



## UTR4502

Power MOSFET

### -1.95A, -30V P-CHANNEL POWER MOSFET

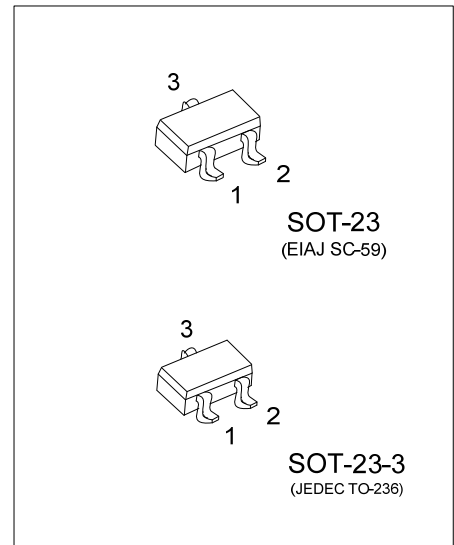
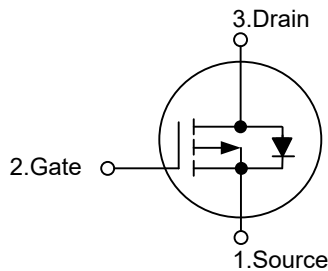
#### DESCRIPTION

The **UTR4502** uses UTC advanced 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

- \*  $R_{DS(ON)} \leq 200 \text{ m}\Omega$  @  $V_{GS} = -10V, I_D = -1.95A$
- \*  $R_{DS(ON)} \leq 350 \text{ m}\Omega$  @  $V_{GS} = -4.5V, I_D = -1.5A$
- \* Low capacitance
- \* Optimized gate charge
- \* Fast switching capability
- \* Avalanche energy specified

#### SYMBOL



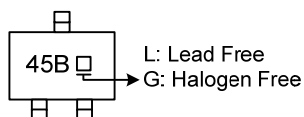
#### ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTR4502L-AE2-R	UTR4502G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UTR4502L-AE3-R	UTR4502G-AE3-R	SOT-23	G	S	D	Tape Reel

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

<p>UTR4502G-AE2-R</p>	<p>(1) R: Tape Reel (2) AE2: SOT-23-3, AE3: SOT-23 (3) G: Halogen Free and Lead Free , L: Lead Free</p>
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#### MARKING



■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V <sub>DSS</sub>	-30	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	-1.13	A
Pulsed Drain Current (Note 1, 2)	I <sub>DM</sub>	-6.8	A
Power Dissipation	SOT-23	0.6	W
	SOT-23-3	0.5	W
Junction Temperature	T <sub>J</sub>	+150	°C
Storage Temperature	T <sub>STG</sub>	-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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction-to-Ambient	SOT-23	208	°C/W
	SOT-23-3	250	°C/W

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

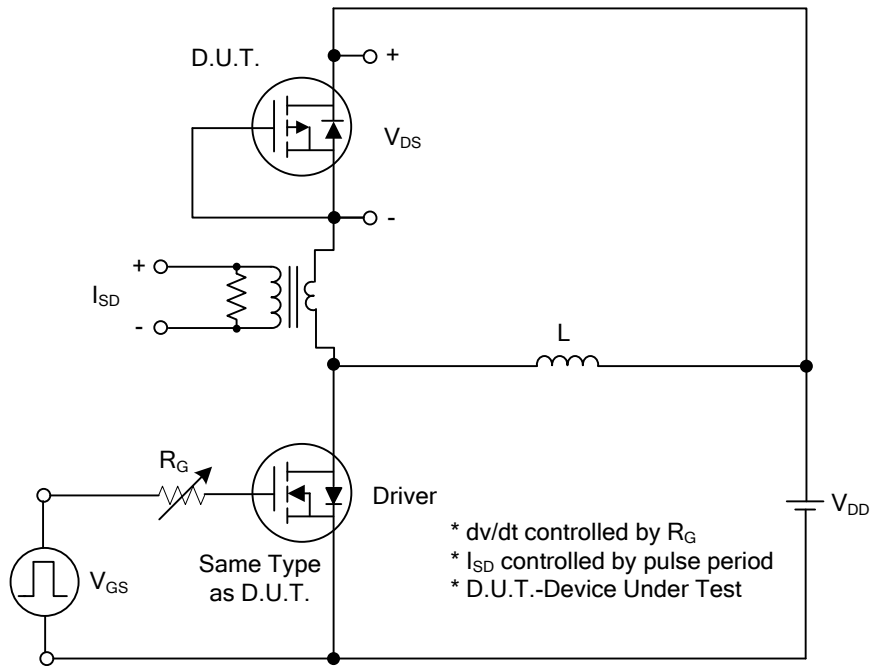
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0 V, I <sub>D</sub> =-250μA	-30			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V			-1	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
<b>ON CHARACTERISTICS (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0		-3.0	V
Static Drain-Source On-Resistance (Note 2)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-1.95A			200	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.5A			350	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz		165		pF
Output Capacitance	C <sub>OSS</sub>			38		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			25		pF
<b>SWITCHING PARAMETERS (Note 4)</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> =-24V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-1.13A		8		nC
Gate Source Charge	Q <sub>GS</sub>			2.2		nC
Gate Drain Charge	Q <sub>GD</sub>			0.8		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-1.13A, R <sub>G</sub> =6Ω		4		ns
Turn-ON Rise Time	t <sub>R</sub>			15		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			8		ns
Turn-OFF Fall-Time	t <sub>F</sub>			18		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (Note 3)</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				-1.13	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				-6.8	A
Drain-Source Diode Forward Voltage(Note2)	V <sub>SD</sub>	I <sub>S</sub> =-1.25A, V <sub>GS</sub> =0V			-1.2	V

