



UTD410

Power MOSFET

N-CHANNEL ENHANCEMENT MODE

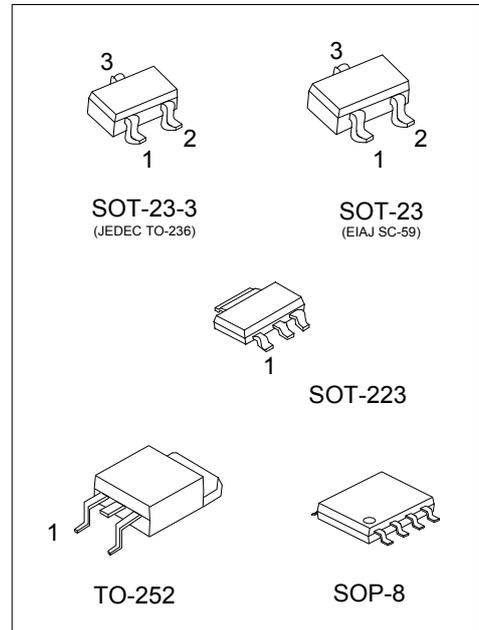
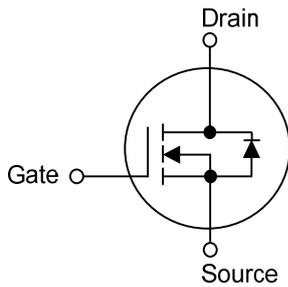
DESCRIPTION

The **UTD410** can provide excellent $R_{DS(ON)}$ and low gate charge by using advanced trench technology. This **UTD410** is suitable for using as a load switch or in PWM applications.

FEATURES

- * $V_{DS}=30V, I_D=8.0A$
- * $R_{DS(ON)} \leq 65\ m\Omega @ V_{GS}=10V, I_D=4.0A$
- $R_{DS(ON)} \leq 105\ m\Omega @ V_{GS}=4.5V, I_D=2.0A$

SYMBOL



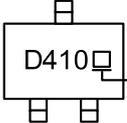
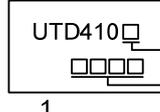
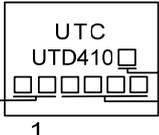
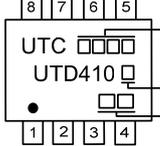
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTD410L-AA3-R	UTD410G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
UTD410L-AE2-R	UTD410G-AE2-R	SOT-23-3	G	S	D	-	-	-	-	-	Tape Reel
UTD410L-AE3-R	UTD410G-AE3-R	SOT-23	G	S	D	-	-	-	-	-	Tape Reel
UTD410L-TN3-R	UTD410G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTD410L-S08-R	UTD410G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UTD410G-AA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AA3: SOT-223, AE2: SOT-23-3, AE3: SOT-23</p> <p> TN3: TO-252, S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

SOT-23-3 / SOT-23	SOT-223
 <p>D410</p> <p>L: Lead Free G: Halogen Free</p>	 <p>UTD410</p> <p>L: Lead Free G: Halogen Free Date Code</p> <p>1</p>
TO-252	SOP-8
 <p>UTC</p> <p>UTD410</p> <p>Lot Code</p> <p>L: Lead Free G: Halogen Free Date Code</p> <p>1</p>	 <p>8 7 6 5</p> <p>UTC</p> <p>UTD410</p> <p>Lot Code</p> <p>1 2 3 4</p> <p>Date Code L: Lead Free G: Halogen Free</p>

■ 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	
Continuous Drain Current		I _D	8	A
Pulsed Drain Current (Note1)		I _{DM}	16	
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	2.5	mJ
Power Dissipation	SOT-223	P _D	1	W
	SOT-23-3		0.5	W
	SOT-23		0.6	W
	TO-252		2	W
	SOP-8		0.8	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.

