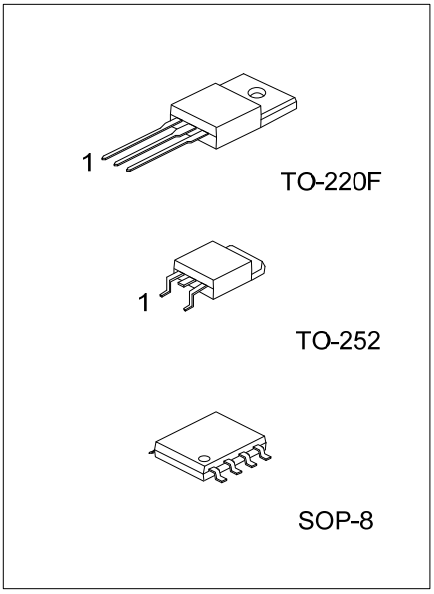
UTD405

Power MOSFET

P-CHANNEL ENHANCEMENT MODE



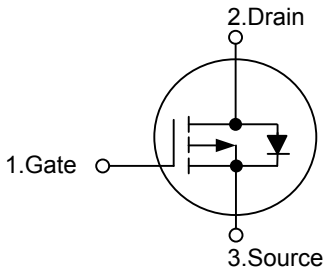
■ DESCRIPTION

The **UTD405** can provide excellent $R_{DS(ON)}$, low gate charge and low gate resistance by using advanced trench technology. This device is well suited for high current load applications with the excellent thermal resistance.

■ FEATURES

* $R_{DS(ON)}$ ≤ 26 mΩ @ V_{GS}=-10V, I_D=-18A
* $R_{DS(ON)}$ ≤ 45 mΩ @ V_{GS}=-4.5V, I_D=-10A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

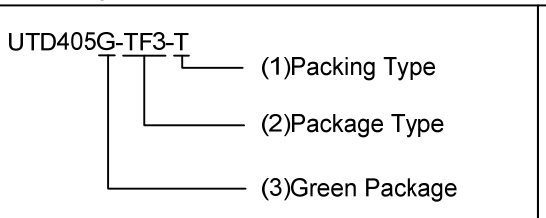
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTD405L-TF3-T	UTD405G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UTD405L-TN3-R	UTD405G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTD405L-S08-R	UTD405G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

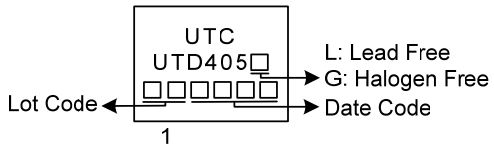
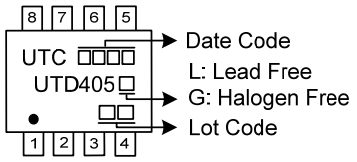


(1) T: Tube, R: Tape Reel

(2) TF3: TO-220F, TN3: TO-252, S08: SOP-8

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220F / TO-252	SOP-8
	

■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current	Continuous	TO-220F/TO-252	I_D	-18	A
		SOP-8		-8	
Pulsed Drain Current	Pulsed (Note 2)		I_{DM}	-36	A
Avalanche Energy	Single Pulsed (Note 3)		E_{AS}	20	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	1.1	V/ns
Power Dissipation		TO-220F	P_D	20	W
		TO-252		46	W
		SOP-8		1.7	W
Junction Temperature			T_J	+150	°C
Operation and 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.
3. L=0.1mH, I_{AS}=-20A, V_{DD}=-20V, R_G=25Ω, Starting T_J=25°C.
4. I_{SD} ≤ -18A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220F	θ_{JA}	62.5	°C/W
	TO-252		50	°C/W
	SOP-8		90	°C/W
Junction to Case	TO-220F	θ_{JC}	6.25	°C/W
	TO-252		2.7	°C/W
	SOP-8		73	°C/W

Note: Device mounted on FR-4 substrate PC 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}	V_{GS}=0V, I_D=-250μA	-30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	μA
Gate-Body 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=-250 μA	-1.0		-3.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-18A			26	mΩ
		V_{GS}=-4.5V, I_D=-10A			45	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=-15 V, V_{GS}=0V, f=1MHz		1240		pF
Output Capacitance	C_{OSS}			210		pF
Reverse Transfer Capacitance	C_{RSS}			175		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=-24V, V_{GS}=-10V, I_D=-18A		26		nC
Gate-Source Charge	Q_{GS}			4.5		nC
Gate-Drain Charge	Q_{GD}			6		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DS}=-15V, V_{GS}=-10V, I_D=-18A, R_G=3Ω		5		ns
Turn-ON Rise Time	t_R			3		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			31		ns
Turn-OFF Fall-Time	t_F			16		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				-18	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=-1A, V_{GS}=0V			-1	V
Body Diode Reverse Recovery Time	T_{rr}	I_F=-18A, dI/dt=100A/μs		110		ns
Body Diode Reverse Recovery Charge	Q_{rr}			156		nC

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse width ≤ 300us, duty cycle 0.5% max.