

1.Description

The IRLML2803TR uses advanced trench technology to provide excellent $R_{DS(on)}$ with low gate charge. This device is suitable for use as a load switch or in PWM applications.

3.Application

- Generation V Technology UltraLowOn- Resistance
- Low Profile (<1.1mm)
- Available in Tape and Reel

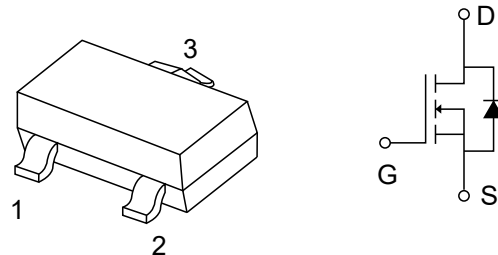
2.Features

- $V_{DS(V)}=30V$
- $R_{DS(on)}<150m\Omega(V_{GS}=10V)$
- $R_{DS(on)}<200m\Omega(V_{GS}=4.5V)$
- Fast Switching
- Lead-Free
- RoHS Compliant Halogen-Free

4.Pinning information

Pin	Symbol	Description
1	G	GATE
2	S	SOURCE
3	D	DRAIN

SOT-23



5.Maximum ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter		Symbol	Value	Units
Continuous Drain Current, V_{GS} @ 10V	$T_A=25^{\circ}C$	I_D	1.2	A
Continuous Drain Current, V_{GS} @ 10V	$T_A=70^{\circ}C$		0.93	
Pulsed Drain Current ①		I_{DM}	7.3	
Power Dissipation	$T_A=25^{\circ}C$	P_D	540	mW
Linear Derating Factor			4.3	mW/ $^{\circ}C$
Gate-to-Source Voltage		V_{GS}	± 20	V
Single Pulse Avalanche Energy ⑤		E_{AS}	3.9	mJ
Peak diode Recovery dv/dt ②		dv/dt	5	V/ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}C$



6. Thermal Resistance Rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambien ④	$R_{\theta JA}$		230	°C/W

7. Electrical Characteristics $T_J=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	$I_D=1\text{mA}$, Reference to 25°C		0.029		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=0.91\text{A}$ ③			150	mΩ
		$V_{GS}=4.5\text{V}$, $I_D=0.46\text{A}$ ③			200	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1			V
Forward Transconductance	g_{fs}	$V_{DS}=10\text{V}$, $I_D=0.46\text{A}$	0.87			S
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$			25	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=-20\text{V}$			-100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=20\text{V}$			100	
Total Gate Charge	Q_g	$I_D=0.91\text{A}$		3.3	5	nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=24\text{V}$		0.48	0.72	
Gate-to-Drain ("Miller") Charge	Q_{gd}	$V_{GS}=10\text{V}$, See Fig.6 and 9 ③		1.1	1.7	
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=15\text{V}$		3.9		ns
Rise Time	t_r	$I_D=0.91\text{A}$		4		
Turn-Off Delay Time	$t_{D(off)}$	$R_G=6.2\Omega$		9		
Fall Time	t_f	$R_D=16\Omega$, See Fig.10 ③		1.7		
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$		85		pF
Output Capacitance	C_{oss}	$V_{DS}=25\text{V}$		34		
Reverse Transfer Capacitance	C_{rss}	$f=1\text{MHz}$, See Fig.5		15		



