



20NP03

Power MOSFET

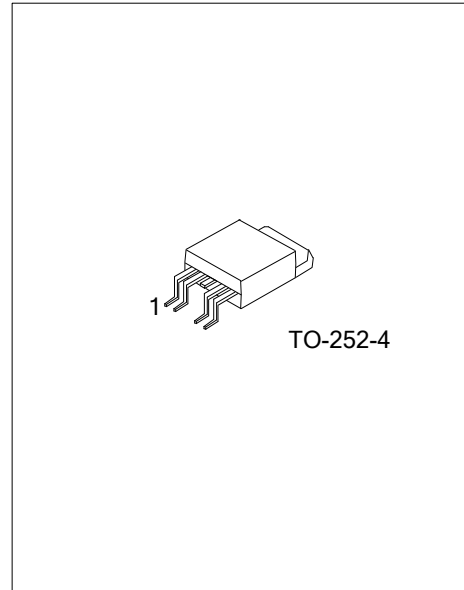
N AND P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

DESCRIPTION

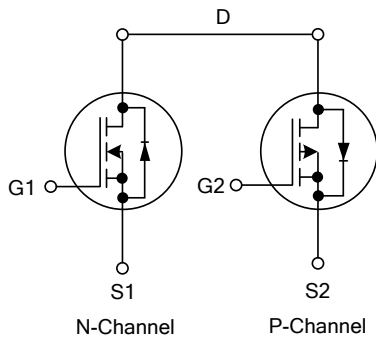
The UTC 20NP03 is an N and P-channel enhancement mode field effect transistor, it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, high switching speed and low gate charge.

FEATURES

- * N-channel:
 - 25A, 30V, $R_{DS(on)} \leq 18\text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=7.0\text{A}$
 - 25A, 30V, $R_{DS(on)} \leq 28\text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=6.0\text{A}$
- * P-channel:
 - 19A, -30V, $R_{DS(on)} \leq 38\text{ m}\Omega$ @ $V_{GS}=-10\text{V}$, $I_D=-6.0\text{A}$
 - 19A, -30V, $R_{DS(on)} \leq 64\text{ m}\Omega$ @ $V_{GS}=-4.5\text{V}$, $I_D=-5.0\text{A}$
- * High switching speed
- * Low gate charge



SYMBOL



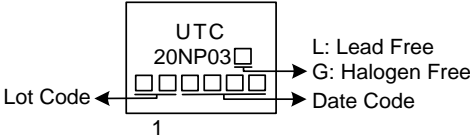
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
20NP03L-TN4-R	20NP03G-TN4-R	TO-252-4	S1	G1	D	S2	G2	Tape Reel

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

<p>20NP03G-TN4-R</p> <ul style="list-style-type: none"> (1)Packing Type (2)Package Type (3)Green Package 	<ul style="list-style-type: none"> (1) R: Tape Reel (2) TN4: TO-252-4 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



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

PARAMETER		SYMBOL	RATINGS		UNIT	
			N-channel	P-channel		
Drain-Source Voltage		V_{DSS}	30	-30	V	
Gate-Source Voltage		V_{GSS}	± 20	± 20	V	
Drain Current	Continuous	I_D	$T_C=25^\circ\text{C}$	25	-19	A
			$T_C=70$	20	-15	A
			$T_A=25^\circ\text{C}$	9	-7	A
			$T_A=70$	7	-5.7	A
	Pulsed (Note 2)	I_{DM}	65	-45	A	
Avalanche Current		I_{AS}	19	-18	A	
Avalanche Energy		E_{AS}	18	17	mJ	
Power Dissipation		P_D	$T_C=25^\circ\text{C}$	21		W
			$T_C=70$	13		W
			$T_A=25^\circ\text{C}$	3		W
			$T_A=70$	2		W
Junction Temperature		T_J	-55 ~ +150		$^\circ\text{C}$	
Storage Temperature		T_{STG}	-55 ~ +150		$^\circ\text{C}$	
Lead Temperature (1/16" from case for 10 sec.)		T_L	275		$^\circ\text{C}$	

Note: 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.

