

SuperMOS – SOP8 -30V BV_{DSS} , 13.5m Ω $R_{DS(on)}$, P-channel MOSFET

1. Description

The IRF7416TRPBF-ES is P-Channel enhancement MOS Field Effect Transistor. Uses 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 IRF7416TRPBF-ES is Pb-free.

2. Features

- -30V, $R_{DS(ON)}$ =13.5m Ω (TYP.) @ V_{GS} =-10V
- $R_{DS(ON)}$ =18.5m Ω (TYP.) @ V_{GS} =-4.5V
- Fast Switching
- 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
- 100% UIS TESTED**

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Sizes
IRF7416TRPBF-ES	SOP8	ES4435/lot	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	13 inches

Table-1 Ordering information

5. Pin Configuration and Functions

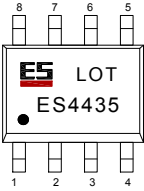
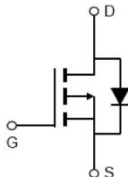
Pin	Function	Outline	Circuit Diagram
4	Gate		
1/2/3	Source		
5/6/7/8	Drain		

Table-2 Pin configuration

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}	-30	V
Gate-Source Voltage	V_{GS}	±25	V
Continuous Drain Current	$T_A=25^{\circ}C$	-10.5	A
	$T_A=70^{\circ}C$	-8.0	
Maximum Power Dissipation	$T_A=25^{\circ}C$	3.1	W
	$T_A=70^{\circ}C$	2.0	
Pulsed Drain Current	I_{DM}	-80	A
Avalanche Current, Single Pulsed ^a	I_{AS}	-18.5	A
Avalanche Energy, Single Pulsed ^a	E_{AS}	51	mJ
Operating Junction Temperature	T_J	150	°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	$R_{\theta JA}$	32	40	°C/W
Junction-to-Lead Thermal Resistance	$R_{\theta JL}$	3.2	4	

Note:

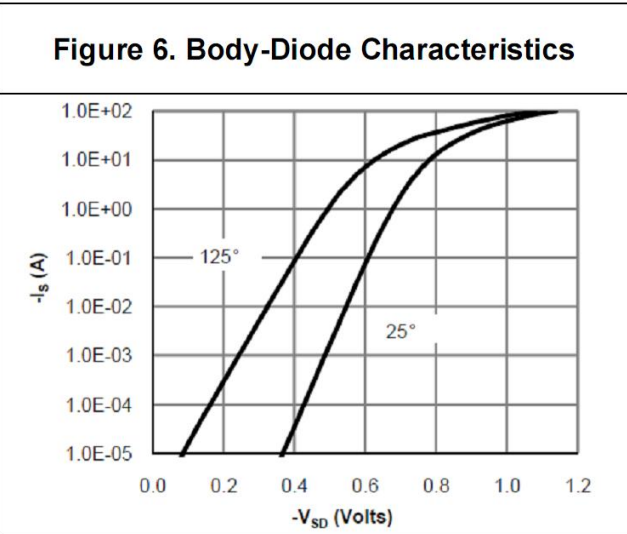
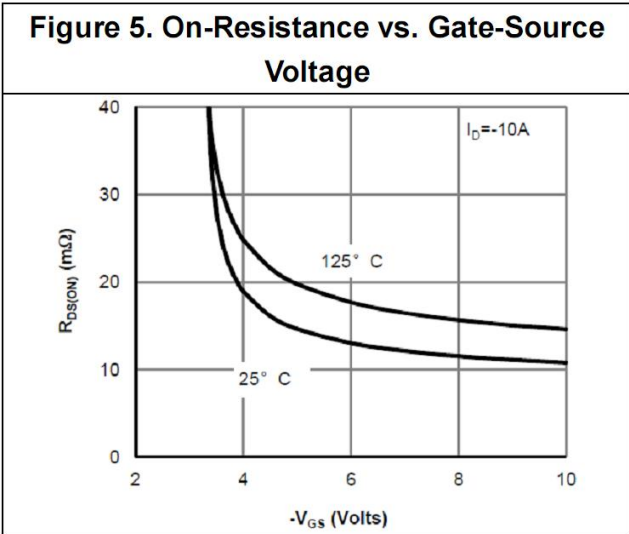
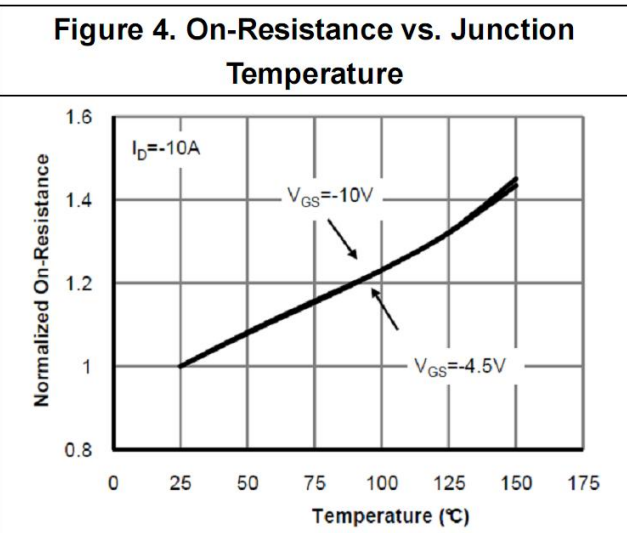
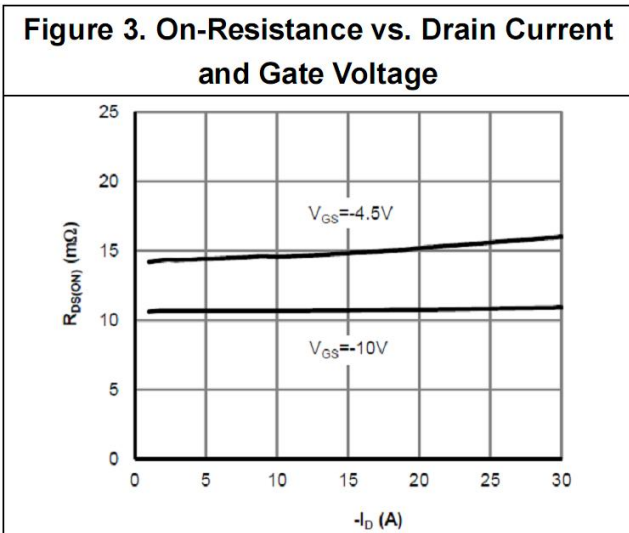
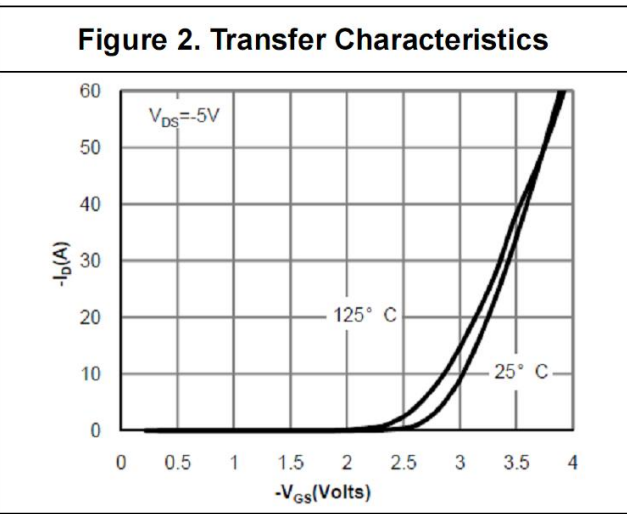
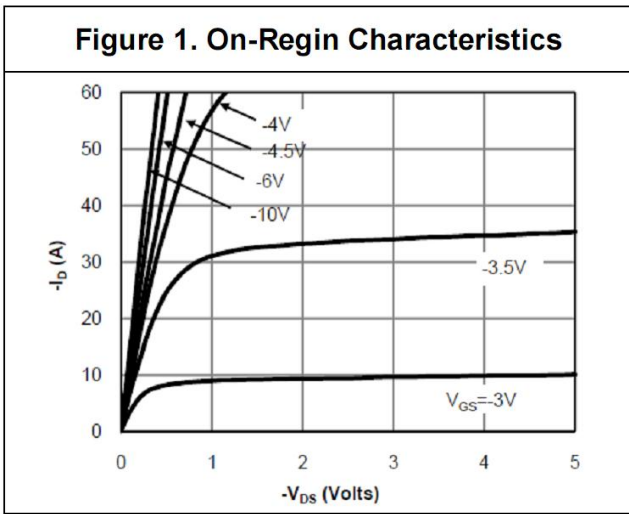
a: $T_J=25^{\circ}C, V_{DD}=-30V, V_G=-10V, L=0.3mH, R_g=25\Omega$

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}	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=-30V$			-1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{GS}=\pm 25V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.5	-2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-10A$		13.5	21	m Ω
		$V_{GS}=-4.5V, I_D=-7A$		18.5	27	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V$ $V_{DS}=-15V$ $f=1MHz$		1230		pF
Output Capacitance	C_{OSS}			160		
Reverse Transfer Capacitance	C_{RSS}			145		
Gate Resistance	R_g	$f=1MHz$		10		Ω
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-10V$ $V_{DS}=-15V$ $I_D=-10A$		26.4		nC
Gate-to-Source Charge	Q_{GS}			6		
Gate-to-Drain Charge	Q_{GD}			4.3		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-10V$ $V_{DS}=-15V$ $R_L=1\Omega$ $R_G=3\Omega$		18		ns
Rise Time	t_r			22		
Turn-Off Delay Time	$t_{d(OFF)}$			55		
Fall Time	t_f			42		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=-1.0A$		-0.75	-1	V

