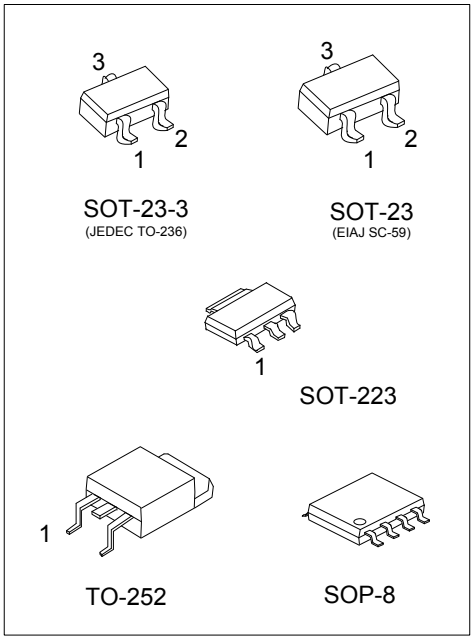
UTD410

Power MOSFET

N-CHANNEL ENHANCEMENT MODE



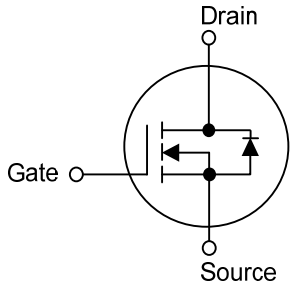
■ DESCRIPTION

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
* $R_{DS(ON)}$ ≤ 65 mΩ @ V_{GS}=10V, I_D=4.0A
  $R_{DS(ON)}$ ≤ 105 mΩ @ V_{GS}=4.5V, I_D=2.0A

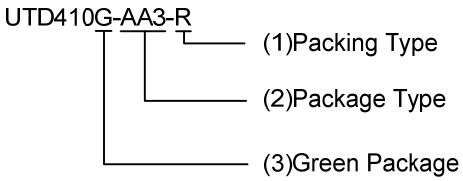
■ SYMBOL



■ ORDERING INFORMATION

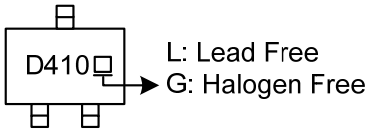
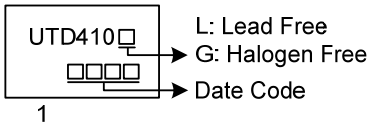
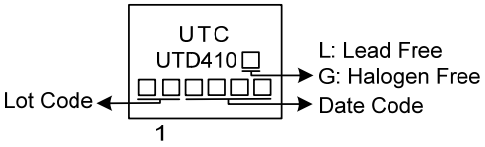
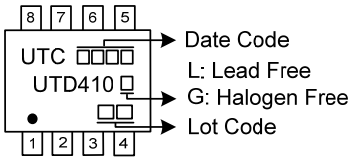
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTD410L-AA3-R	UTD410G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
UTD410L-AE2-R	UTD410G-AE2-R	SOT-23-3	G	S	D	-	-	-	-	-	Tape Reel
UTD410L-AE3-R	UTD410G-AE3-R	SOT-23	G	S	D	-	-	-	-	-	Tape Reel
UTD410L-TN3-R	UTD410G-TN3-R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



(1) R: Tape Reel
(2) AA3: SOT-223, AE2: SOT-23-3, AE3: SOT-23
TN3: TO-252, S08: SOP-8
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-23-3 / SOT-23	SOT-223
	
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	
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.

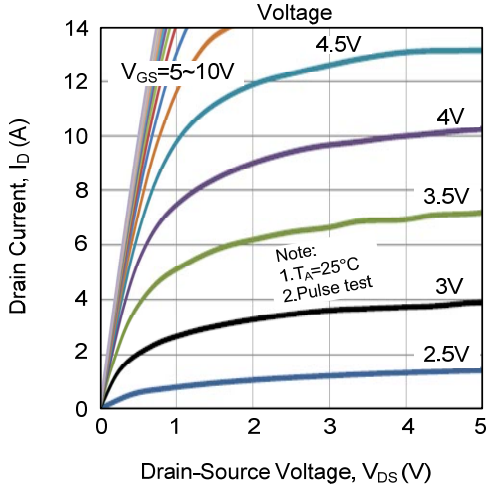
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

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		nC

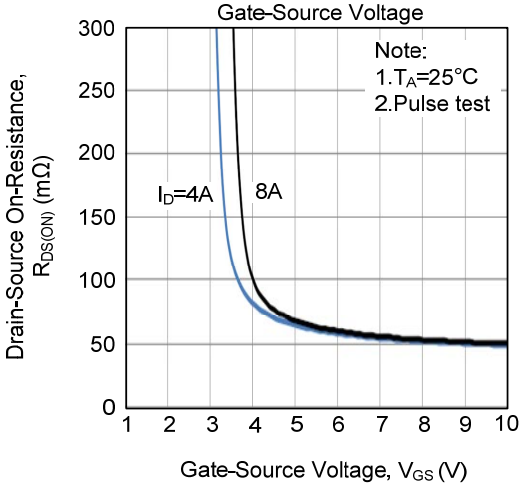
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TYPICAL CHARACTERISTICS