3. L = 0.1mH, I_{AS} = 7.0A, V_{DD} = 25V, R_G = 25 Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	SOT-223	θ _{JA}	125	°C/W
	SOT-23-3		250	°C/W
	SOT-23		208	°C/W
	TO-252		62.5	°C/W
	SOP-8		156	°C/W

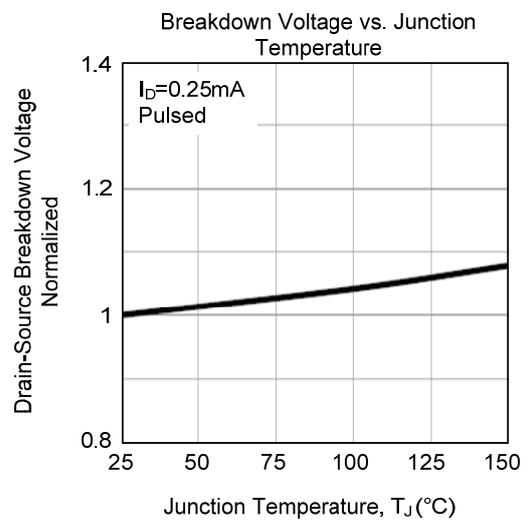
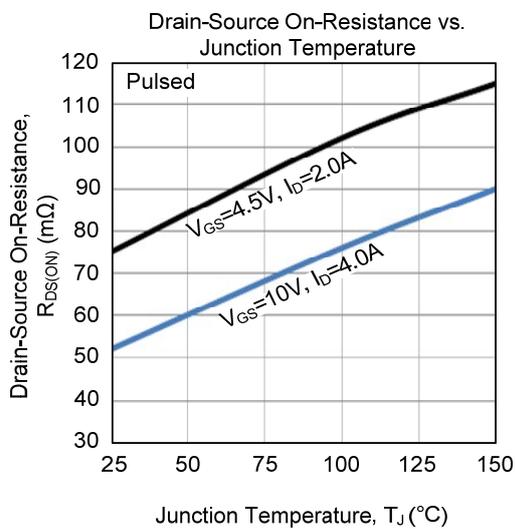
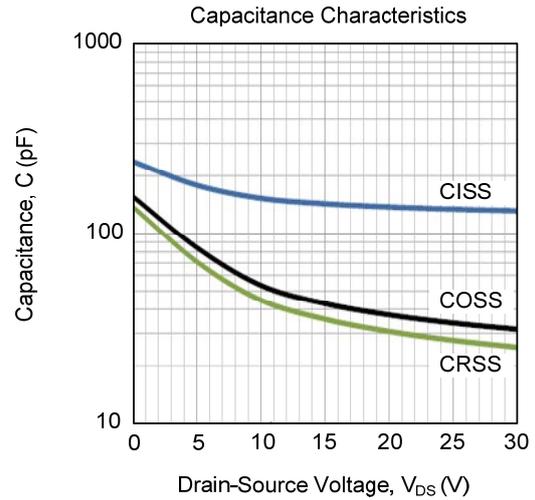
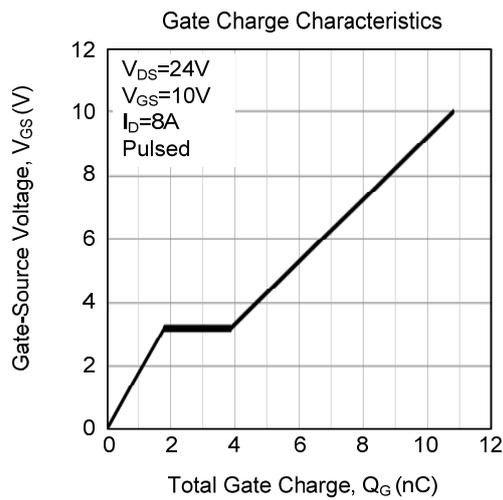
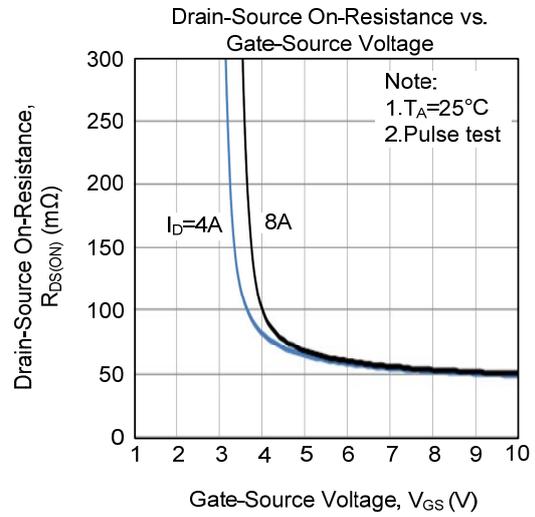
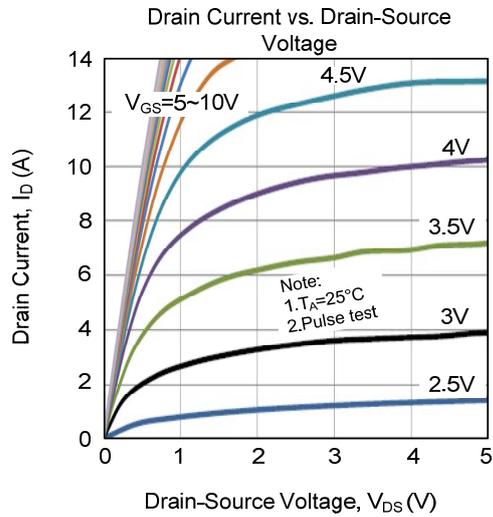
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

