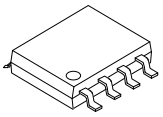
UT4413

Power MOSFET

P-CHANNEL ENHANCEMENT MODE



SOP-8

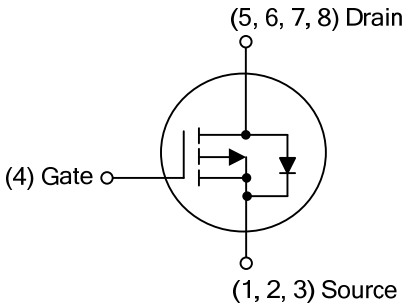
■ DESCRIPTION

The **UT4413** 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

* $R_{DS(ON)}$ ≤ 14 mΩ @ V_{GS}=-10V, I_D=-15A
  $R_{DS(ON)}$ ≤ 13 mΩ @ V_{GS}=-20V, I_D=-15A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

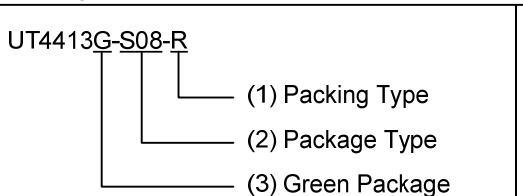
■ SYMBOL



■ ORDERING INFORMATION

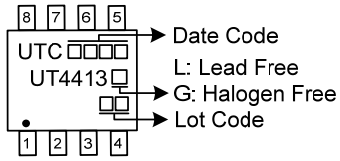
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT4413L-S08-R	UT4413G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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



(1) R: Tape Reel
(2) S08: SOP-8
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ 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}	±25	V
Continuous Drain Current (Note 1)		I_D	-15	A
Pulsed Drain Current (Note 2)		I_{DM}	-80	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	198	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.3	V/ns
Power Dissipation (T_C=25°C)		P_D	5	W
Junction a Temperature		T_J	-55 ~ +150	°C
Strong 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 = -10mH, I_{AS} = -6.3A, V_{DD} = -20V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤ -2.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	75	°C/W
Junction to Case	θ_{JC}	25	°C/W

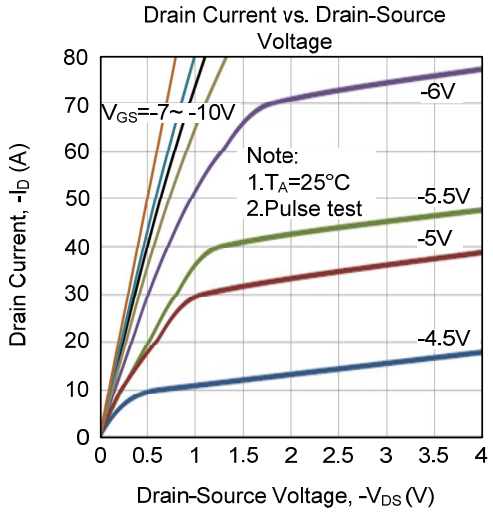
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

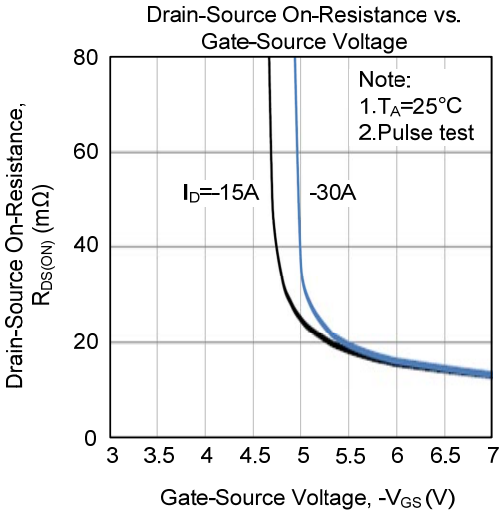
■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

