

EVVOSEMI[®]

THINK CHANGE DO



ESD



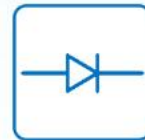
TVS



MOS



LDO



Diode



Sensor



DC-DC

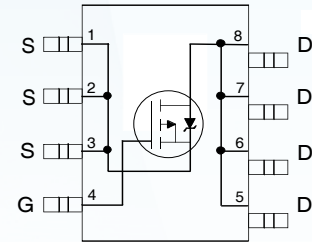
Product Specification

▶ Domestic	Part Number	IRF7416
▶ Overseas	Part Number	IRF7416
▶ Equivalent	Part Number	IRF7416

EV is the abbreviation of name EVVO

P-Channel 30 V (D-S) MOSFET
FEATURES

- Low On-Resistance
- P-Channel Mosfet
- Surface Mount
- dv/dt Rating
- Fast Switching



Top View

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -10V	-10	A
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -10V	-7.1	
I_{DM}	Pulsed Drain Current ①	-45	
P_D @ $T_A = 25^\circ\text{C}$	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	370	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	V/ns
T_J	Operating Junction and	-55 to + 150	°C
T_{STG}	Storage Temperature Range		

Thermal Resistance

	Parameter	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient ⑤	50	°C/W

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

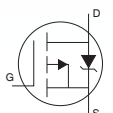
	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30	—	—	V	$V_{GS} = 0V$, $I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.024	—	V/°C	Reference to 25°C , $I_D = -1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	20	mΩ	$V_{GS} = -10V$, $I_D = -5.6A$ ④
		—	—	35		$V_{GS} = -4.5V$, $I_D = -2.8A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—	-2.04	V	$V_{DS} = V_{GS}$, $I_D = -250\mu A$
g_{fs}	Forward Transconductance	5.6	—	—	S	$V_{DS} = -10V$, $I_D = -2.8A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0	μA	$V_{DS} = -24V$, $V_{GS} = 0V$
		—	—	-25		$V_{DS} = -24V$, $V_{GS} = 0V$, $T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = -20V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = 20V$

P-Channel 30 V (D-S) MOSFET

= 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q_g	Total Gate Charge	—	61	92	nC	$I_D = -5.6A$ $V_{DS} = -24V$ $V_{GS} = -10V$, See Fig. 6 & 9 ④
Q_{gs}	Gate-to-Source Charge	—	8.0	12		
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	22	32		
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	$V_{DD} = -15V$ $I_D = -5.6A$ $R_G = 6.2\Omega$ $R_D = 2.7\Omega$, See Fig. 10 ④
t_r	Rise Time	—	49	—		
$t_{d(off)}$	Turn-Off Delay Time	—	59	—		
t_f	Fall Time	—	60	—		
C_{iss}	Input Capacitance	—	1700	—	pF	$V_{GS} = 0V$ $V_{DS} = -25V$ $f = 1.0MHz$, See Fig. 5
C_{oss}	Output Capacitance	—	890	—		
C_{rss}	Reverse Transfer Capacitance	—	410	—		

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-3.1	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-45		
V_{SD}	Diode Forward Voltage	—	—	-1.0	V	$T_J = 25^\circ C$, $I_S = -5.6A$, $V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	56	85	ns	$T_J = 25^\circ C$, $I_F = -5.6A$ $di/dt = 100A/\mu s$ ③
Q_{rr}	Reverse Recovery Charge	—	99	150	nC	

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Starting $T_J = 25^\circ C$, $L = 25mH$
 $R_G = 25\Omega$, $I_{AS} = -5.6A$. (See Figure 12)
- ③ $I_{SD} \leq -5.6A$, $di/dt \leq 100A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 150^\circ C$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ⑤ Surface mounted on FR-4 board, $t \leq 10sec$.