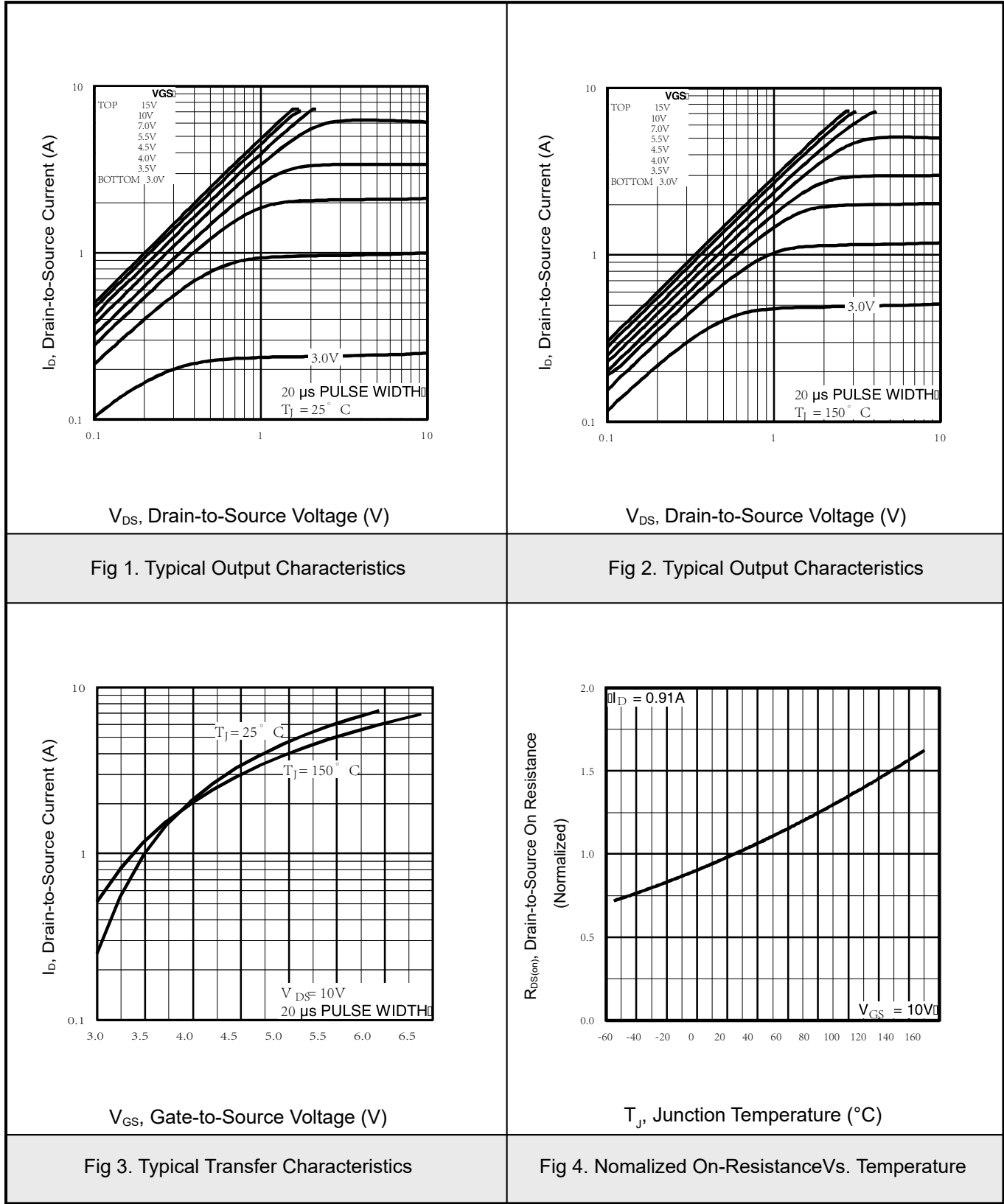
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			0.54	A
Pulsed Source Current (Body Diode) ①	I_{SM}				7.3	
Diode Forward Voltage	V_{SD}	$T_J=25^{\circ}\text{C}, I_S=0.91\text{A}, V_{GS}=0\text{V}$ ③			1.2	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=0.91\text{A}$		26	40	ns
Reverse Recovery Charge	Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$ ③		22	32	nC

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig.11)
- ② $I_{SD} \leq 0.91\text{A}$, $di/dt \leq 120\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^{\circ}\text{C}$
- ③ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ Surface mounted on FR-4 board, $t_s \leq 5\text{sec}$.
- ⑤ Limited by T_{Jmax} , starting $T_J = 25^{\circ}\text{C}$, $L = 9.4\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 0.9\text{A}$.

