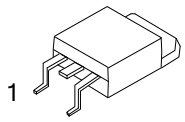
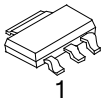
UTD454

Power MOSFET

N-CHANNEL ENHANCEMENT MODE POWER MOSFET



TO-252



SOT-223

■ DESCRIPTION

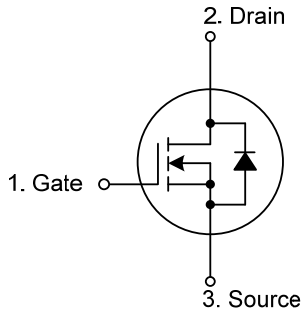
The UTC **UTD454** is an N-channel enhancement MOSFET providing perfect $R_{DS(ON)}$ and low gate charge with UTC advanced technology.

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

■ FEATURES

* $R_{DS(ON)}$ ≤ 33 mΩ @ V_{GS}=10V, I_D=12A
* $R_{DS(ON)}$ ≤ 47 mΩ @ V_{GS}=4.5V, I_D=6.0A
* 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-AA3-R	UTD454G-AA3-R	SOT-223	G	D	S	Tape Reel
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

UTD454G-AA3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel, T: Tube (2) AA3: SOT-223, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°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 (T_C=25°C)		I_D	12	A
Pulsed Drain Current (Note 2)		I_{DM}	30	A
Avalanche Current (Note 2)		I_{AR}	13.6	A
Repetitive avalanche energy (L=0.1mH)(Note 2)		E_{AR}	9.2	mJ
Power Dissipation (T_C=25°C)	SOT-223	P_D	1.3	W
	TO-252		44	W
Junction Temperature		T_J	+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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	140 (Note)	°C/W
	TO-252		110 (Note)	°C/W
Junction to Case	SOT-223	θ_{JC}	96 (Note)	°C/W
	TO-252		2.84 (Note)	°C/W

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

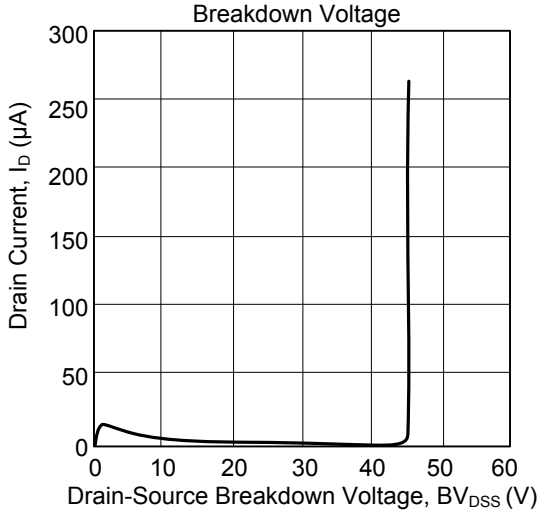
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	40			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=40V, 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	1.0	1.6	3.0	V
On State Drain Current	$I_{D(ON)}$	V_{DS}=5V, V_{GS}=10V	30			A
Drain to Source On-state Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=12A		27	33	mΩ
		V_{GS}=4.5V, I_D=6.0A		39	47	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=20V, f=1MHz		380	500	pF
Output Capacitance	C_{OSS}			57	150	pF
Reverse Transfer Capacitance	C_{RSS}			49	60	nC
Gate Resistance	R_G	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.8		Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=20V, V_{GS}=10V, I_D=12A		17		nC
Gate Source Charge	Q_{GS}			3		nC
Gate Drain Charge	Q_{GD}			4		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DS}=20V, V_{GS}=10V, R_L=1.7Ω, R_G=3Ω		4		ns
Turn-ON Rise Time	t_R			15		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			11		ns
Turn-OFF Fall-Time	t_F			20		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Continuous Forward Current	I_S				12	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V		0.76	1.0	V
Reverse Recovery Time	t_{rr}	I_F=12A, dI/dt=100A/μs, V_{GS}=0V		24		ns
Reverse Recovery Charge	Q_{rr}			26		nC

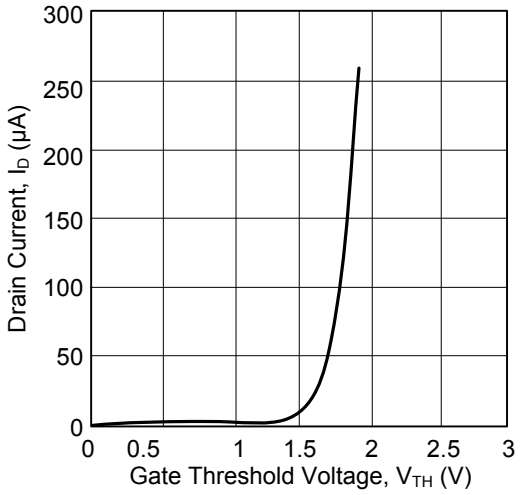
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TYPICAL CHARACTERISTICS

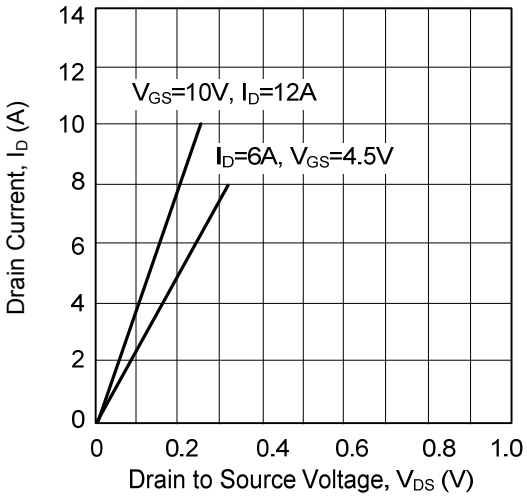
Drain Current vs. Drain-Source Breakdown Voltage



Drain Current vs. Gate Threshold Voltage



Drain-Source On-State Resistance Characteristics



Drain Current vs. Source to Drain Voltage