



UTD413

Power MOSFET

P-CHANNEL ENHANCEMENT MODE

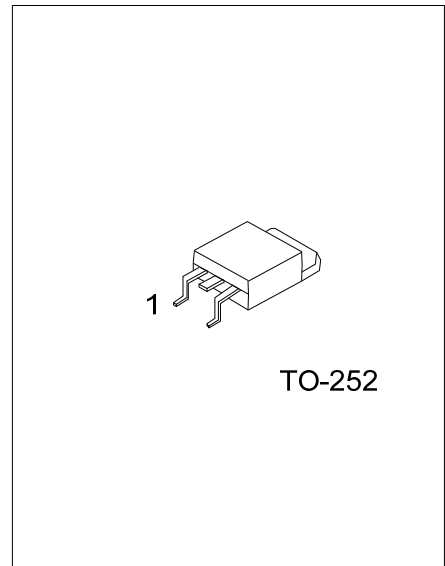
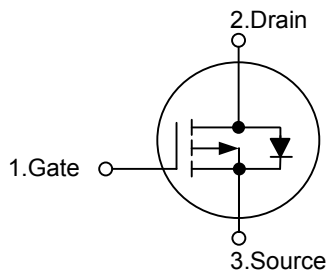
DESCRIPTION

The **UTD413** can provide excellent $R_{DS(ON)}$ and low gate charge by using UTC's advanced trench technology. The **UTD413** is well suited for high current load applications with the excellent thermal resistance of the TO-252 package. Standard Product **UTD413** is Pb-free.

FEATURES

- * $R_{DS(ON)} < 45m\Omega$ @ $V_{GS} = -10V$
- * $R_{DS(ON)} < 69m\Omega$ @ $V_{GS} = -4.5V$
- * Low capacitance
- * Low gate charge
- * Fast switching capability
- * Avalanche energy specified

SYMBOL



TO-252

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTD413L-TN3-R	UTD413G-TN3-R	TO-252	G	D	S	Tape Reel
UTD413L-TN3-T	UTD413G-TN3-T	TO-252	G	D	S	Tube

UTD413L-TN3-R (1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel, T: Tube (2) TN3: TO-252 (3) G: Halogen Free, L: Lead Free
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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}	± 20	V
Continuous Drain Current	I_D	-12	A
Pulsed Drain Current	I_{DM}	-30	A
Avalanche Current	I_{AR}	-12	A
Repetitive avalanche energy $L=0.1\text{mH}$	E_{AR}	30	mJ
Power Dissipation	P_D	2.5	W
Junction Temperature	T_J	+175	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +175	$^{\circ}\text{C}$