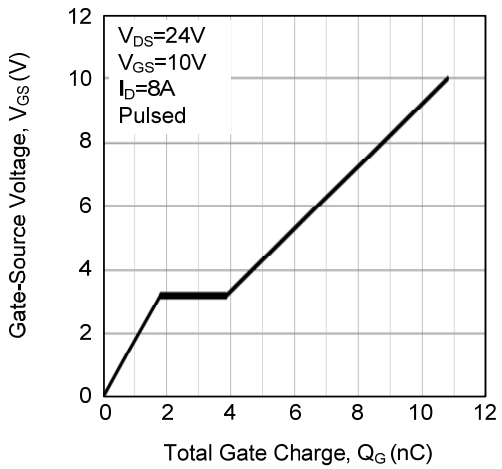
Drain Current vs. Drain-Source Voltage



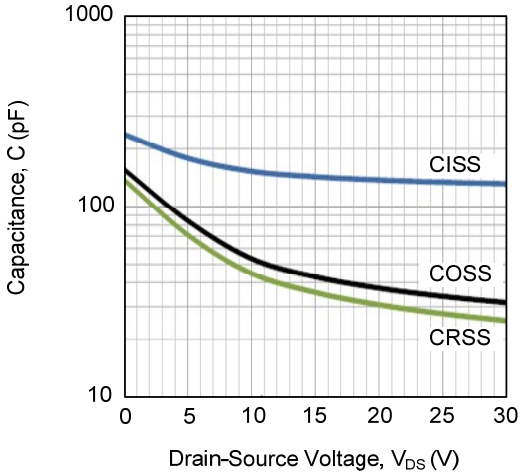
Drain-Source On-Resistance vs. Gate-Source Voltage



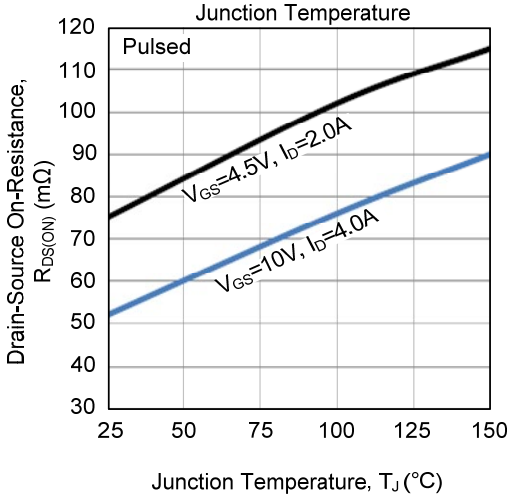
Gate Charge Characteristics



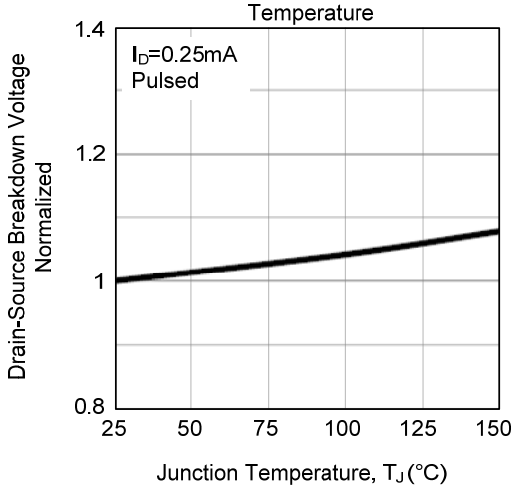
Capacitance Characteristics



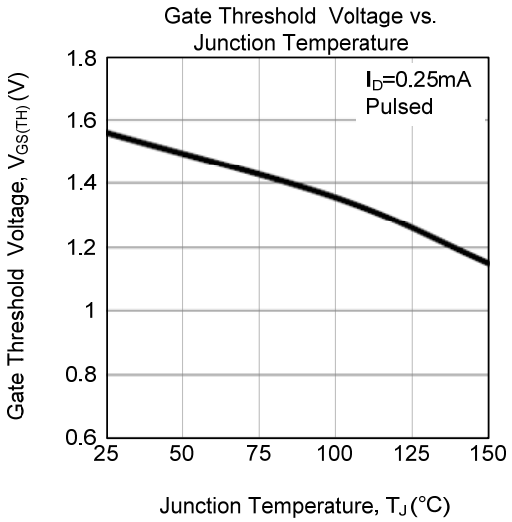
Drain-Source On-Resistance vs. Junction Temperature

