



UT2302D

Preliminary

Power MOSFET

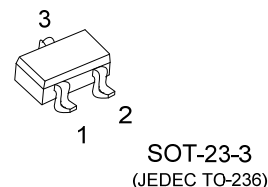
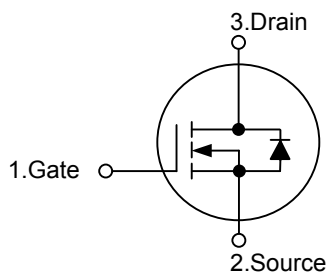
N-CHANNEL ENHANCEMENT MODE

DESCRIPTION

The UTC **UT2302D** is N-channel Power MOSFET, designed with high density cell, with fast switching speed, ultra low on-resistance, and excellent thermal and electrical capabilities.

Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

SYMBOL



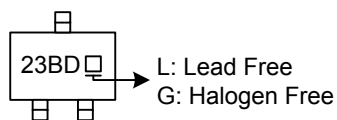
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2302DL-AE2-R	UT2302DG-AE2-R	SOT-23-3	G	S	D	Tape Reel

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

UT2302DG-AE2-R		(1) Packing Type	(1) R: Tape Reel
		(2) Package Type	(2) AE2: SOT-23-3
		(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 8	V
Drain Current	Continuous	I_D	2.4	A
	Pulsed (Note 2)	I_{DM}	10	A
Power Dissipation		P_D	0.4	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

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	θ_{JA}	312	$^\circ\text{C/W}$

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

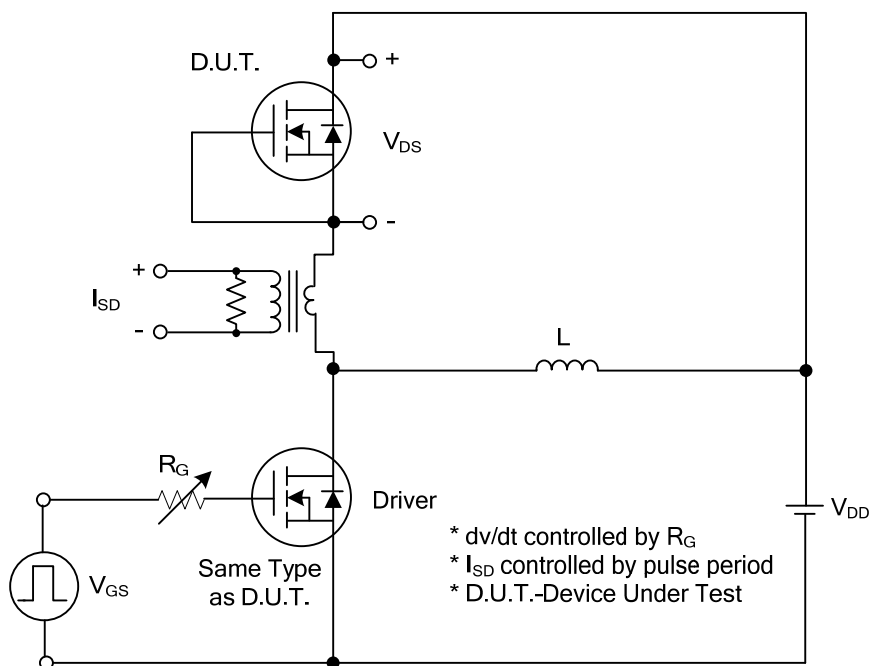
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	20			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =20V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =8V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-8V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	0.45		1.2	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =4.5V, I _D =7.2A			90	mΩ
			V _{GS} =2.5V, I _D =3.1A			120	mΩ
			V _{GS} =1.8V, I _D =3.0A			182	mΩ
			DYNAMIC CHARACTERISTICS				
Input Capacitance		C _{ISS}	V _{DS} =10V, V _{GS} =0V, f=1MHz		69		pF
Output Capacitance		C _{OSS}			31		pF
Reverse Transfer Capacitance		C _{RSS}			22		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =16V, V _{GS} =10V, I _D =2.0A, I _G =1mA (Note 1, 2)		7		nC
Gate to Source Charge		Q _{GS}			2		nC
Gate to Drain Charge		Q _{GD}			0.6		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =10V, V _{GS} =10V, I _D =2.0A, R _G =6Ω (Note 1, 2)		2		ns
Rise Time		t _R			14		ns
Turn-OFF Delay Time		t _{D(OFF)}			9		ns
Fall-Time		t _F			15		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				2.4	A
Maximum Body-Diode Pulsed Current		I _{SM}				10	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =2.0A, V _{GS} =0V			1.4	V

