



# UTD452

*Power MOSFET*

## N-CHANNEL ENHANCEMENT MODE

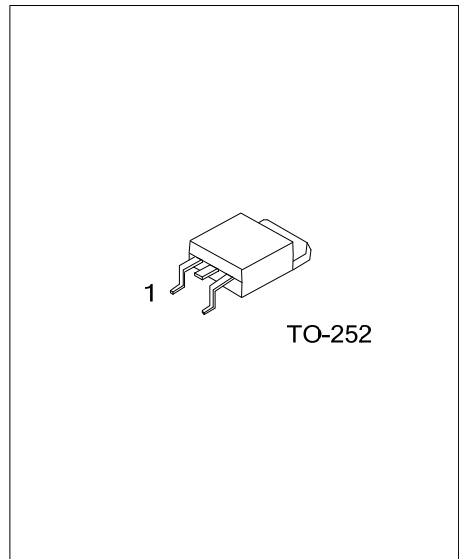
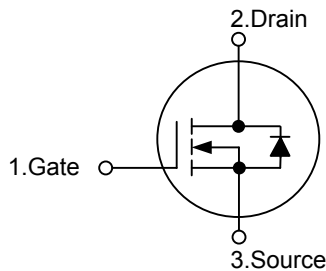
### DESCRIPTION

The **UTD452** uses advanced trench 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

- \*  $R_{DS(ON)} \leq 8.5 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=30\text{A}$
- \*  $R_{DS(ON)} \leq 14 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=20\text{A}$
- \* Low capacitance
- \* Low gate charge
- \* Fast switching capability
- \* Avalanche energy specified

### SYMBOL



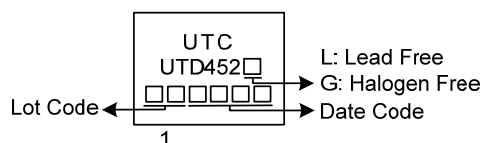
### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTD452L-TN3-R	UTD452G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UTD452G-TN3-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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### MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	25	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	55	A
Pulsed Drain Current	$I_{DM}$	100	A
Avalanche Current	$I_{AS}$	24.8	A
Avalanche Energy (Note 3)	$E_{AS}$	30.8	mJ
Power Dissipation	$P_D$	50	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.  $L = 0.1\text{mH}$ ,  $I_{AS} = 24.8\text{A}$ ,  $V_{DD} = 20\text{V}$ ,  $R_G = 25\ \Omega$  Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction-to-Ambient	$\theta_{JA}$	110	$^\circ\text{C/W}$
Junction-to-Case	$\theta_{JC}$	2.5 (Note)	$^\circ\text{C/W}$

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

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

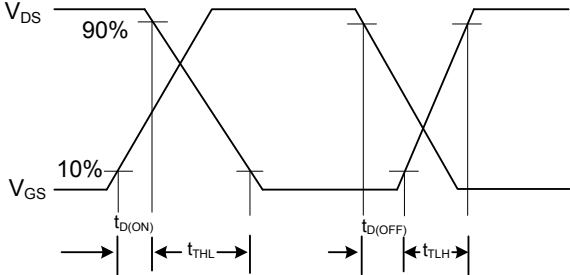
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	25			V	
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	μA	
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			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	1.0	1.5	3.0	V	
On State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> =5V, V <sub>GS</sub> =10V	100			A	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A		7.6	8.5	mΩ	
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A		12.4	14	mΩ	
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =12.5V, V <sub>GS</sub> =0V, f=1MHz		1429	1476	pF	
Output Capacitance	C <sub>OSS</sub>			332		pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>			294		pF	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =10A		18.1		S	
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge	10V	Q <sub>G</sub> V <sub>DS</sub> =12.5V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A (Note 1, 2)		40		nC	
	5V			21		nC	
Gate Source Charge	Q <sub>GS</sub>			5.5		nC	
Gate Drain Charge	Q <sub>GD</sub>			11		nC	
Turn-ON Delay Time	t <sub>D(ON)</sub>			8		ns	
Turn-ON Rise Time	t <sub>R</sub>		V <sub>DS</sub> =12.5V, V <sub>GS</sub> =10V,		16		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>		R <sub>L</sub> =0.6Ω, R <sub>G</sub> =3Ω (Note 1, 2)		27		ns
Turn-OFF Fall-Time	t <sub>F</sub>				20		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current	I <sub>S</sub>				55	A	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =1.0A, V <sub>GS</sub> =0V		0.72	1	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =30A, V <sub>GS</sub> =0V,		153		ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>F</sub> /dt=100A/μs		471		nC	

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

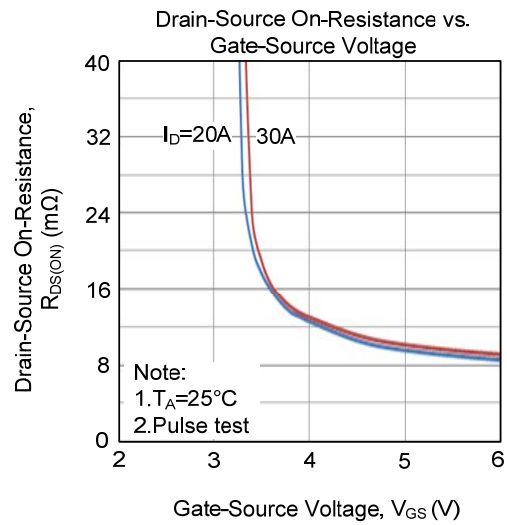
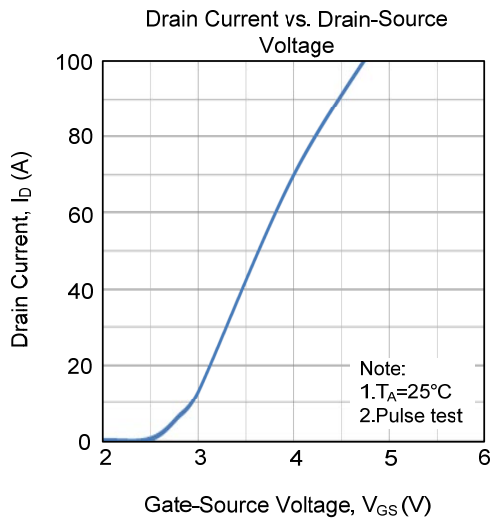
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

Switching Time Waveforms



■ TYPICAL CHARACTERISTICS



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