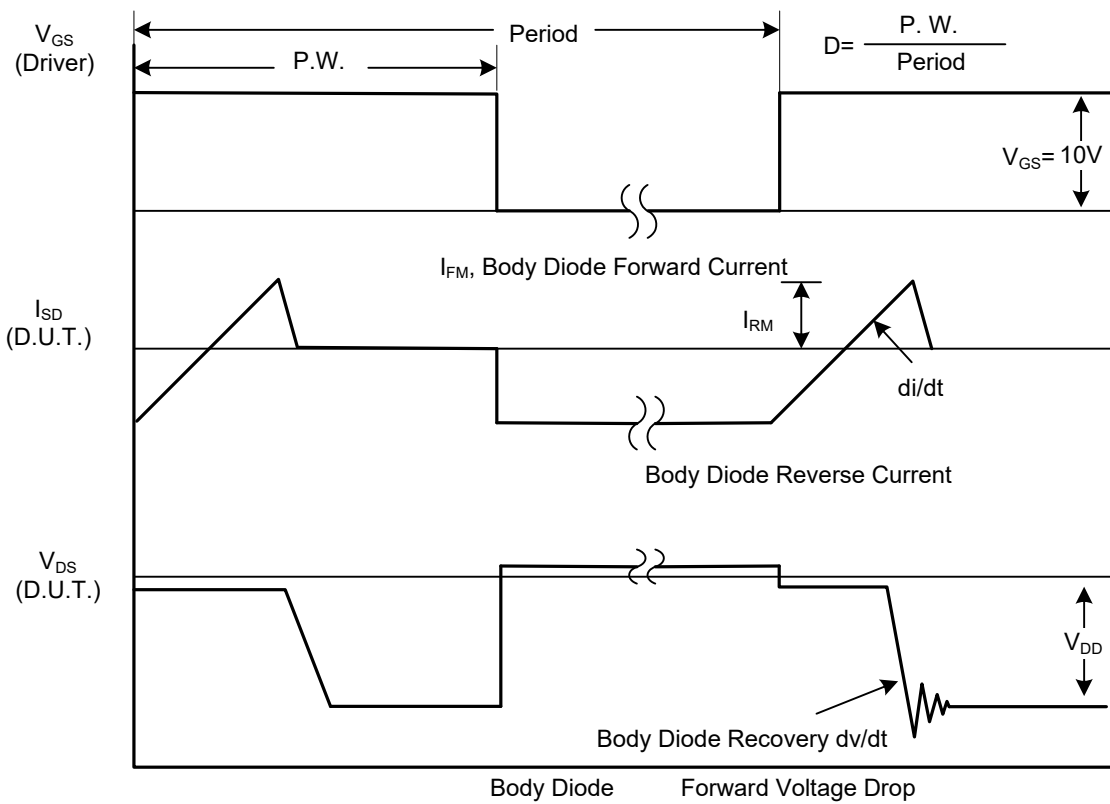
Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

