

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

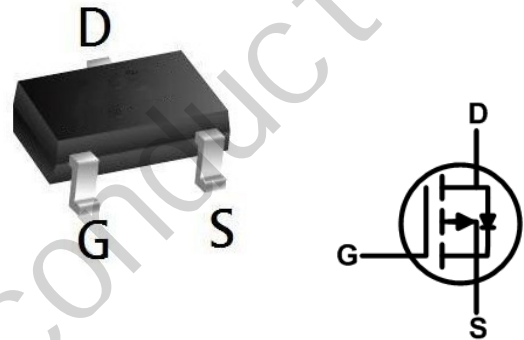
Product Summary

BVDSS	RDS(on)	ID
40V	30.0mΩ	5 A

Description

The IRLML0040TRPBF is the high cell density trenched N-ch MOSFETs, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The IRLML0040TRPBF meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

SOT 23 Pin Configurations

Absolute Maximum Ratings (TA=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units	
V _{DSS}	Drain-Source Voltage	40	V	
V _{GSS}	Gate-Source Voltage	±20	V	
I _D	Continuous Drain Current	T _A = 25°C	5	A
		T _A = 100°C	3	A
I _{DM}	Pulsed Drain Current ^{note1}	20	A	
P _D	Power Dissipation	1.6	W	
R _{θJA}	Thermal Resistance, Junction to Ambient	78	°C/W	
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C	

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.2	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=4A$	-	30	40	m Ω
		$V_{GS}=4.5V, I_D=3A$	-	40	60	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=20V, V_{GS}=0V,$ $f=1.0MHz$	-	435	-	pF
C_{oss}	Output Capacitance		-	58	-	pF
C_{rss}	Reverse Transfer Capacitance		-	35	-	pF
Q_g	Total Gate Charge	$V_{DS}=20V, I_D=3A,$ $V_{GS}=10V$	-	11	-	nC
Q_{gs}	Gate-Source Charge		-	2	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	2.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=20V, I_D=4A,$ $R_L=1\Omega, R_{GEN}=3\Omega,$ $V_{GS}=10V$	-	10	-	ns
t_r	Turn-on Rise Time		-	8	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	29	-	ns
t_f	Turn-off Fall Time		-	12	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	20	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=5A$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$T_J=25^\circ\text{C},$ $I_F=5A, dI/dt=100A/\mu s$	-	20	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	11	-	nC

