



## UML2502

Power MOSFET

### N-CHANNEL POWER MOSFET

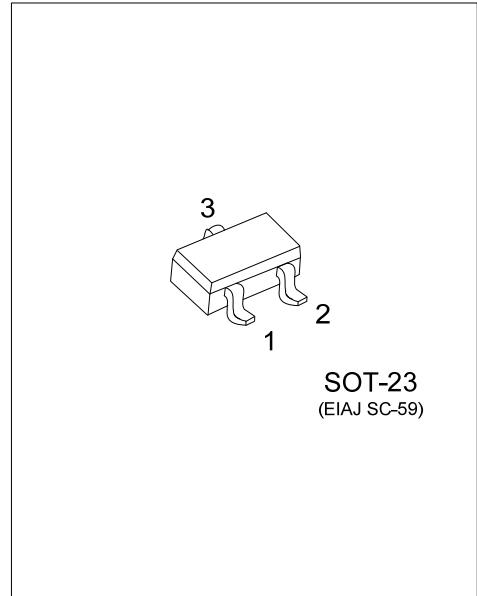
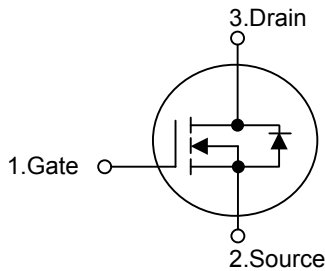
#### DESCRIPTION

The **UML2502** 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

- \*  $R_{DS(ON)} \leq 45m\Omega$  @  $V_{GS}=4.5V, I_D=4.2A$
- \*  $R_{DS(ON)} \leq 80m\Omega$  @  $V_{GS}=2.5V, I_D=3.6A$
- \* Ultra Low Gate Charge (Max. 12nC )
- \* Low Reverse Transfer Capacitance (  $C_{RSS}$  = Typical 66pF )
- \* Fast Switching Capability
- \* Avalanche Energy Specified
- \* Improved dv/dt Capability

#### SYMBOL



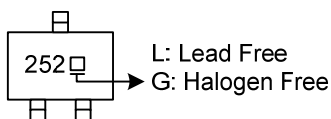
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UML2502L-AE3-R	UML2502G-AE3-R	SOT-23	G	S	D	Tape Reel

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

<p>UF07P15G-AE3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AE3: SOT-23 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	20	V
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current $V_{GS}=4.5\text{V}$	$I_D$	4.2	A
Pulsed Drain Current (Note 2)	$I_{DM}$	33	A
Maximum Power Dissipation	$P_D$	1.25	W
Linear Derating Factor		0.01	W/ $^\circ\text{C}$
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 CHARACTERISTICS

