

P-Ch 20V Fast Switching MOSFETs

Description

The IRLML2246TR is the high cell density trenched P-ch MOSFETs, which provides excellent R_{DS(ON)} and efficiency for most of the small power switching and load switch applications.

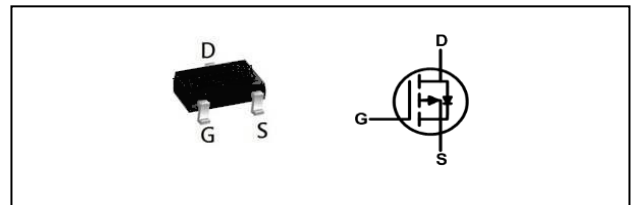
The IRLML2246TR meet the RoHS and Green Product requirement with full function reliability approved.

- Green Device Available
- Super Low Gate Charge
- Excellent C_{dv/dt} effect decline
- Advanced high cell density Trench technology

Product Summary

V _{DS}	-20	V
R _{DS(ON),typ}	89	mΩ
I _D	-3	A

SOT23 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-20	V
V _{GS}	Gate-Source Voltage	± 12	V
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ -4.5V ¹	-3	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ -4.5V ¹	-2.4	A
I _{DM}	Pulsed Drain Current ²	-12	A
P _D @T _A =25°C	Total Power Dissipation ³	1	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-ambient ¹	---	125	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	80	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20	---	---	V
R _{DS(on)}	Static Drain-Source On-Resistance ²	V _{GS} =-4.5V, I _D =-3A	---	89	100	mΩ
		V _{GS} =-2.5V, I _D =-2A	---	130	140	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.3	-0.5	-1.0	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-16V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-16V, V _{GS} =0V, T _J =55°C	---	---	-5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-3A	---	12.2	---	S
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-3A	---	10.1	---	nC
Q _{gs}	Gate-Source Charge		---	1.21	---	
Q _{gd}	Gate-Drain Charge		---	2.46	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-10V, V _{GS} =-4.5V, R _G =3.3Ω I _D =-3A	---	5.6	---	ns
T _r	Rise Time		---	32.2	---	
T _{d(off)}	Turn-Off Delay Time		---	45.6	---	
T _f	Fall Time		---	29.2	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	677	---	pF
C _{oss}	Output Capacitance		---	82	---	
C _{rss}	Reverse Transfer Capacitance		---	73	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	-3	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