P-Channel 30 V (D-S) MOSFET

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

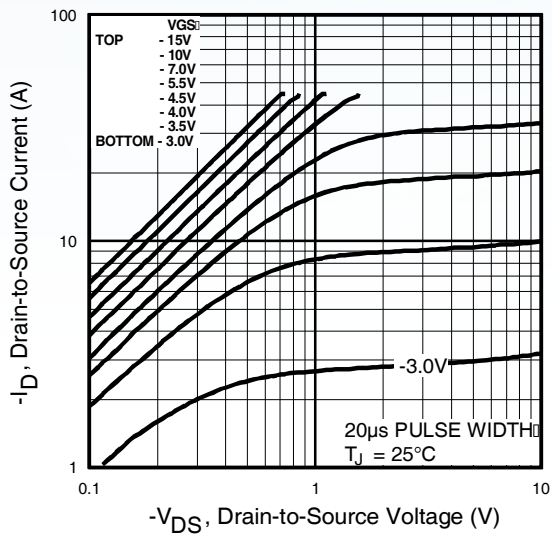


Fig 1. Typical Output Characteristics

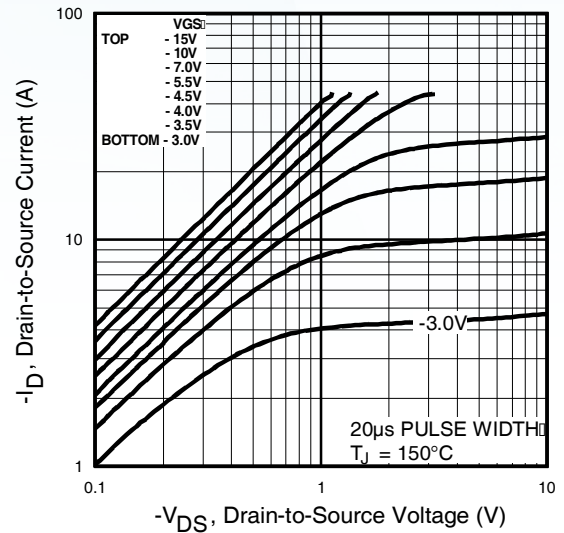


Fig 2. Typical Output Characteristics

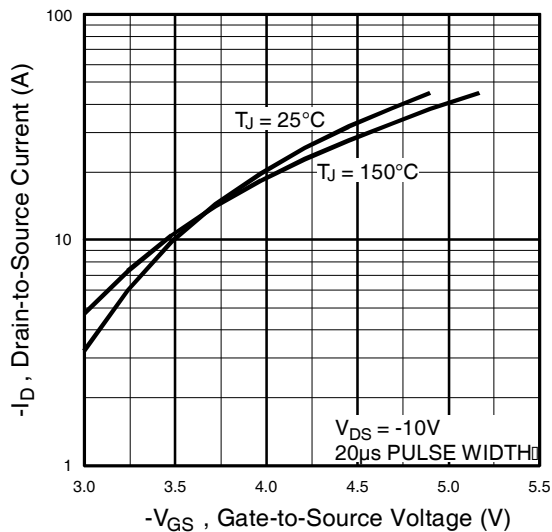


Fig 3. Typical Transfer Characteristics

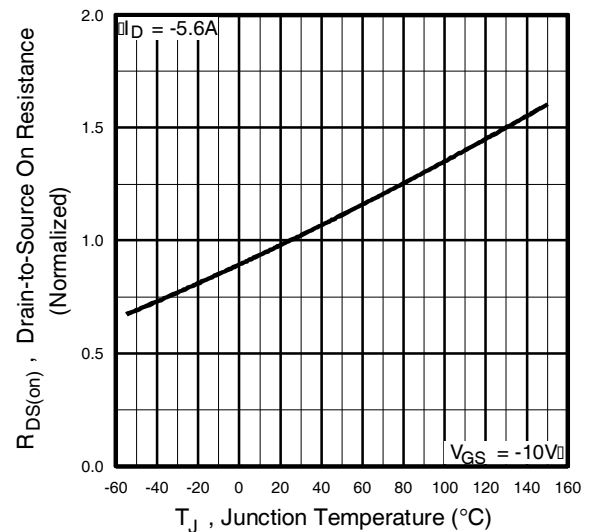


Fig 4. Normalized On-Resistance Vs. Temperature

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TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