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

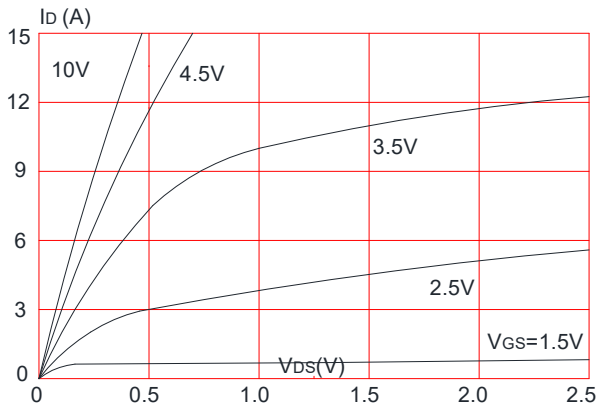
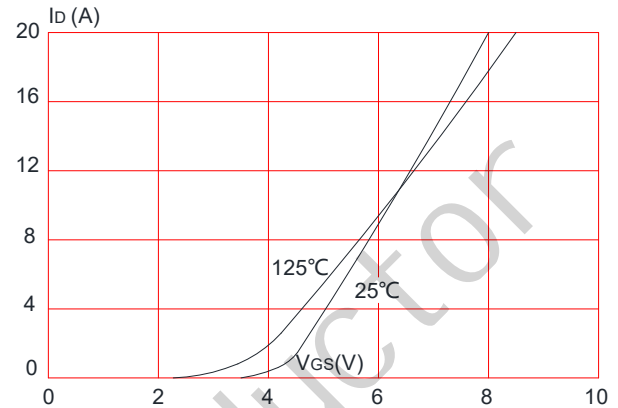
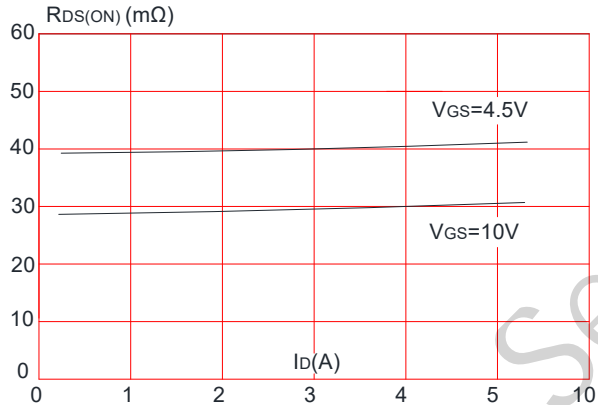
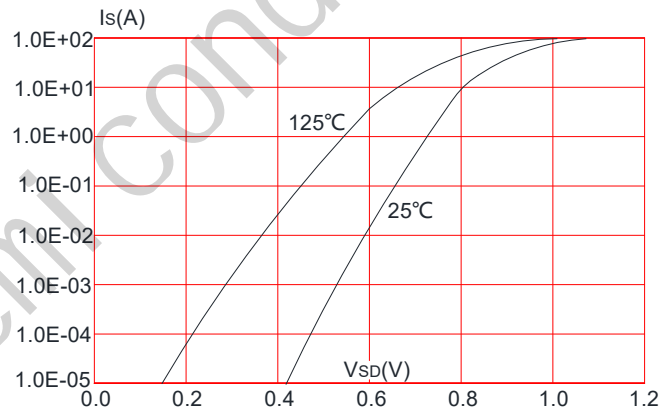
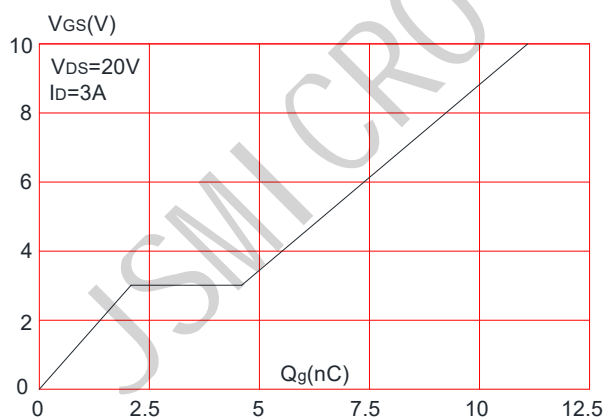
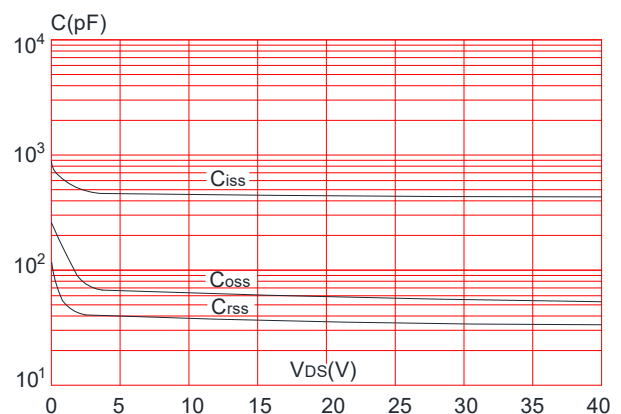
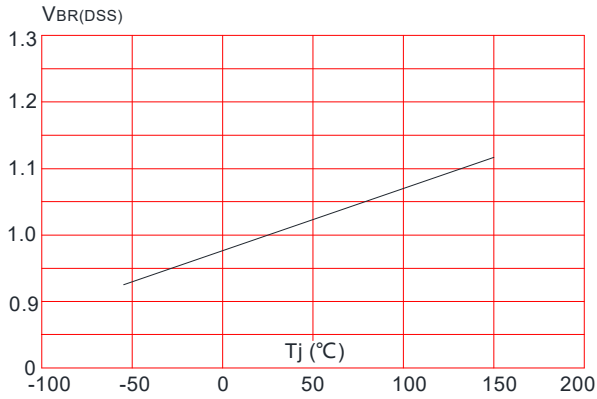
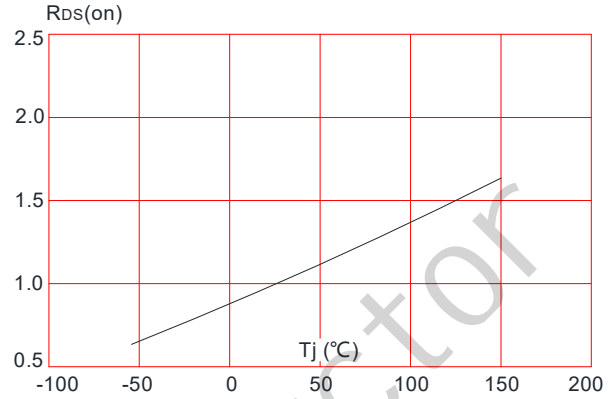
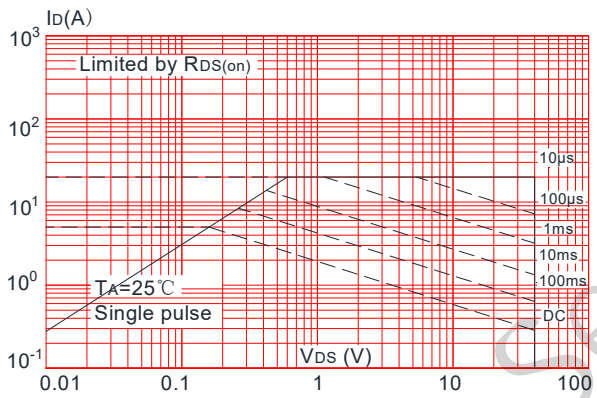