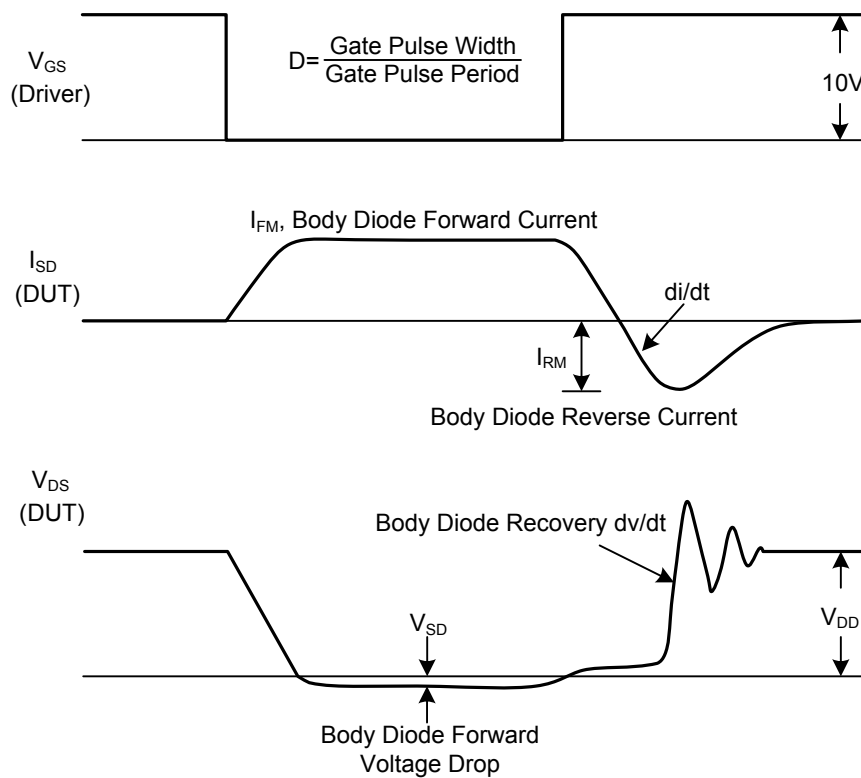
Notes: 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

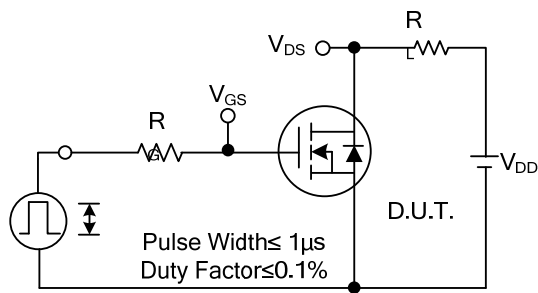


Peak Diode Recovery dv/dt Test Circuit

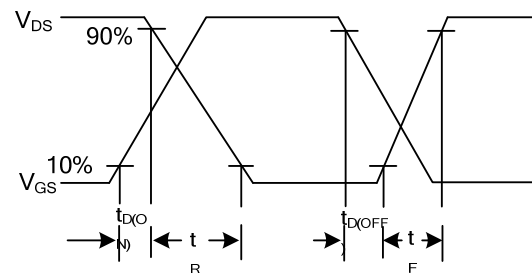


Peak Diode Recovery dv/dt Waveforms

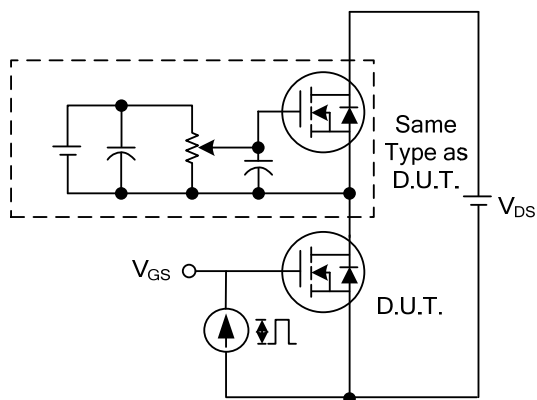
TEST CIRCUITS AND WAVEFORMS



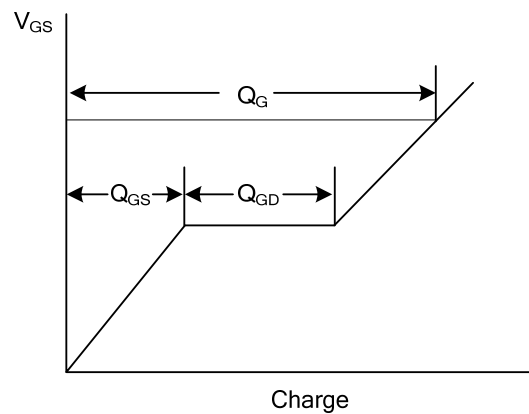
Switching Test Circuit



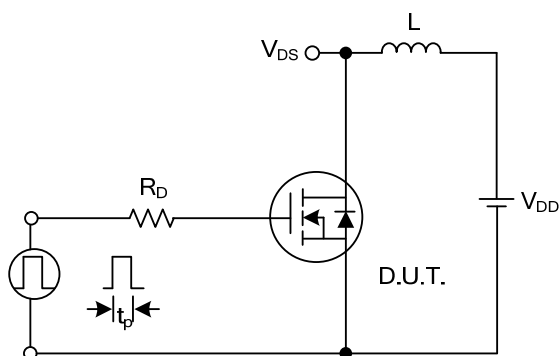
Switching Waveforms



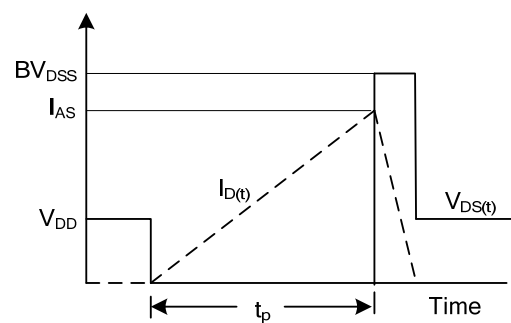
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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