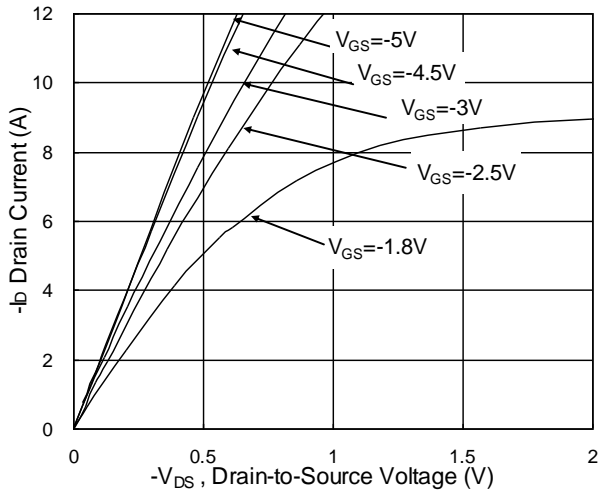


Fig.1 Typical Output Characteristics

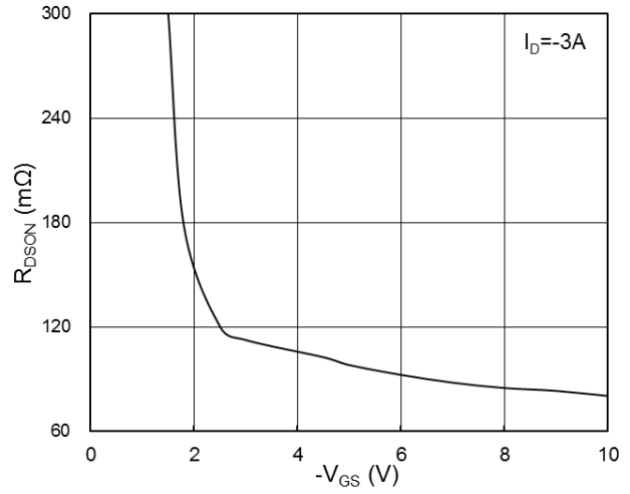


Fig.2 On-Resistance vs. G-S Voltage

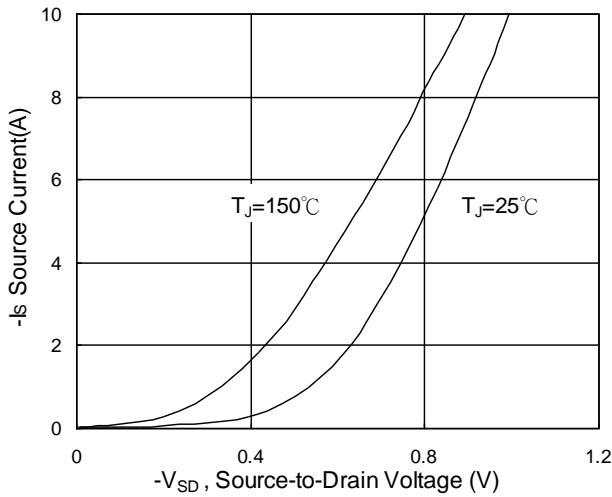


Fig.3 Source Drain Forward Characteristics

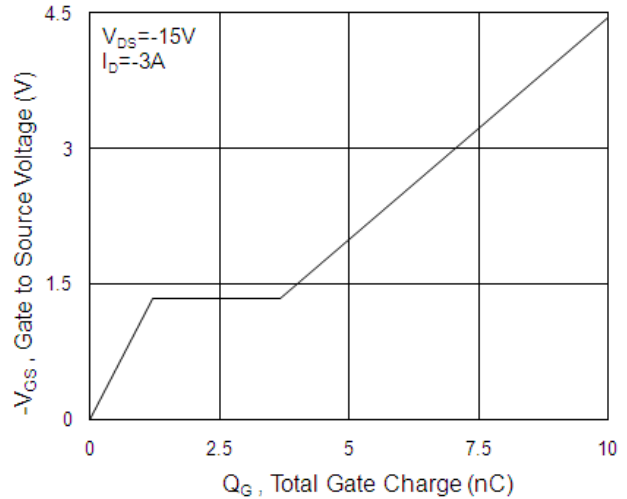