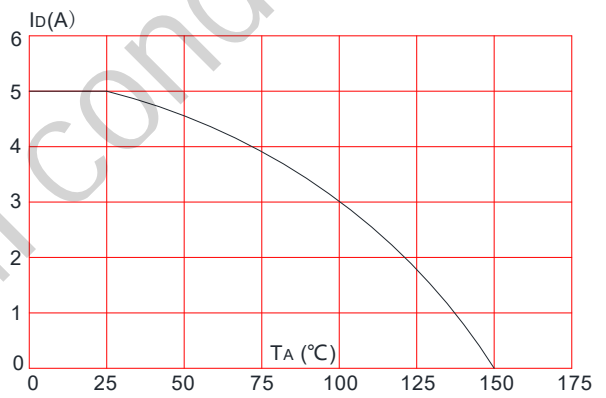
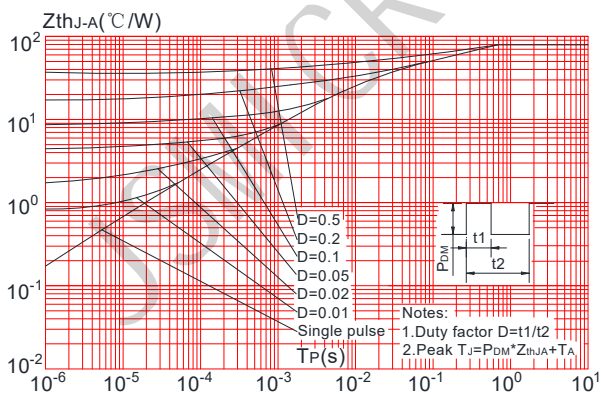
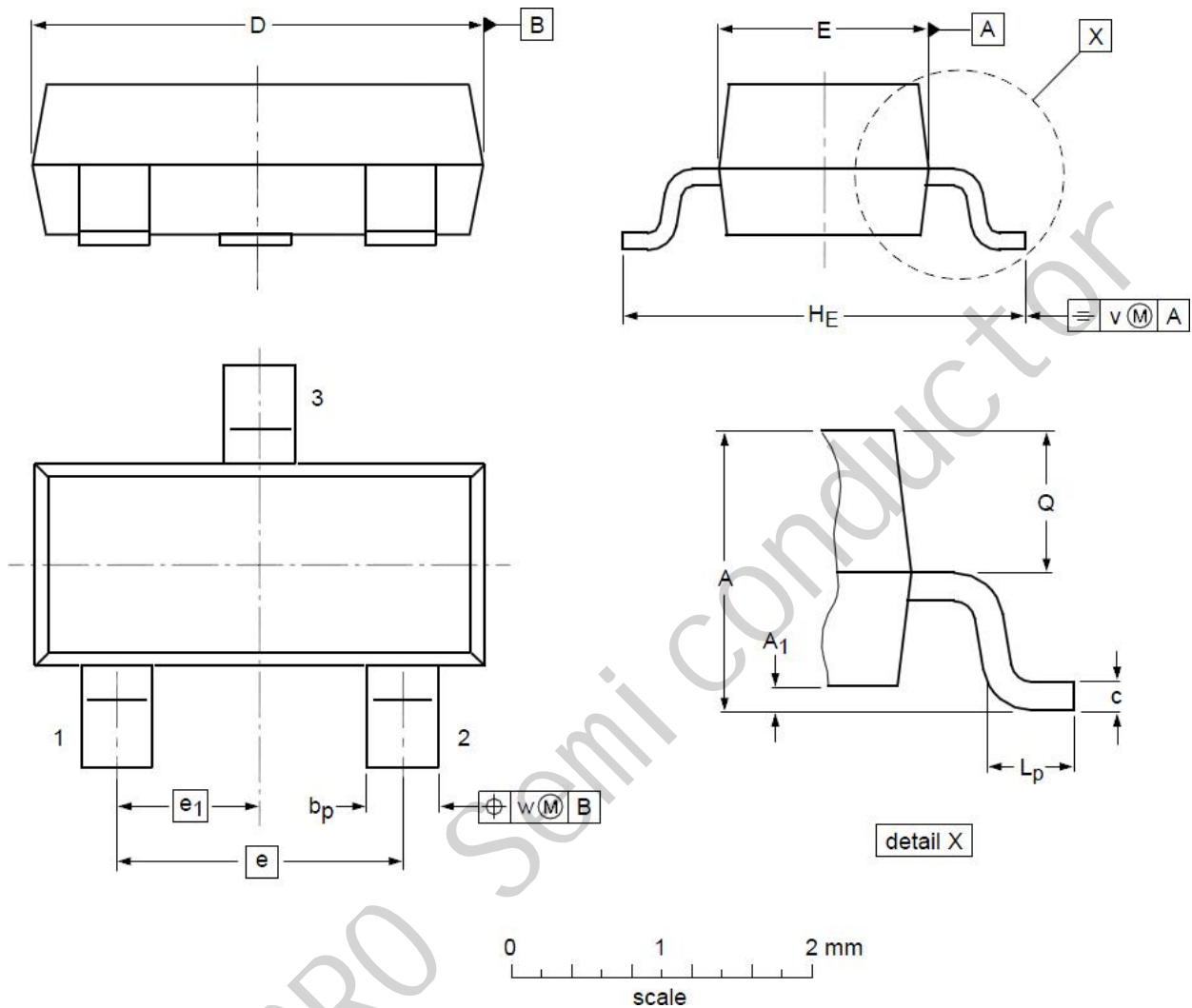
Figure 1: Output Characteristics

Figure 2: Typical Transfer Characteristics

Figure 3: On-resistance vs. Drain Current

Figure 4: Body Diode Characteristics

Figure 5: Gate Charge Characteristics

Figure 6: Capacitance Characteristics


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

Figure 8: Normalized on Resistance vs. Junction Temperature

Figure 9: Maximum Safe Operating Area

Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient


SOT23 Mechanical Data

DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A ₁	0.01	0.05	0.10
b _p	0.30	0.42	0.50	c	0.08	0.13	0.15
D	2.80	2.92	3.00	E	1.20	1.33	1.40
e	--	1.90	--	e ₁	--	0.95	--
H _E	2.25	2.40	2.55	L _p	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
w	--	0.10	--				