7. Typical Characteristic



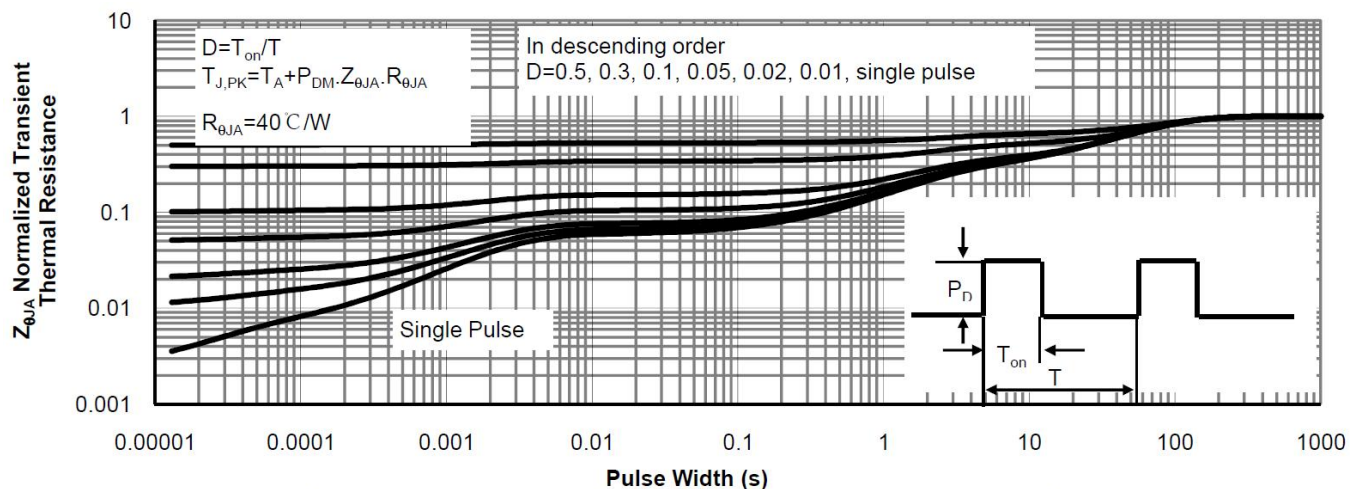
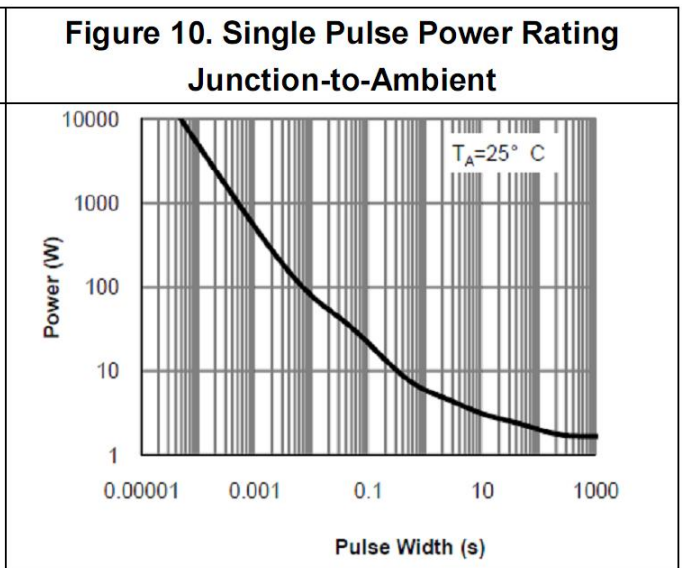
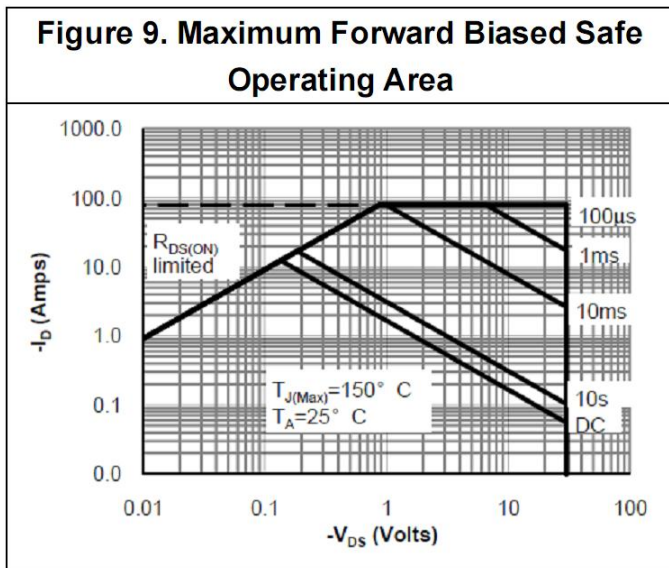
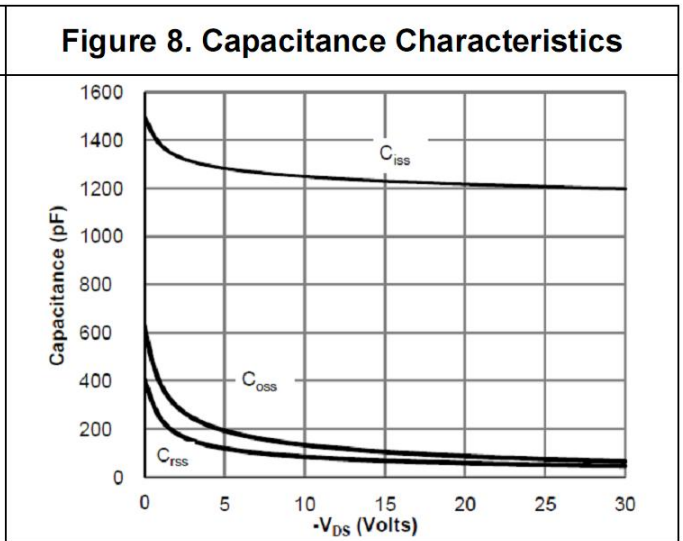
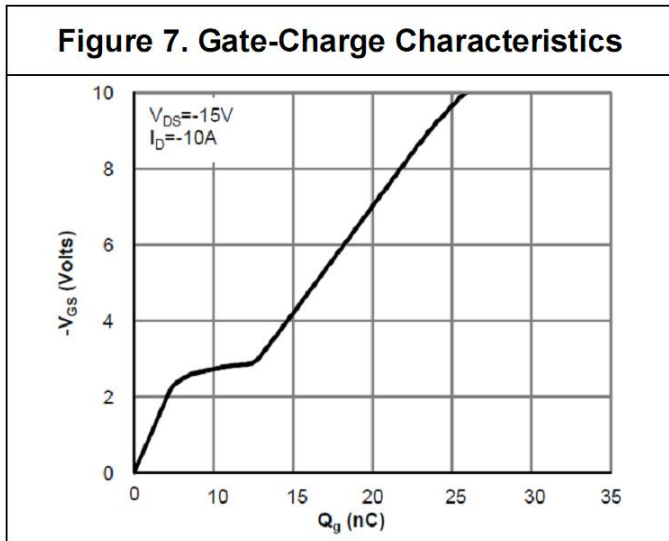
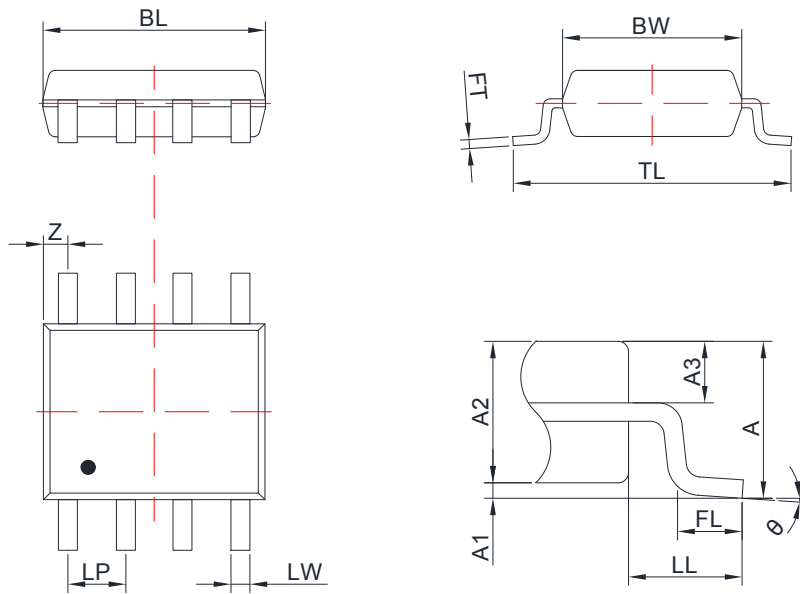


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

8. Dimension (SOP8)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	1.75		FL	0.50	0.80
A1	0.05	0.15	LP	1.25	1.30
A2	1.40	1.50	LL	1.1 BSC	
A3	0.623 BSC		LW	0.38	0.43
BL	4.80	5.00	TL	5.90	6.10
BW	3.70	4.10	Z	0.54	
FT	0.20	0.21	θ	0°	8°

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