

1.Description

The IRLML0040TRPBF(ES) is N-Channel enhancement MOS Field Effect Transistor. Using advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product IRLML0040TRPBF(ES) is Pb-free.

2.Features

- 40V, $R_{DS(ON)}=35m\Omega(TYP.) @V_{GS}=10V$
 $R_{DS(ON)}=46m\Omega(TYP.) @V_{GS}=4.5V$
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

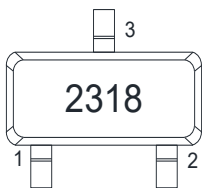
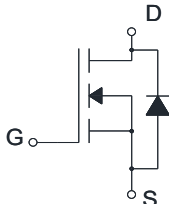
3.Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4.Ordering Information

Part Number	Packag e	Markin g	Material	Packing	Quantit y per reel	Flammabilit y Rating	Reel Size
IRLML0040TRPBF(ES))	SOT-23	2318	Haloge n free	Tape&Ree l	3,000 PCS	UL 94V-0	7 inche s

5.Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

6.Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	$T_C=25^{\circ}C$	I_D	4	A
	$T_C=100^{\circ}C$		2.4	
Maximum Power Dissipation		P_D	1.25	W
Pulsed Drain Current		I_{DM}	16	A
Operating Junction Temperature		T_J	-55 to 150	°C
Lead Temperature		T_L	260	°C
Storage Temperature Range		T_{stg}	-55 to 150	°C

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$		100	°C/W

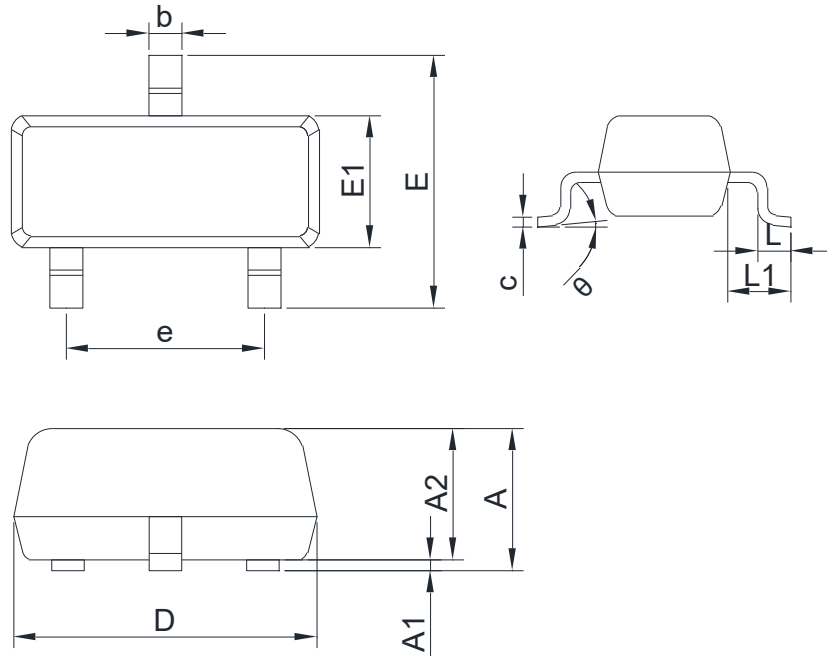
Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V			1.0	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	1.0	1.5	2.0	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =3A		35	46	mΩ
		V _{GS} =4.5V, I _D =2A		46	60	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =20V		404		pF
Output Capacitance	C _{OSS}			33		
Reverse Transfer Capacitance	C _{RSS}			26		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =0 to 10V, V _{DS} =20V, I _D =3A		8.4		nC
Gate-to-Source Charge	Q _{GS}			1.62		
Gate-to-Drain Charge	Q _{GD}			1.37		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =10V, V _{DD} =20V, I _D =3A, R _{GEN} =3.3Ω		7		ns
Rise Time	t _r			3.5		
Turn-Off Delay Time	t _{d(OFF)}			6.8		
Fall Time	t _f			1.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =3A			1.2	V