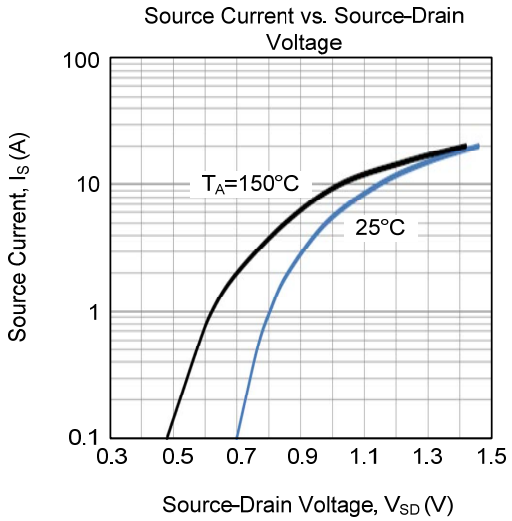


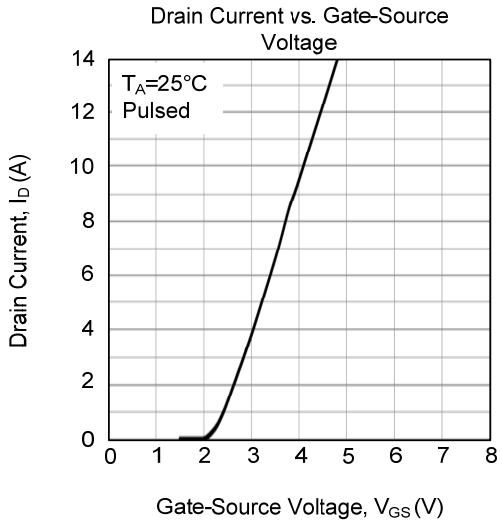
Breakdown Voltage vs. Junction Temperature

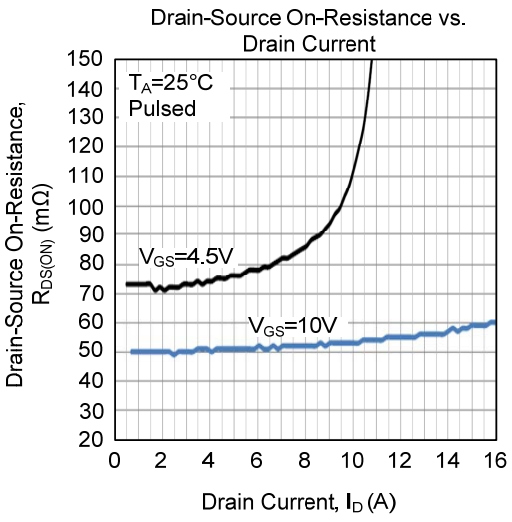


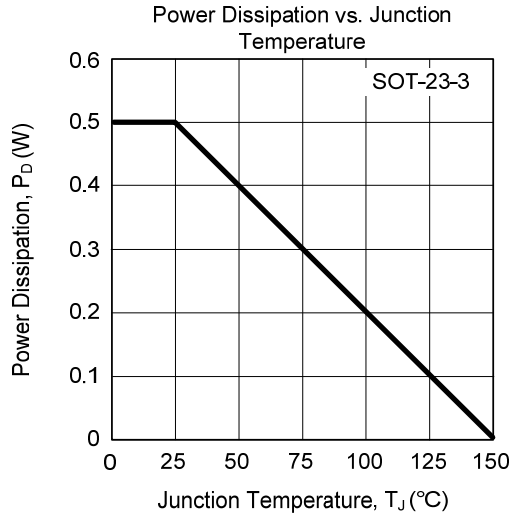
■ TYPICAL CHARACTERISTICS (Cont.)

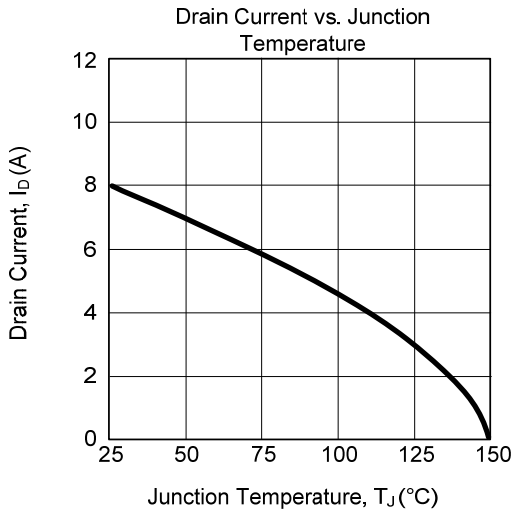












■ TYPICAL CHARACTERISTICS (Cont.)