



# UTD454

*Power MOSFET*

## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

■ DESCRIPTION

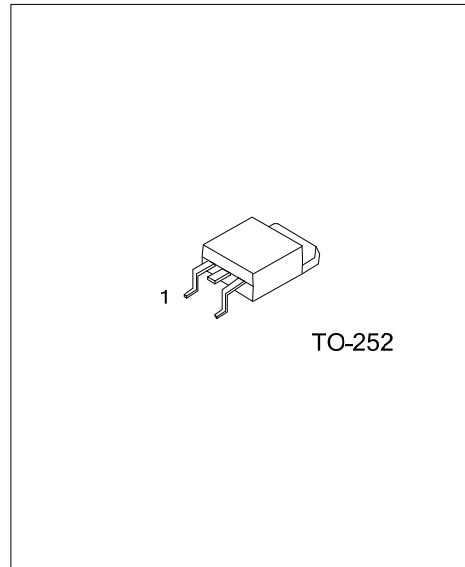
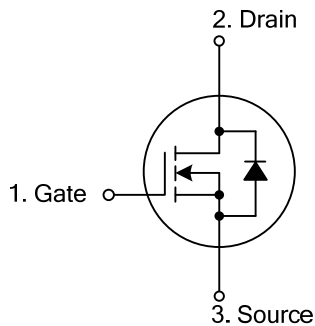
The UTC **UTD454** is an N-channel enhancement MOSFET providing perfect  $R_{DS(ON)}$  and low gate charge with UTC advanced technology.

The UTC **UTD454** is intended for being used in PWM, load switching and general purpose applications.

■ FEATURES

- \*  $R_{DS(ON)} < 33\ m\Omega$  @  $V_{GS} = 10V$
- \*  $R_{DS(ON)} < 47\ m\Omega$  @  $V_{GS} = 4.5V$
- \*  $V_{DS} (V) = 40V$
- \*  $I_D = 12\ A$  @  $V_{GS} = 10V$
- \* Low gate charge

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTD454L-TN3-R	UTD454G-TN3-R	TO-252	G	D	S	Tape Reel
UTD454L-TN3-T	UTD454G-TN3-T	TO-252	G	D	S	Tube

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

<p>UTD454L-TN3-R</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) R: Tape Reel, T: Tube (2) TN3: TO-252 (3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_C=25^{\circ}\text{C}$ )	$I_D$	12	A
Pulsed Drain Current (Note 2)	$I_{DM}$	30	A
Avalanche Current (Note 2)	$I_{AR}$	12	A
Repetitive avalanche energy ( $L=0.1\text{mH}$ )(Note 2)	$E_{AR}$	20	mJ
Power Dissipation ( $T_C=25^{\circ}\text{C}$ )	$P_D$	20	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. Pulse width limited by  $T_{J(MAX)}$

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	60	$^{\circ}\text{C/W}$
Junction to Case	$\theta_{JC}$	3	$^{\circ}\text{C/W}$