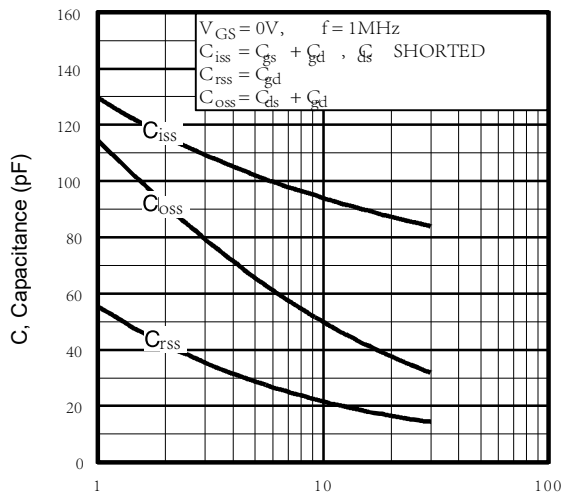


8.1Typical Characteristics



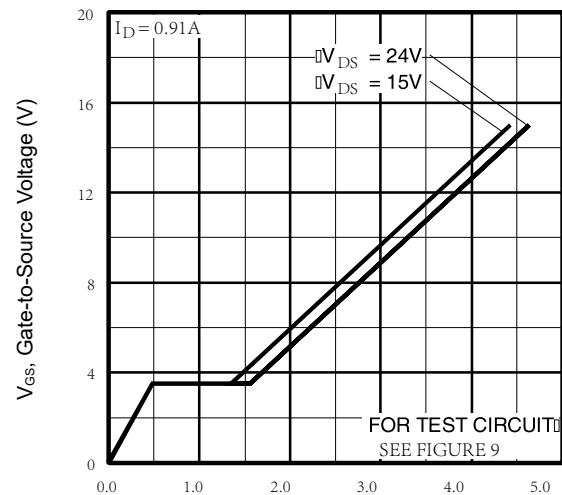


8.2 Typical Characteristics



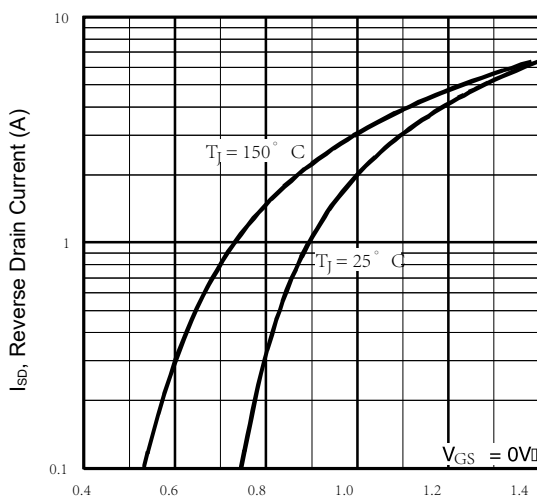
V_{DS} , Drain-to-Source Voltage (V)

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage



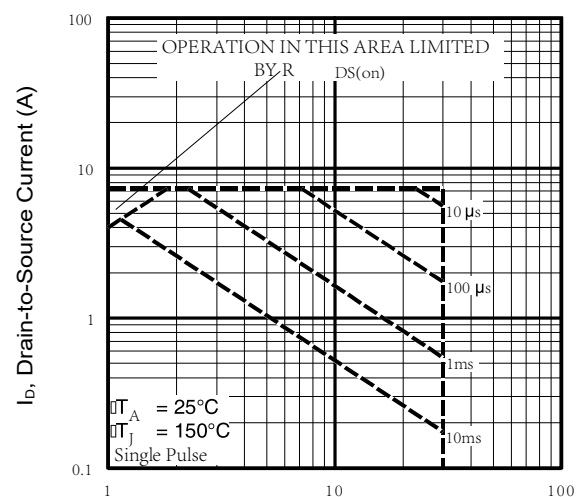
Q_g , Total Gate Charge (nC)