Fig.4 Gate-Charge Characteristics

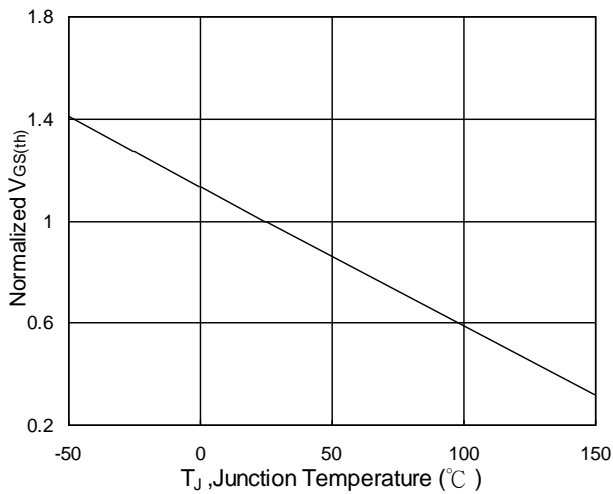


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

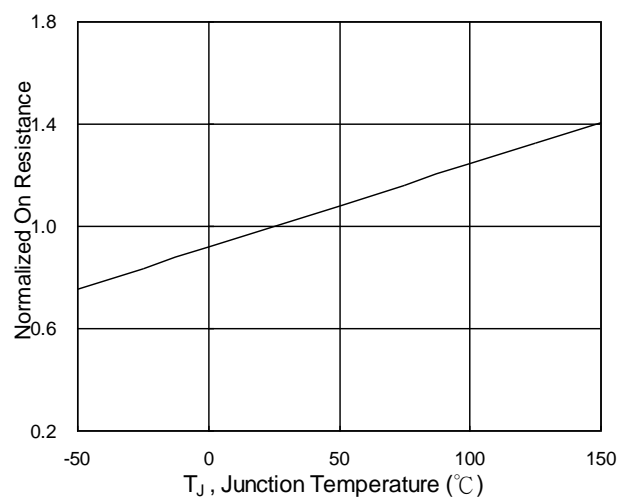


Fig.6 Normalized R_{DSON} vs. T_J

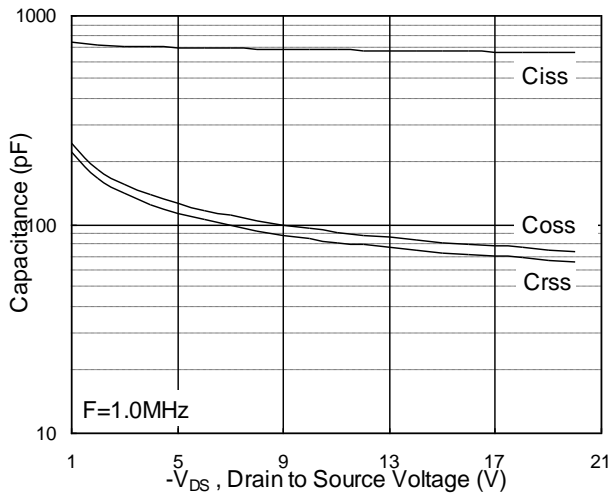


Fig.7 Capacitance

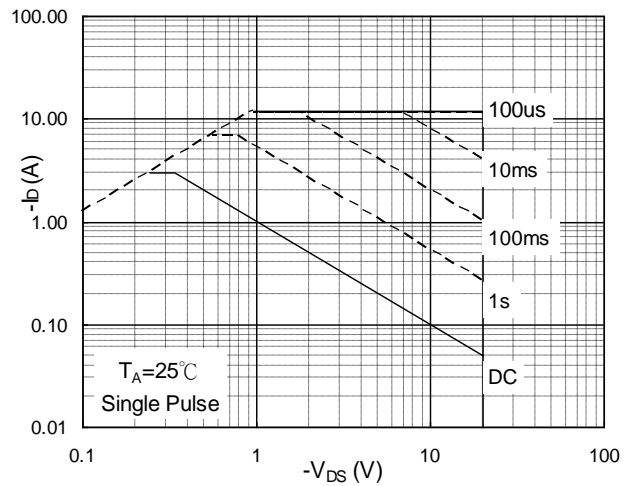