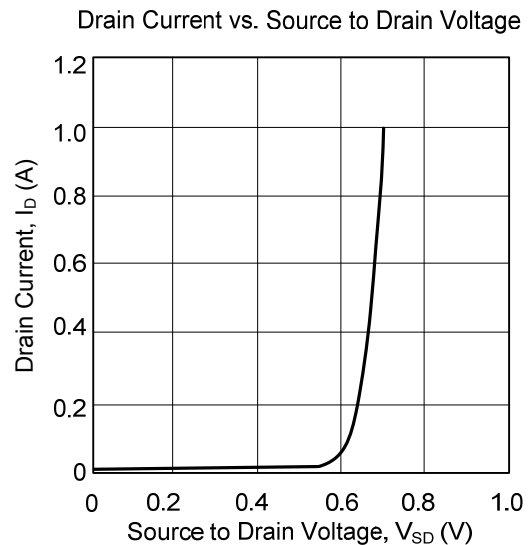
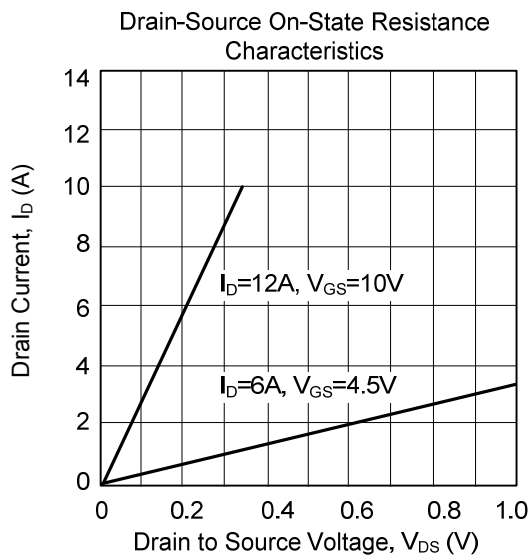
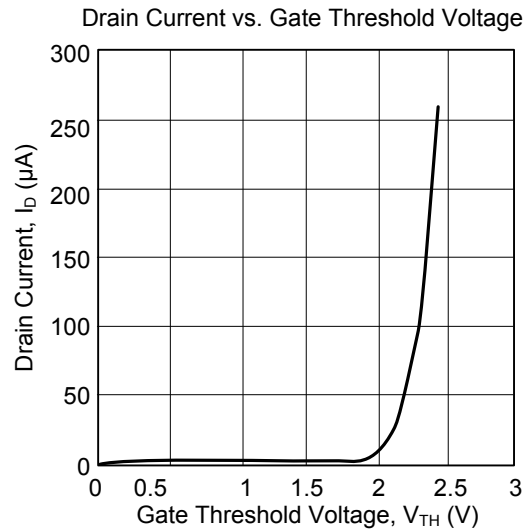
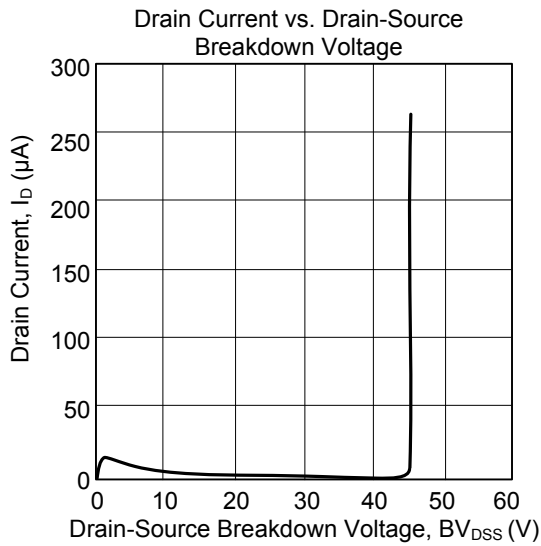
Note: Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board with 2oz

■ ELECTRICAL CHARACTERISTICS ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	40			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=32\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1.8	2.3	3	V
On-State Drain Current	$I_{D(ON)}$	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	30			A
Drain to Source On-state Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=12\text{A}$		25	33	m $\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=6\text{A}$		34	47	m $\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=20\text{V}$ , $f=1\text{MHz}$		404	500	pF
Output Capacitance	$C_{OSS}$			95	150	pF
Reverse Transfer Capacitance	$C_{RSS}$			37	60	nC
Gate resistance	$R_G$	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		2.7		$\Omega$
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{GS}=10\text{V}$ , $V_{DS}=20\text{V}$ , $R_L=1.7\Omega$ , $R_{GEN}=3\Omega$		3.5		ns
Turn-ON Rise Time	$t_R$			6		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			13.2		ns
Turn-OFF Fall-Time	$t_F$			3.5		ns
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}$ , $V_{DS}=20\text{V}$ , $I_D=12\text{A}$		9.2		nC
Gate Source Charge	$Q_{GS}$			1.6		nC
Gate Drain Charge	$Q_{GD}$			2.6		nC
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=1\text{A}$ , $V_{GS}=0\text{V}$		0.76	1	V
Diode Continuous Forward Current	$I_S$				12	A
Reverse Recovery Time	$t_{rr}$	$I_F=12\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		22.9		ns
Reverse Recovery Charge	$Q_{RR}$				18.3	

Note: Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 0.5\%$ .

## ■ TYPICAL CHARACTERISTICS



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