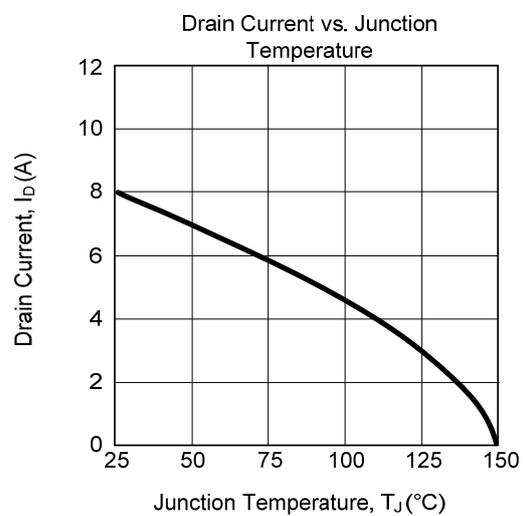
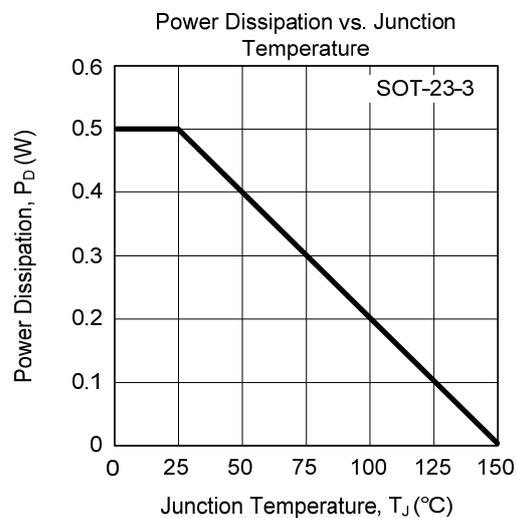
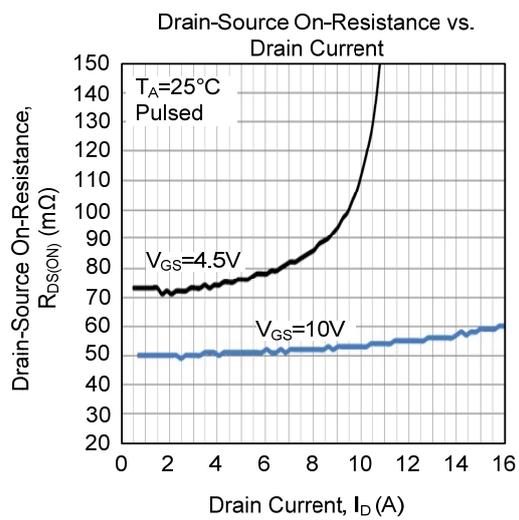
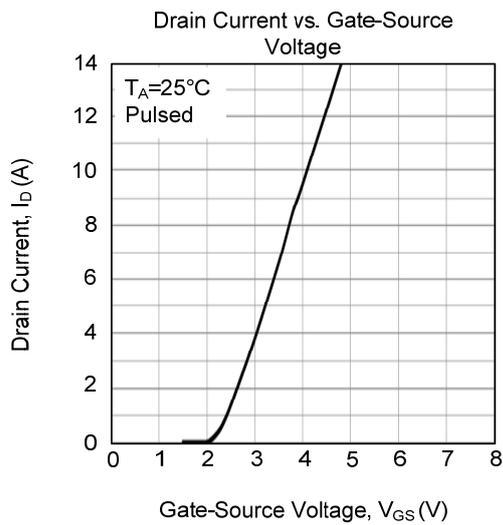
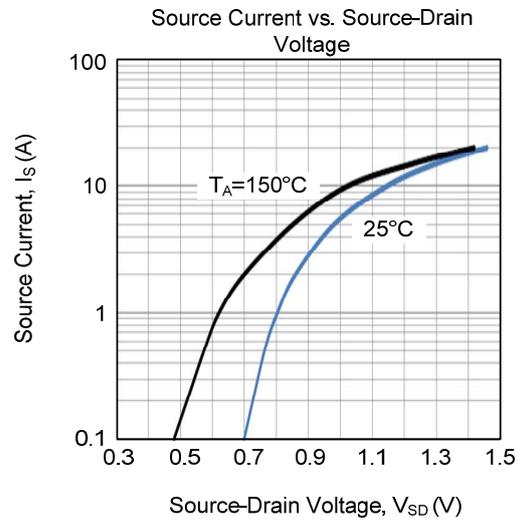
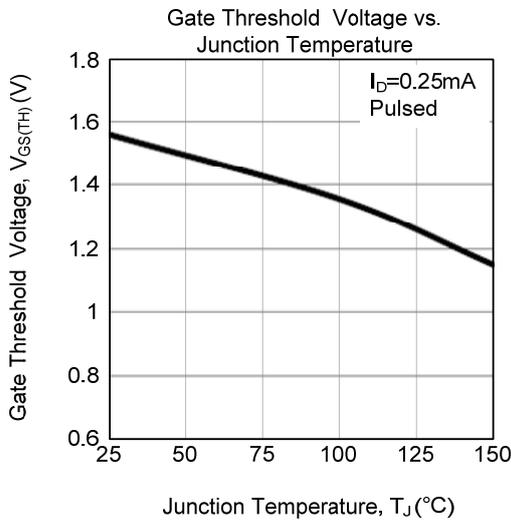
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =24V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =4.0A		50	65	mΩ
		V _{GS} =4.5V, I _D =2.0A		75	105	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =15V, V _{GS} =0V, f=1MHz		142		pF
Output Capacitance	C _{OSS}			43		pF
Reverse Transfer Capacitance	C _{RSS}			35		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =24V, V _{GS} =10V, I _D =8.0A (Note1,2)		10.8		nC
Gate Source Charge	Q _{GS}			1.8		nC