■ **THERMAL CHARACTERISTICS**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ_{JC}	6	$^\circ\text{C/W}$
Junction to Ambient	θ_{JA}	42	$^\circ\text{C/W}$

Note: Pulse width limited by maximum junction temperature.

■ ELECTRICAL CHARACTERISTICS (Cont.)

N-channel

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	30			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$			1	μA
		$V_{DS}=20V, V_{GS}=0V, T_J=55^\circ C$			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}				
	Reverse					
		$V_{GS}=+20V, V_{DS}=0V$			+100	nA
		$V_{GS}=-20V, V_{DS}=0V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	2.5	V
Static Drain-Source On-State Resistance (Note 1)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=7.0A$			18	m Ω
		$V_{GS}=4.5V, I_D=6.0A$			28	m Ω
Forward Transconductance (Note 1)	g_{FS}	$V_{DS}=10V, I_D=7.0A$		29		S
On-State Drain Current (Note 1)	$I_{D(ON)}$	$V_{GS}=10V, V_{DS}=5.0V$	65			A
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		670		pF
Output Capacitance	C_{OSS}			160		pF
Reverse Transfer Capacitance	C_{RSS}			155		pF
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}=0V, f=1.0MHz$		2		Ω
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q_G	$V_{GS}=10V, V_{DS}=30V_{(BR)DSS}, I_D=1A, I_G=100\mu A$		106		nC
Gate to Source Charge Note 2)	Q_{GS}			5		nC
Gate to Drain Charge Note 2)	Q_{GD}			10.5		nC
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DS}=30V, V_{GS}=10V, I_D=0.5A, R_G=25\Omega$		40		ns
Rise Time (Note 2)	t_R			75		ns
Turn-OFF Delay Time (Note 2)	$t_{D(OFF)}$			365		ns
Fall-Time (Note 2)	t_F			205		ns
SOURCE TO DRAIN DIODE SPECIFICATIONS						
Continuous Current	I_S				9	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=I_F, V_{GS}=0V$			1	V

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

P-channel

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =-250μA, V _{GS} =0V	-30			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V			-1	μA
		V _{DS} =-20V, V _{GS} =0V, T _J =55°C			-10	μA
Gate-Source Leakage Current	Forward	I _{GSS}				
	Reverse					
		V _{GS} =+20V, V _{DS} =0V			+100	nA
		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.6	-2.5	V
Static Drain-Source On-State Resistance (Note 1)	R _{DS(ON)}	V _{GS} =-10V, I _D =-6.0A		35	38	mΩ
		V _{GS} =-4.5V, I _D =-5.0A			64	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-10V, I _D =-6.0A		15		S
On-State Drain Current (Note 1)	I _{D(ON)}	V _{GS} =-5V, V _{DS} =-10V	-45			A
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz		605		pF
Output Capacitance	C _{OSS}			110		pF
Reverse Transfer Capacitance	C _{RSS}			75		pF
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		6.27		Ω
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q _G	V _{GS} =-10V, V _{DS} =-30V _{(BR)DSS} , I _D =-1A, I _G =100μA		60		nC
Gate to Source Charge Note 2)	Q _{GS}			2.5		nC
Gate to Drain Charge Note 2)	Q _{GD}			6		nC
Turn-ON Delay Time (Note 2)	t _{D(ON)}	V _{DS} =-30V, V _{GS} =-10V, I _D =-0.5A, R _G =25Ω		60		ns
Rise Time (Note 2)	t _R			84		ns
Turn-OFF Delay Time (Note 2)	t _{D(OFF)}			560		ns
Fall-Time (Note 2)	t _F			305		ns
SOURCE TO DRAIN DIODE SPECIFICATIONS						
Continuous Current	I _S				-7	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =I _F , V _{GS} =0V			-1	V

Notes: 1. Pulse test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

2. Independent of operating temperature.

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