it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, high switching speed and low gate charge.

■ FEATURES

* N-channel
  $R_{DS(on)}$ ≤ 24 mΩ @ V_{GS}=10V, I_D=11A
  $R_{DS(on)}$ ≤ 32 mΩ @ V_{GS}=4.5V, I_D=11A
* P-channel
  $R_{DS(on)}$ ≤ 28 mΩ @ V_{GS}= -10V, I_D= -11A
  $R_{DS(on)}$ ≤ 36 mΩ @ V_{GS}= -4.5V, I_D= -11A
* High switching speed
* Low gate charge

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
UT22NP04L-TN4-R	UT22NP04G-TN4-R	TO-252-4	S1	G1	D	S2	G2	Tape Reel

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

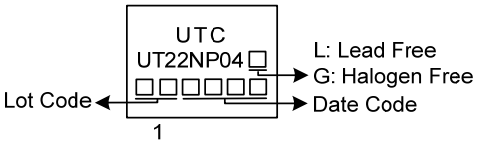
UT22NP04G-TN4-R

(1)Packing Type — (1) R: Tape Reel

(2)Package Type — (2) TN4: TO-252-4

(3)Green Package — (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS		UNIT
			N-Channel	P- Channel	
Drain-Source Voltage		V_{DSS}	40	-40	V
Gate-Source Voltage		V_{GSS}	±20	±20	V
Drain Current	Continuous	I_D	22	-22	A
	Pulsed (Note 2)	I_{DM}	44	-44	A
Avalanche Energy, Single Pulse (Note 3, 4)		E_{AS}	11	33	mJ
Power Dissipation		P_D	50		W
Junction Temperature		T_J	-55 ~ +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. N-Channel: L = 0.1mH, I_{AS} = 15A, V_{DD} = 30V, R_G = 25 Ω Starting T_J = 25°C
P-Channel: L = 0.1mH, I_{AS} = -26A, V_{DD} = -30V, R_G = 25 Ω Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ_{JC}	110	°C/W
Junction to Ambient	θ_{JA}	2.5	°C/W

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

N-channel

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250uA, V_{GS}=0V	40			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=32V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	1.0		3.0	V
Static Drain-Source On-State Resistance (Note 1)		$R_{DS(ON)}$	V_{GS}=10V, I_D=11A			24	mΩ
			V_{GS}=4.5V, I_D=11A			32	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1.0MHz		680		pF
Output Capacitance		C_{OSS}			85		pF
Reverse Transfer Capacitance		C_{RSS}			73		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	V_{DS}=32V, V_{GS}=10V, I_D=22A		36		nC
Gate to Source Charge Note 2)		Q_{GS}			4.5		nC
Gate to Drain Charge Note 2)		Q_{GD}			9.2		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	V_{DS}=20V, V_{GS}=10V, I_D=22A, R_G=3Ω		4		ns
Rise Time (Note 2)		t_R			16		ns
Turn-OFF Delay Time (Note 2)		$t_{D(OFF)}$			20		ns
Fall-Time (Note 2)		t_F			19		ns
SOURCE TO DRAIN DIODE SPECIFICATIONS							
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_F=22A, V_{GS}=0V			1.4	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

P-channel

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250uA, V_{GS}=0V	-40			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-32V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250uA	-1.0		-3.0	V
Static Drain-Source On-State Resistance (Note 1)		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-11A			28	mΩ
			V_{GS}=-4.5V, I_D=-11A			36	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1.0MHz		1880		pF
Output Capacitance		C_{OSS}			212		pF
Reverse Transfer Capacitance		C_{RSS}			162		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	V_{DS}=-32V, V_{GS}=-10V, I_D=-22A		37		nC
Gate to Source Charge Note 2)		Q_{GS}			5		nC
Gate to Drain Charge Note 2)		Q_{GD}			8		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	V_{Ds}=-20V, V_{GS}=-10V, I_D=-22A, R_G=3Ω		6		ns
Rise Time (Note 2)		t_R			18		ns
Turn-OFF Delay Time (Note 2)		$t_{D(OFF)}$			76		ns
Fall-Time (Note 2)		t_F			40		ns
SOURCE TO DRAIN DIODE SPECIFICATIONS							
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_F=-22A, V_{GS}=0V			-1.4	V

Notes: 1. Pulse test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. Independent of operating temperature.