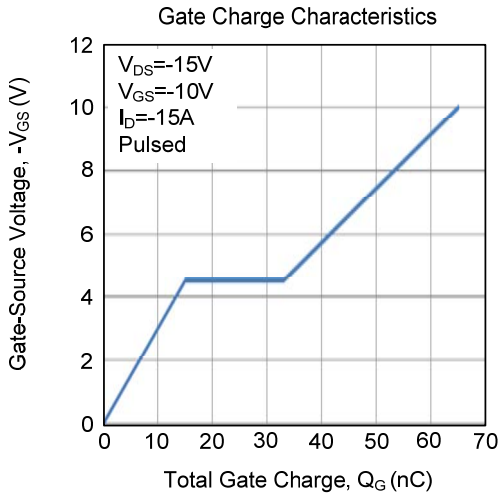
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	μA
Drain-Source Breakdown Voltage	I_{GSS}	V_{DS}=0V, V_{GS}=±25V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0	-3.0	-4.0	V
On State Drain Current	$I_{D(ON)}$	V_{DS}=-5V, V_{GS}=-10V	-60			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-15A		10	14	mΩ
		V_{GS}=-20V, I_D=-15A		8.0	13	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=-15V, V_{GS} =0V, f=1MHz		3927	5500	pF
Output Capacitance	C_{OSS}			618		
Reverse Transfer Capacitance	C_{RSS}			481		
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=-15V, V_{GS}=-10V, I_D=-15A		65	90	nC
Gate Source Charge	Q_{GS}			15		
Gate Drain Charge	Q_{GD}			18		
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS}=-10V, V_{DS}=-15V, R_L=1.0Ω, R_{GEN}=3Ω		21		ns
Turn-ON Rise Time	t_R			17		
Turn-OFF Delay Time	$t_{D(OFF)}$			53		
Turn-OFF Fall-Time	t_F			26		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				-15	A
Maximum Body-Diode Pulsed Current (Note 1)	I_{SM}				-80	A
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	I_S=-1A, V_{GS}=0V		-0.72	-1	V
Reverse Recovery Time	t_{rr}	I_F=-15A, dI/dt=100A/μs		205		ns
Reverse Recovery Charge	Q_{rr}	I_F=-15A, dI/dt=100A/μs		843		nC

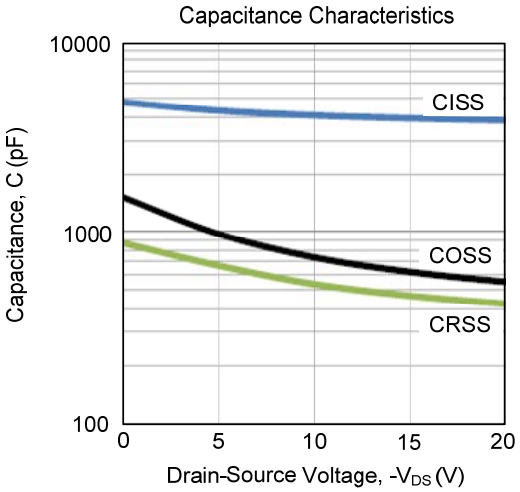
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