Note: 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 $T_{J(MAX)}$

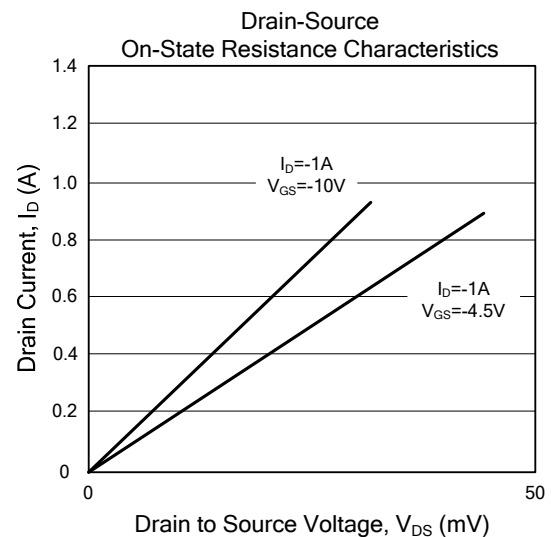
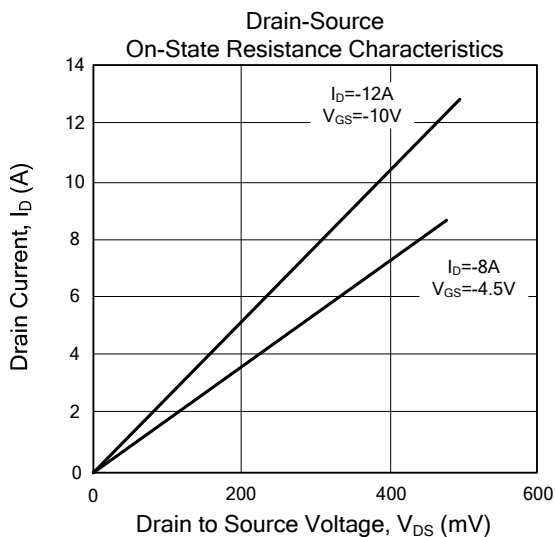
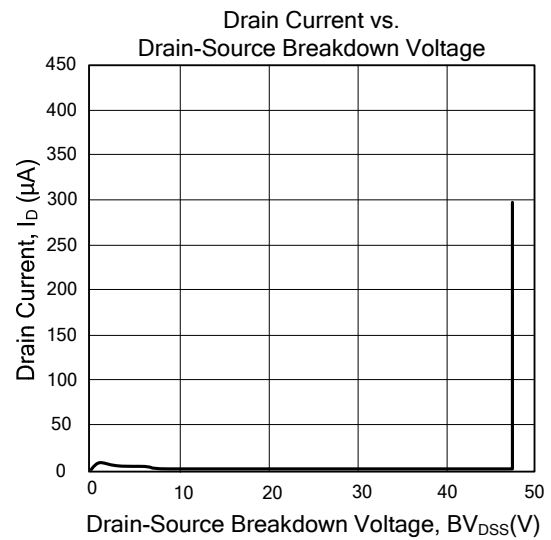
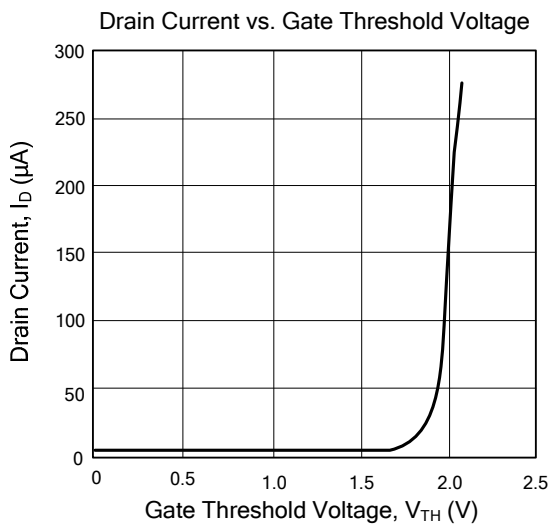
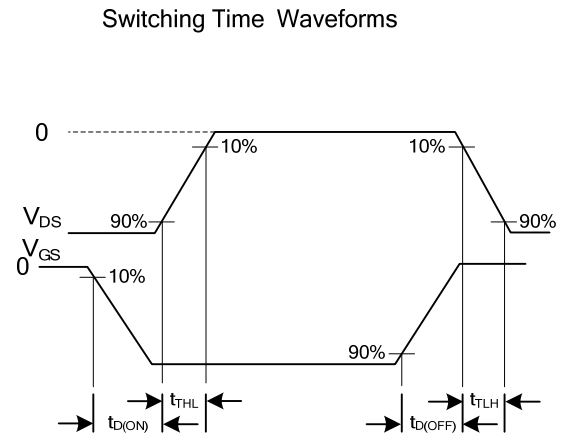
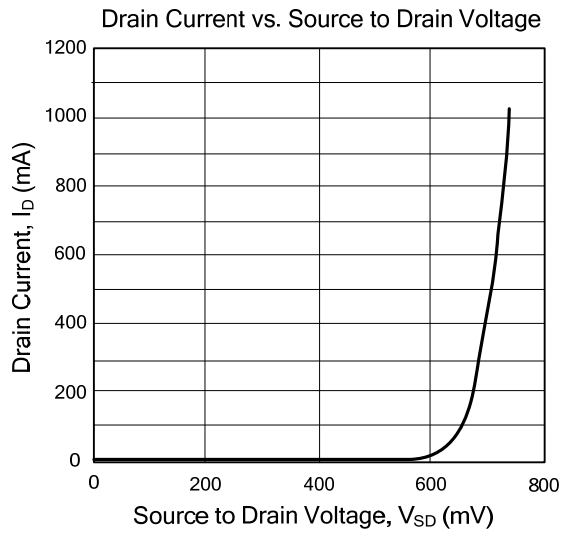
■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	50	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	3	$^{\circ}\text{C}/\text{W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-10mA	-40			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-32V, V _{GS} =0V			-1	μA
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.9	-3	V
On State Drain Current	I _{D(ON)}	V _{DS} =-5V, V _{GS} =-10V	-30			A
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-12A		36	45	mΩ
		V _{GS} =-4.5V, I _D =-8 A		51	69	
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =-20V, V _{GS} =0V, f=1MHz		657		pF
Output Capacitance	C _{OSS}			143		pF
Reverse Transfer Capacitance	C _{RSS}			63		pF
SWITCHING PARAMETERS						
Total Gate Charge	10V	Q _G	V _{DS} =-20V, V _{GS} =-10V, I _D =-12A	14.1		nC
	4.5V			7		
Gate Source Charge	Q _{GS}	2.2			nC	
Gate Drain Charge	Q _{GD}	4.1			nC	
Turn-ON Delay Time	t _{D(ON)}	8			ns	
Turn-ON Rise Time	t _R	V _{GS} =-10V, V _{DS} =-20V, R _L =1.7Ω, R _G =3Ω		12.2		ns
Turn-OFF Delay Time	t _{D(OFF)}			24		ns
Turn-OFF Fall-Time	t _F			12.5		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V _{SD}	I _S =-1A, V _{GS} =0V		-0.75	-1	V
Maximum Body-Diode Continuous Current	I _S				-12	A
Body Diode Reverse Recovery Time	t _{RR}	I _F =-12A, dI/dt=100A/μs		23.2		ns
Body Diode Reverse Recovery Charge	Q _{RR}	I _F =-12A, dI/dt=100A/μs		18.2		nC

TYPICAL CHARACTERISTICS



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