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage



V_{SD} , Source-to-Drain Voltage (V)

Fig 7. Typical Source-Drain Diode Forward Voltage



V_{DS} , Drain-to-Source Voltage (V)

Fig 8. Maximum Safe Operating Area



8.3Typical Characterisitics

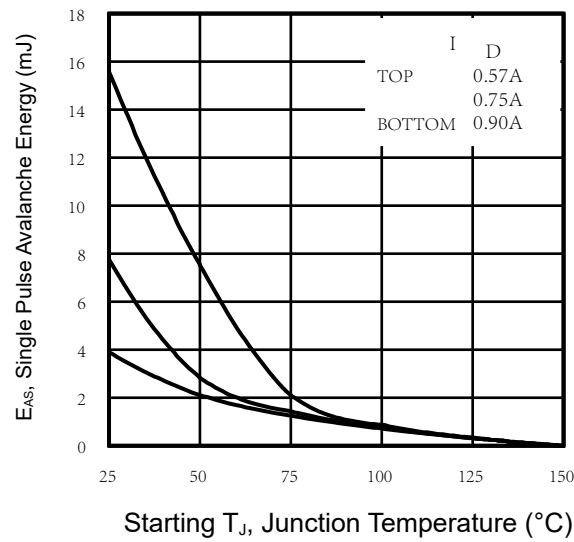


Fig 9. Maximum Avalanche Energy vs. Drain Current

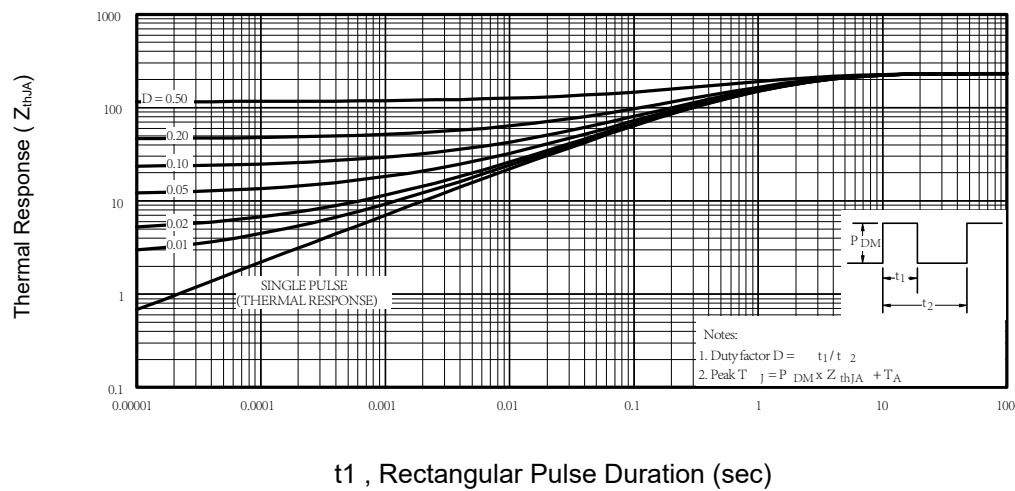


Fig 10. Typical Effective Transient Thermal Impedance, Junction-to-Ambient



8.4 Typical Characteristics

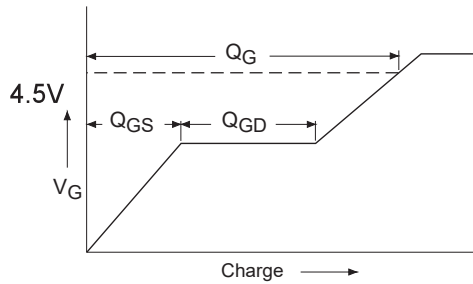