Fig.8 Safe Operating Area

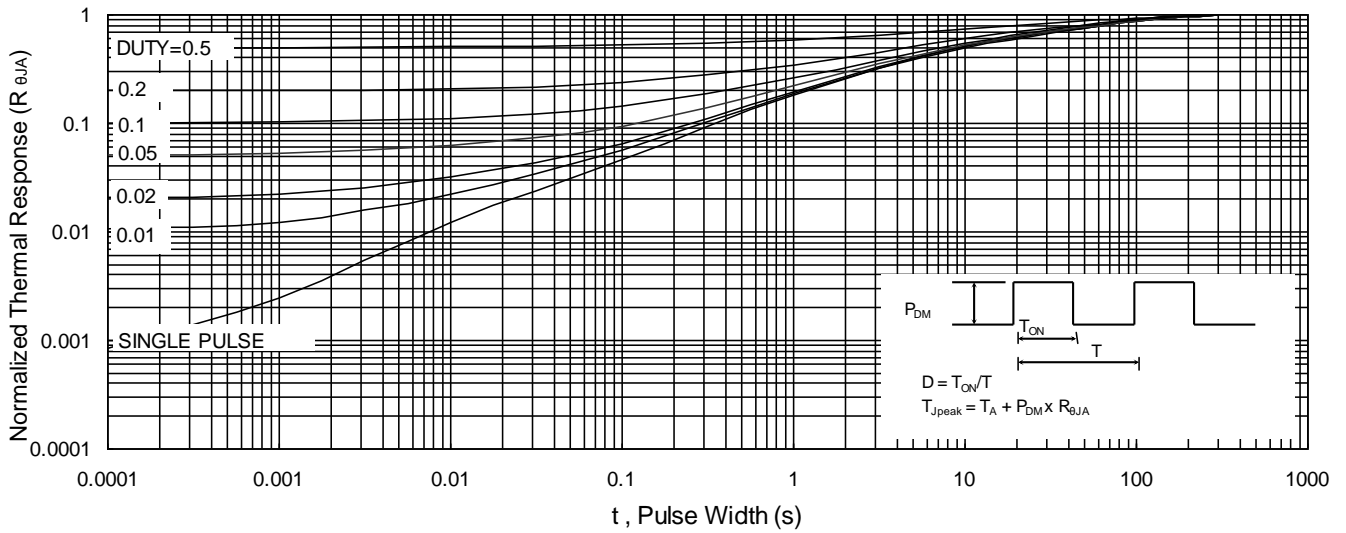


Fig.9 Normalized Maximum Transient Thermal Impedance

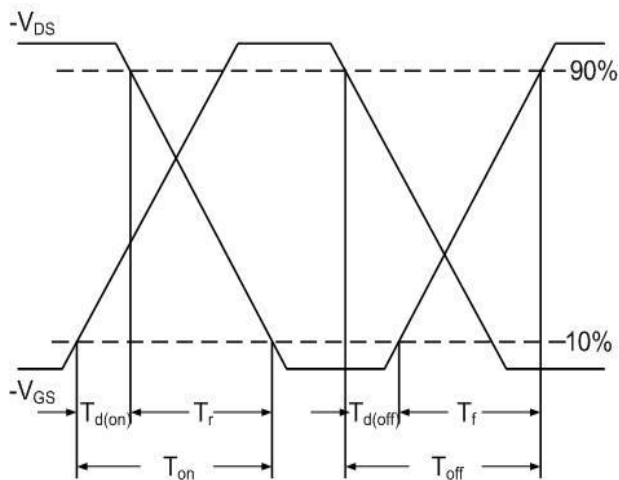


Fig.10 Switching Time Waveform

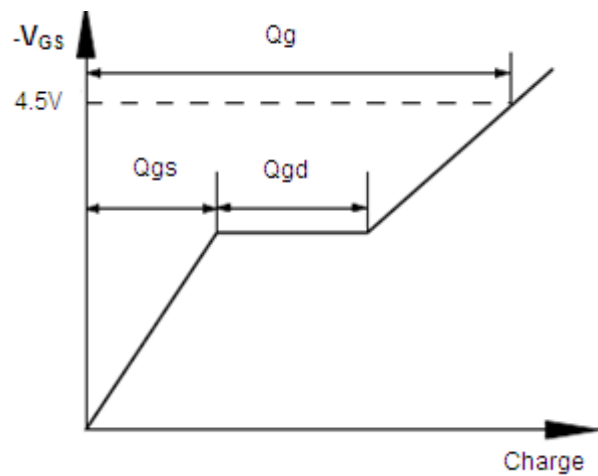
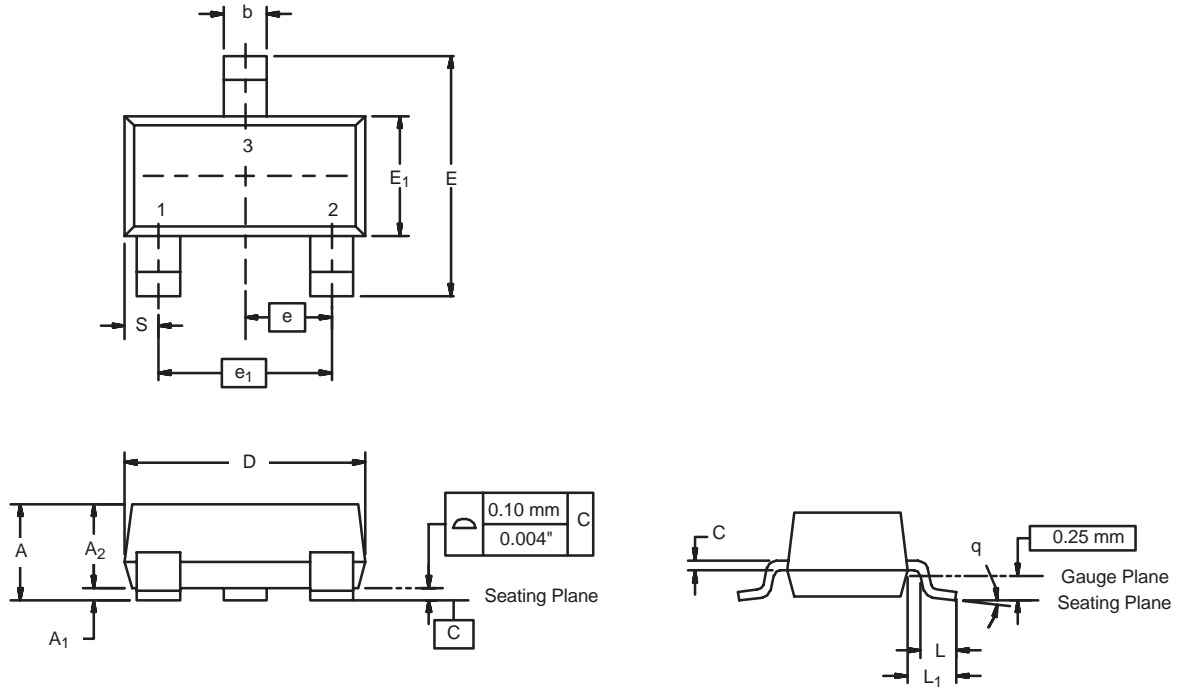


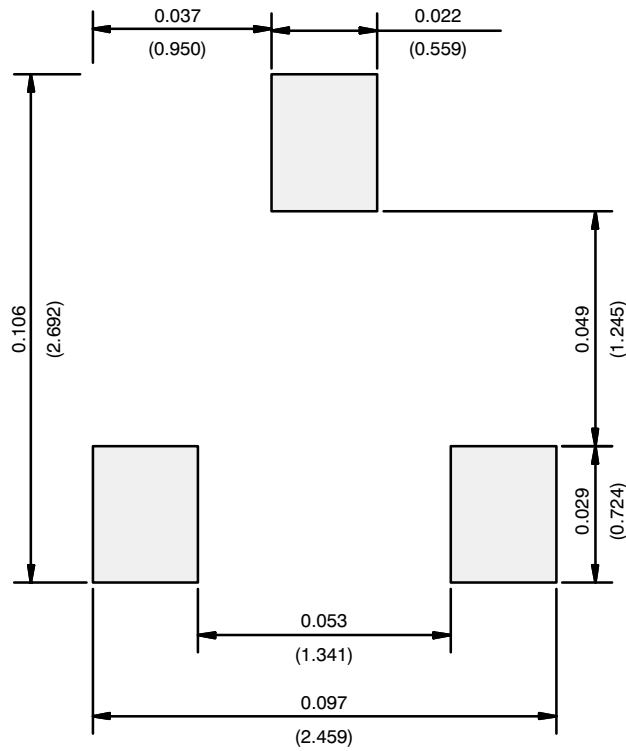
Fig.11 Gate Charge Waveform

SOT-23 (TO-236): 3-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°

ECN: S-03946-Rev. K, 09-Jul-01
DWG: 5479

RECOMMENDED MINIMUM PADS FOR SOT-23

Recommended Minimum Pads
Dimensions in Inches/(mm)

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