■ TEST CIRCUITS AND WAVEFORMS

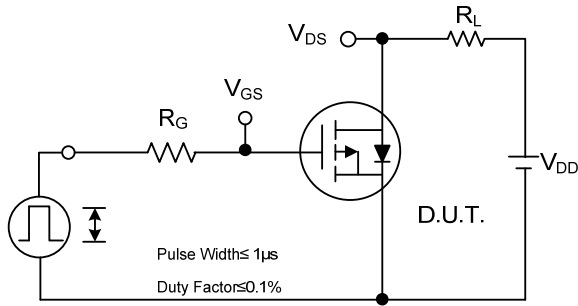


Peak Diode Recovery  $dv/dt$  Test Circuit

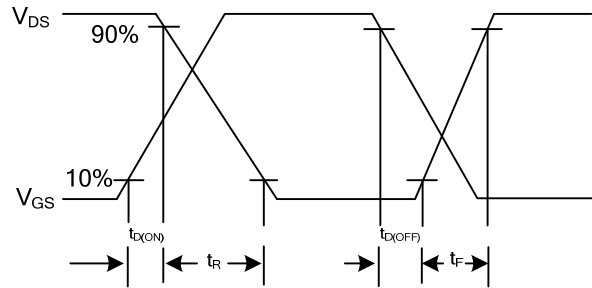


Peak Diode Recovery  $dv/dt$  Waveforms

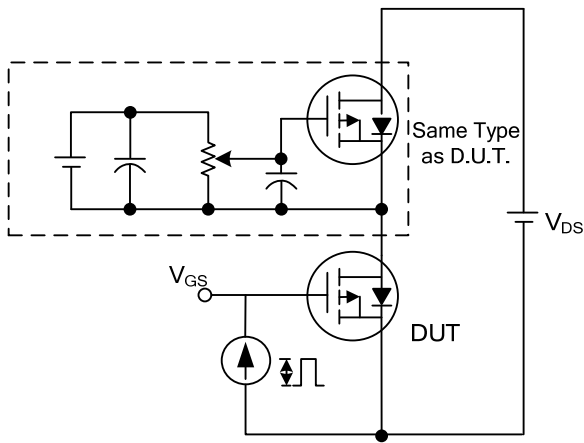
■ TEST CIRCUITS AND WAVEFORMS



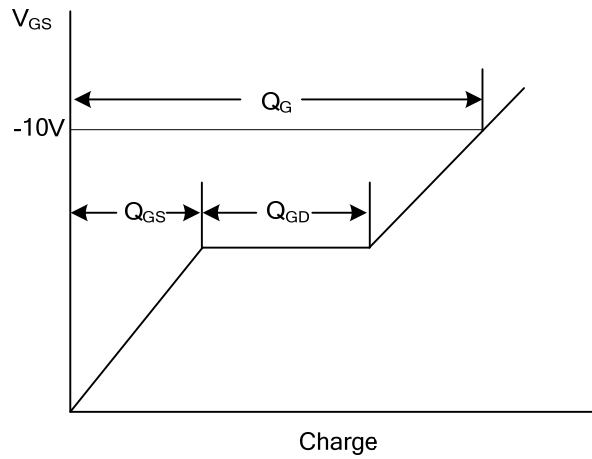
Switching Test Circuit



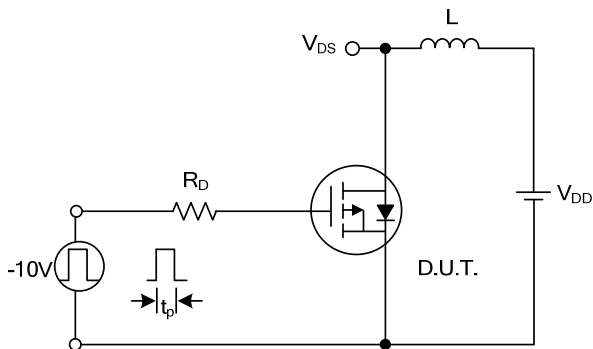
Switching Waveforms



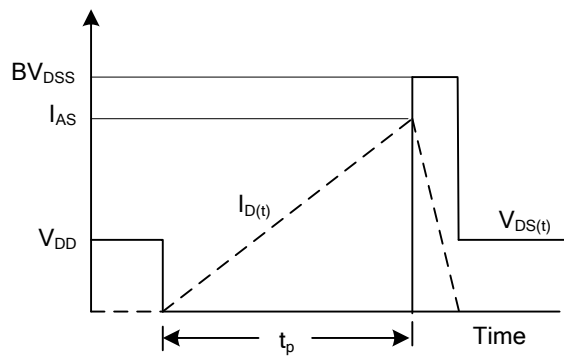
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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