Gate Drain Charge	Q _{GD}			2.2		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DS} =15V, V _{GS} =10V, I _D =8.0A R _G =3Ω (Note1,2)		3		ns
Turn-ON Rise Time	t _R			14		ns
Turn-OFF Delay Time	t _{D(OFF)}			8		ns
Turn-OFF Fall-Time	t _F			14		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				8	A
Maximum Body-Diode Pulsed Current	I _{SM}				16	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =1.0A			1.0	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =8.0A, V _{GS} =0V dI _F /dt=100A/μs		180		ns
Body Diode Reverse Recovery Charge	Q _{rr}				280	

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

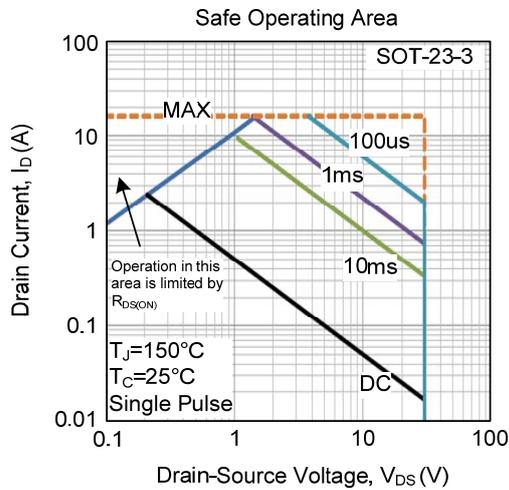
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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