Fig 11a. Basic Gate Charge Waveform

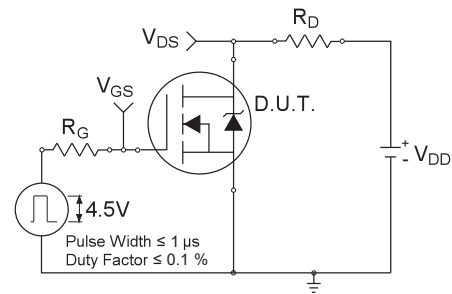


Fig 11a. Switching Time Test Circuit

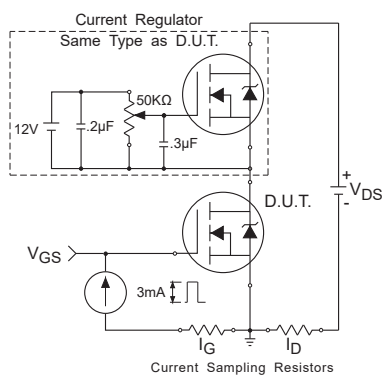


Fig 12a. Gate Charge Test Circuit

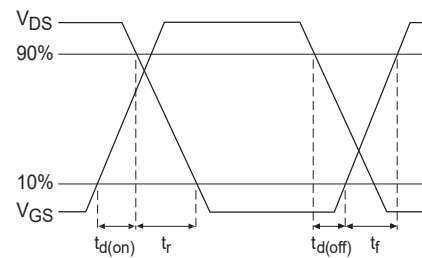


Fig 12b. Switching Time Waveforms

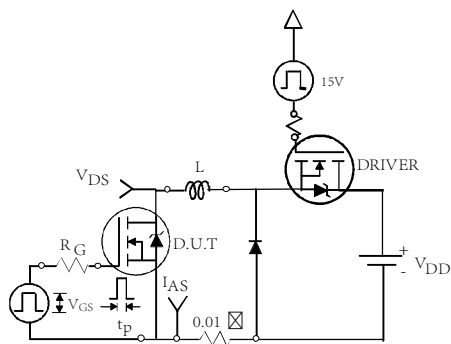


Fig 13a. Unclamped Inductive Test Circuit

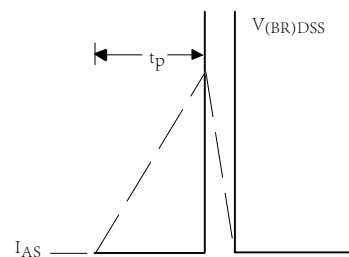


Fig 13b. Unclamped Inductive Waveforms



8.5 Typical Characteristics

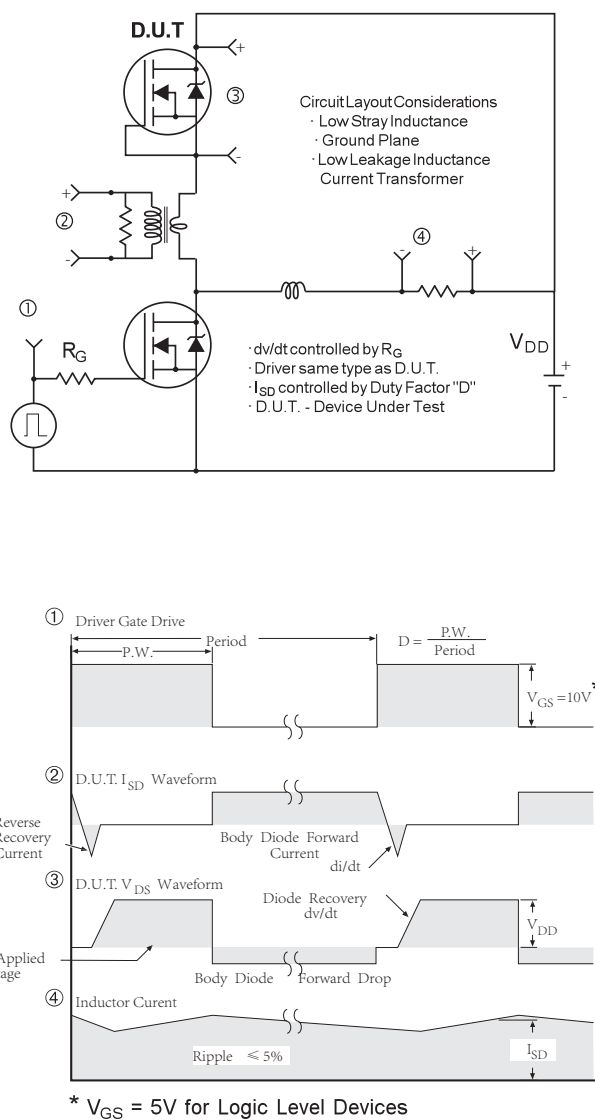
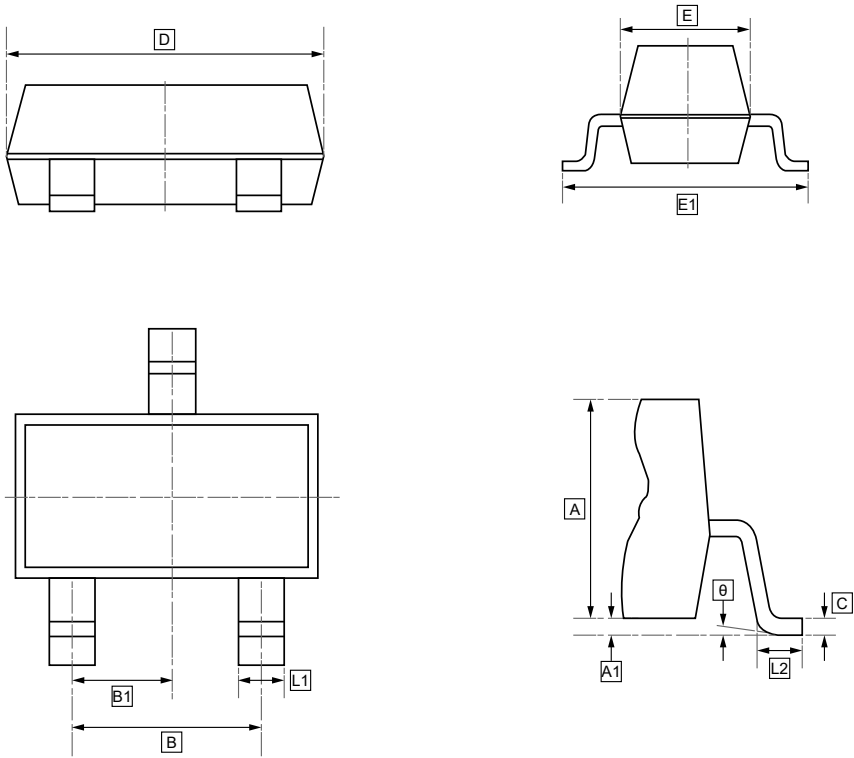


Fig 14. Fig13. Peak Diode Recovery dv/dt Test Circuit for N-Channel
HEXFET[®] Power Mosfets



9.SOT-23 Package Outline Dimensions

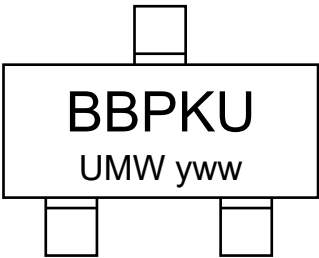


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	L1	L2	C	D	E	E1	B	B1	θ
Min	0.900	0.020	0.300	0.300	0.100	2.800	1.200	2.300	1.800	0.950	0°
Max	1.100	0.100	0.500	0.500	0.120	3.000	1.400	2.500	2.000	TYP	8°



10.Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLML2803TR	SOT-23	3000	Tape and reel



11.Disclaimer

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