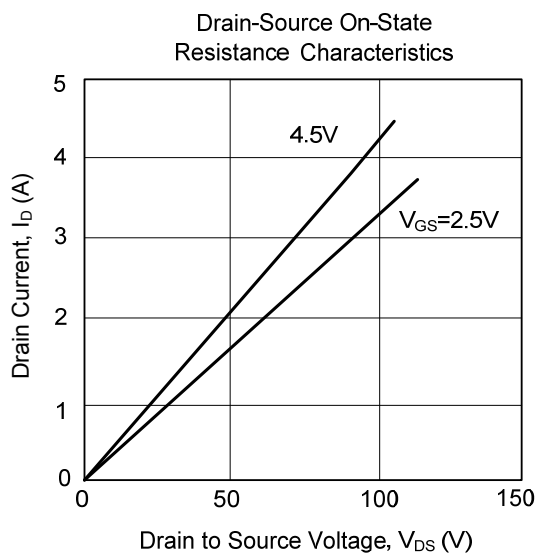
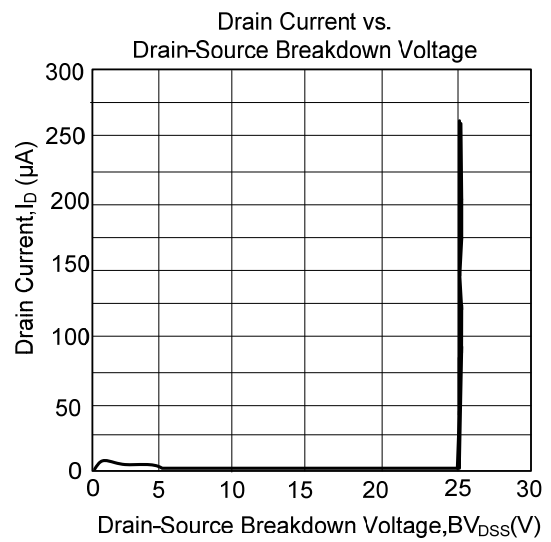
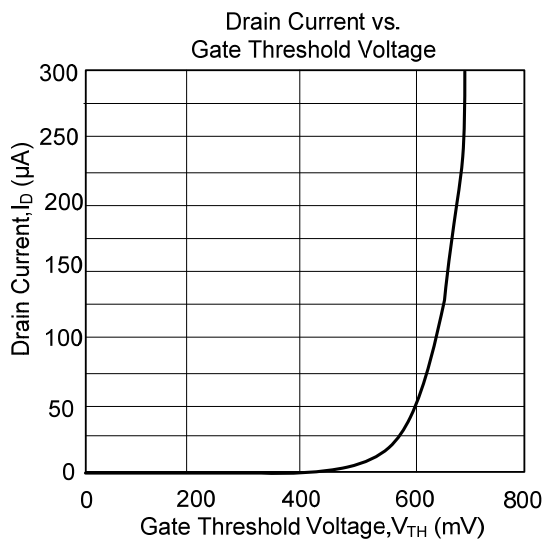
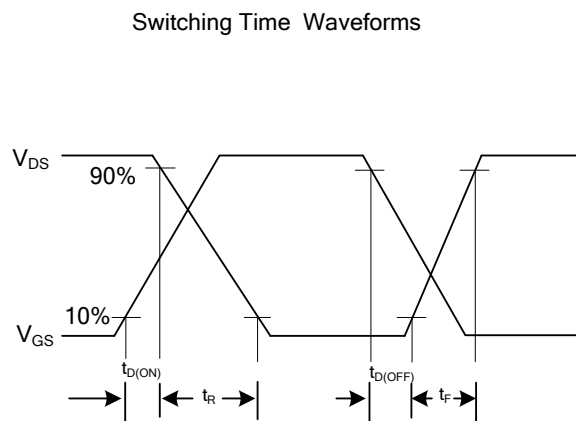
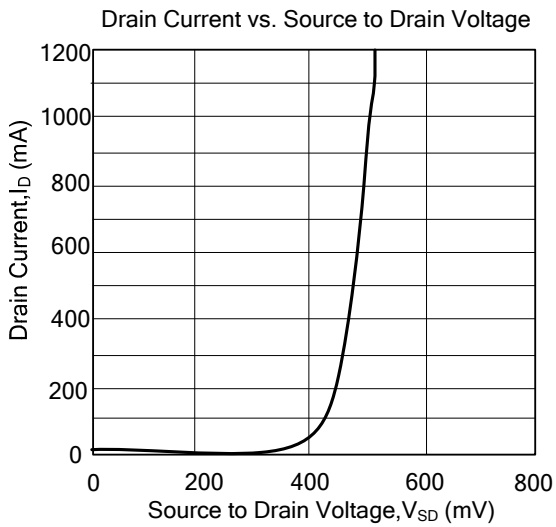
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	75 ~ 100	$^\circ\text{C/W}$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}$ , $I_D=250\mu\text{A}$	20			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{GS}=0\text{V}$ , $V_{DS}=16\text{V}$			1	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12\text{V}$ , $V_{DS}=0\text{V}$			$\pm 100$	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$		0.01		V/ $^\circ\text{C}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	0.6		1.2	V
Drain-Source On-State Resistance (Note)	$R_{DS(ON)}$	$V_{GS}=4.5\text{V}$ , $I_D=4.2\text{A}$		35	45	m $\Omega$
		$V_{GS}=2.5\text{V}$ , $I_D=3.6\text{A}$		50	80	
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1.0\text{MHz}$		740		pF
Output Capacitance	$C_{OSS}$			90		pF
Reverse Transfer Capacitance	$C_{RSS}$			66		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note)	$Q_G$	$V_{GS}=5.0\text{V}$ , $V_{DS}=10\text{V}$ , $I_D=4.0\text{A}$		8.0	12	nC
Gate Source Charge	$Q_{GS}$			1.8	2.7	nC
Gate Drain Charge	$Q_{GD}$			1.7	2.6	nC
Turn-ON Delay Time (Note)	$t_{D(ON)}$	$V_{DS}=10\text{V}$ , $R_G=6\Omega$ , $R_D=10\Omega$ , $I_D=1.0\text{A}$		7.5		ns
Turn-ON Rise Time	$t_R$			10		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			54		ns
Turn-OFF Fall-Time	$t_F$			26		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				1.3	A
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				33	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0\text{V}$ , $I_S=1.3\text{A}$ , $T_J=25^\circ\text{C}$ (Note)			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=1.3\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$ ,		16	24	ns
Reverse Recovery Charge	$Q_{rr}$	$T_J=25^\circ\text{C}$ (Note)		8.6	13	nC

Notes: Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## TYPICAL CHARACTERISTICS



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