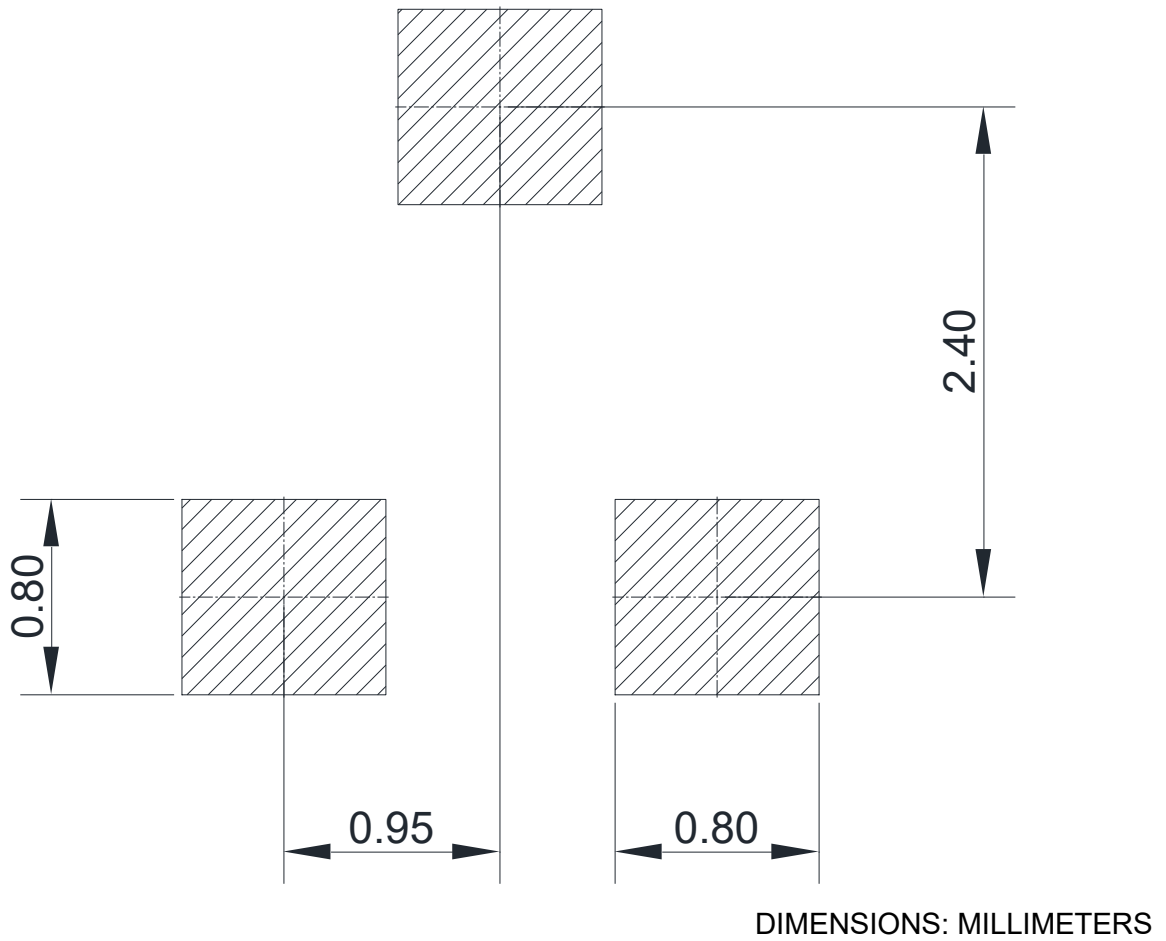
7. Dimension (SOT-23)

POD(Z)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER					
SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A	0.90	1.20	E	2.25	2.55
A1	0.00	0.10	E1	1.20	1.40
A2	0.90	1.10	e	1.80	2.00
b	0.30	0.50	L	0.30	0.50
c	0.07	0.18	L1	0.475	0.625
D	2.80	3.04	θ	0°	8°

8. Recommended Soldering Footprint



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