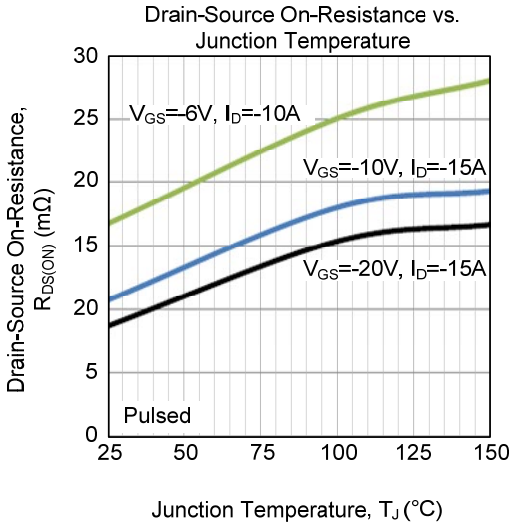
■ TYPICAL CHARACTERISTICS

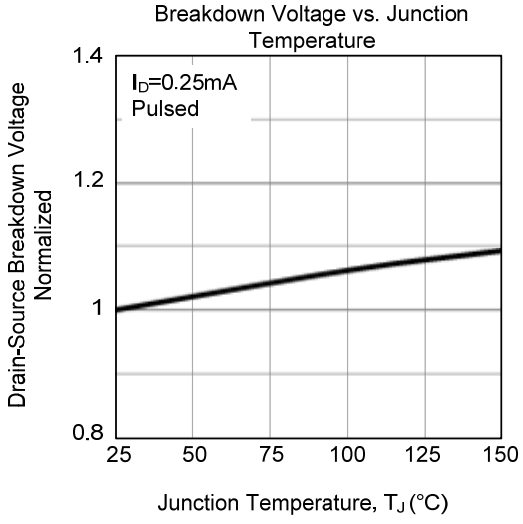






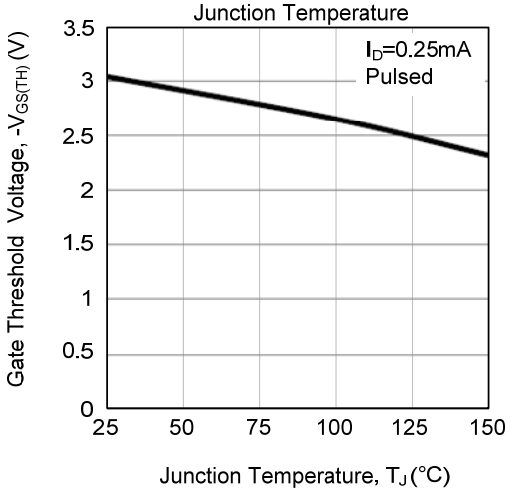




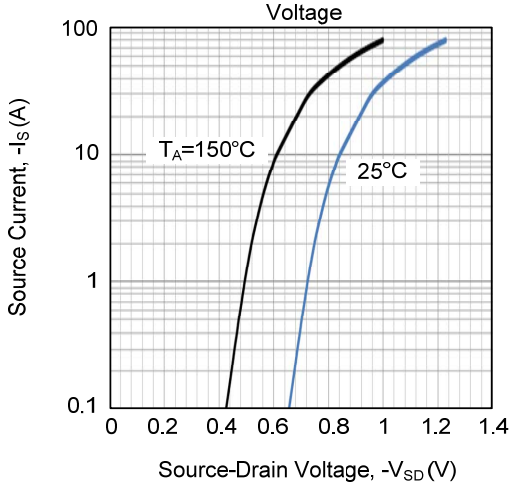


■ TYPICAL CHARACTERISTICS (Cont.)

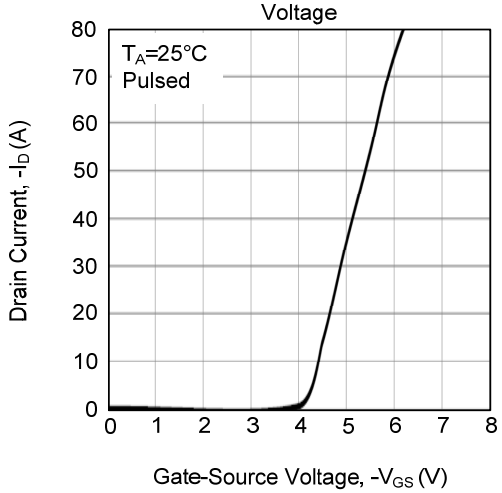
Gate Threshold Voltage vs. Junction Temperature



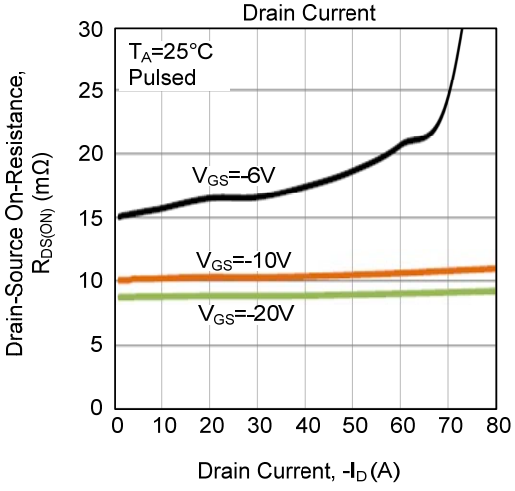
Source Current vs. Source-Drain Voltage



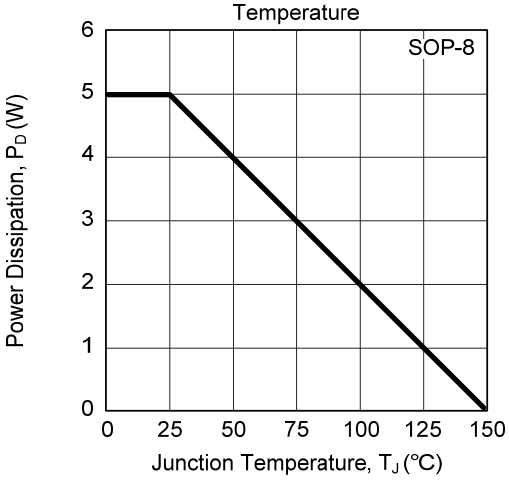
Drain Current vs. Gate-Source Voltage



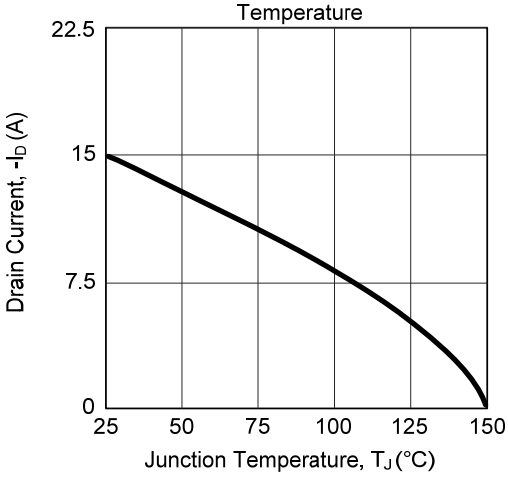
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)