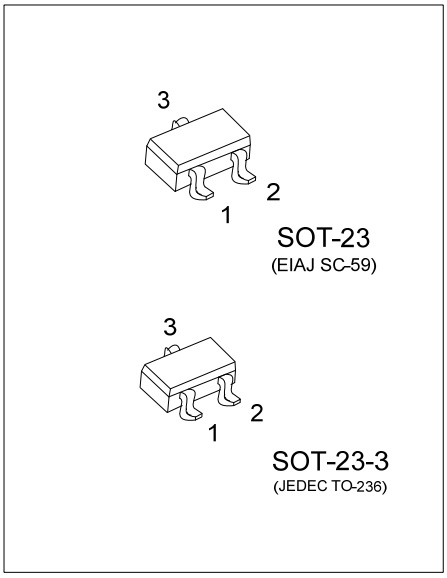
UML2502

Power MOSFET

N-CHANNEL POWER MOSFET



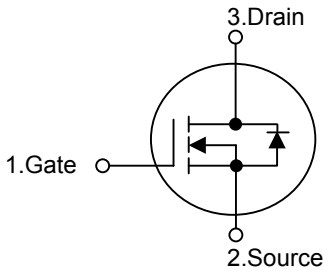
■ DESCRIPTION

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

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

■ SYMBOL



■ ORDERING INFORMATION

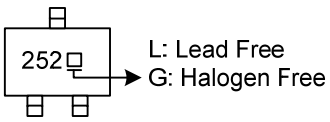
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UML2502L-AE2-R	UML2502G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UML2502L-AE3-R	UML2502G-AE3-R	SOT-23	G	S	D	Tape Reel

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

UML2502G-AE2-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AE2: SOT-23-3, AE3: SOT-23
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current V_{GS}=4.5V		I_D	4.2	A
Pulsed Drain Current (Note 2)		I_{DM}	10	A
Maximum Power Dissipation (T_A=25°C)	SOT-23-3	P_D	0.5	W
	SOT-23		0.6	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.

■ THERMAL DATA

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

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

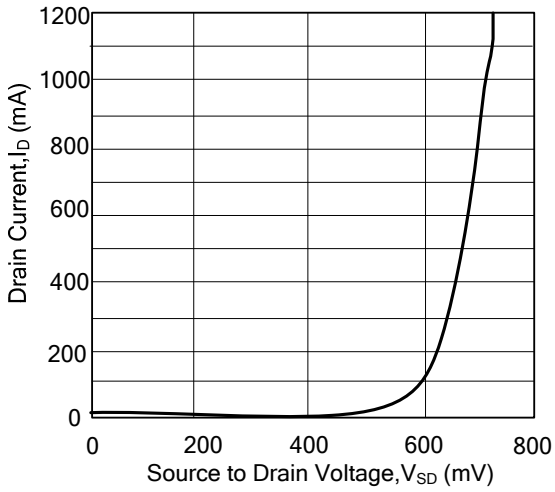
■ Electrical Characteristics (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	20			V
Drain-Source Leakage Current	I_{DSS}	V_{GS}=0V, V_{DS}=16V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±12V, 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
Drain-Source On-State Resistance (Note)	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4.2A		30	45	mΩ
		V_{GS}=2.5V, I_D=3.6A		50	80	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=15V, f=1.0MHz		192		pF
Output Capacitance	C_{OSS}			55		pF
Reverse Transfer Capacitance	C_{RSS}			44		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note)	Q_G	V_{DS}=10V, V_{GS}=4.5V, I_D=3.0A		8		nC
Gate Source Charge	Q_{GS}			1.2		nC
Gate Drain Charge	Q_{GD}			2.4		nC
Turn-ON Delay Time (Note)	$t_{D(ON)}$	V_{DS}=10V, V_{GS}=4.5V, I_D=3.0A, R_G=3Ω		3.5		ns
Turn-ON Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			11		ns
Turn-OFF Fall-Time	t_F			23		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				1.3	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				10	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1.3A, T_J=25°C (Note)			1.2	V

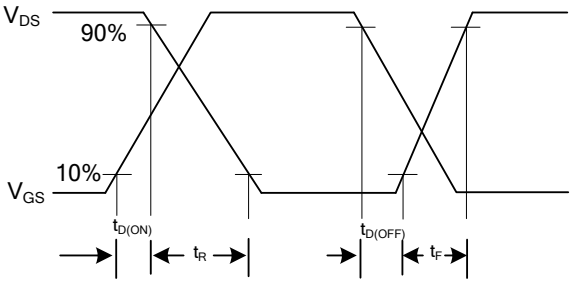
Notes: Pulse width ≤ 300μs; duty cycle ≤ 2%.

■ TYPICAL CHARACTERISTICS

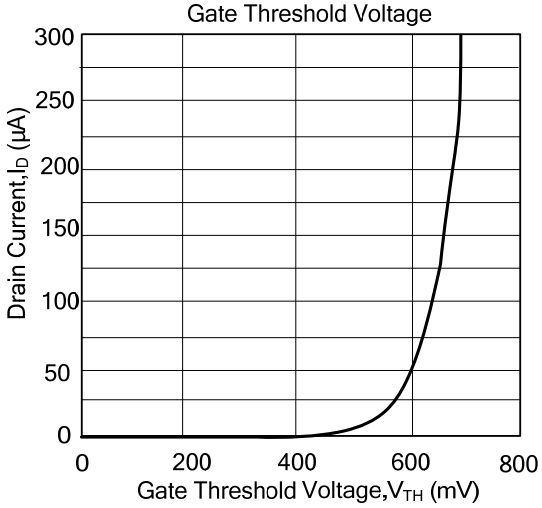
Drain Current vs. Source to Drain Voltage



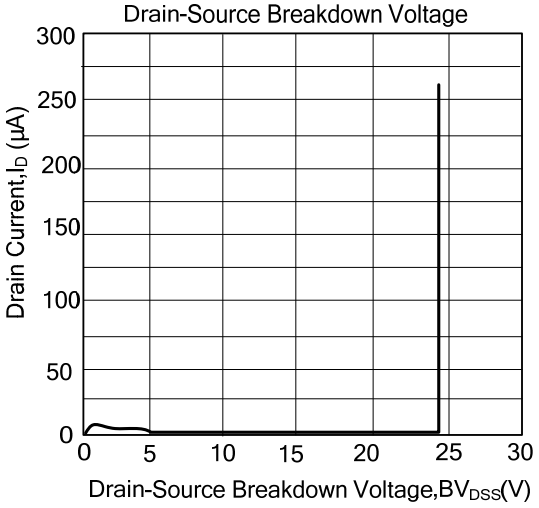
Switching Time Waveforms



Drain Current vs.
Gate Threshold Voltage



Drain Current vs.
Drain-Source Breakdown Voltage



Drain-Source On-State
Resistance Characteristics