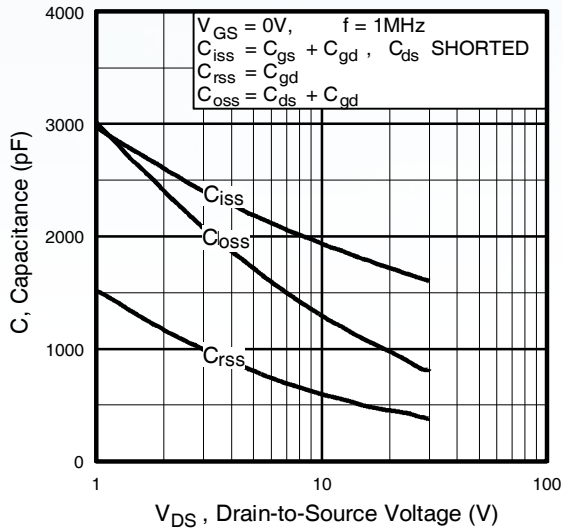


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

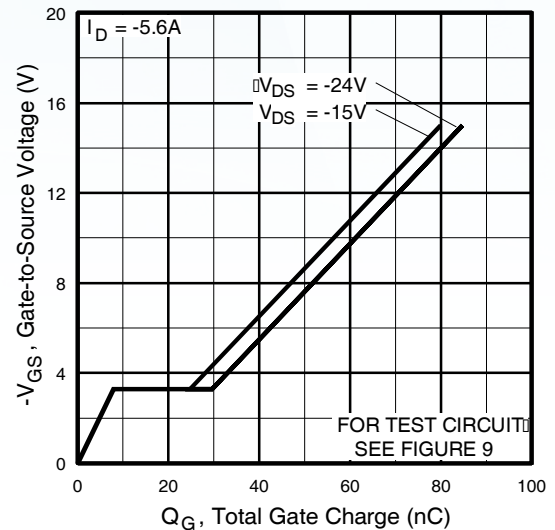


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

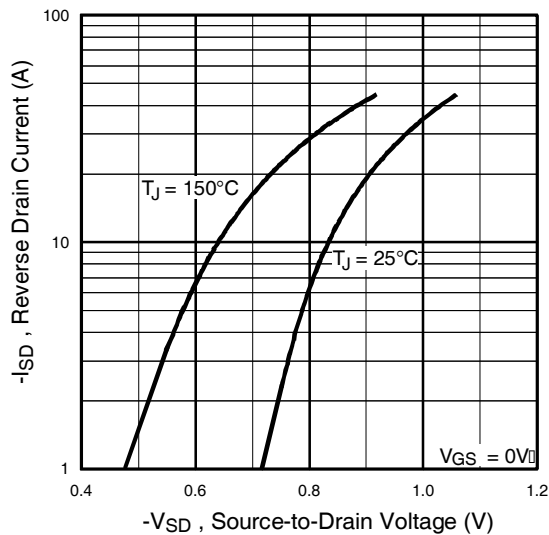


Fig 7. Typical Source-Drain Diode Forward Voltage

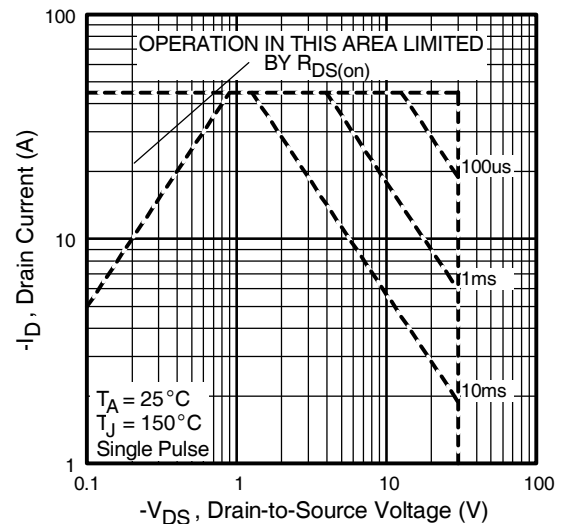


Fig 8. Maximum Safe Operating Area

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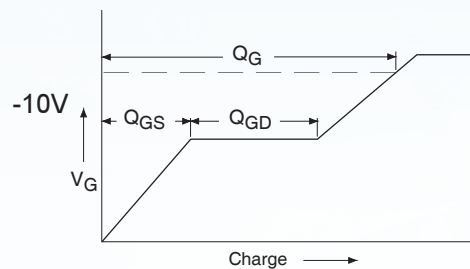


Fig 9a. Basic Gate Charge Waveform

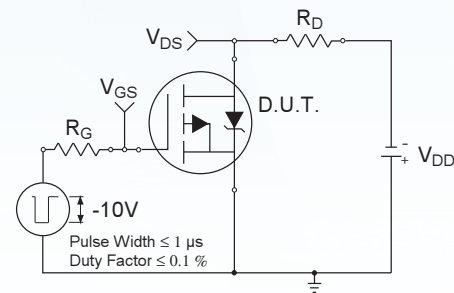


Fig 10a. Switching Time Test Circuit

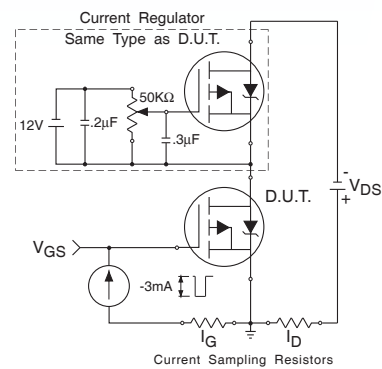


Fig 9b. Gate Charge Test Circuit

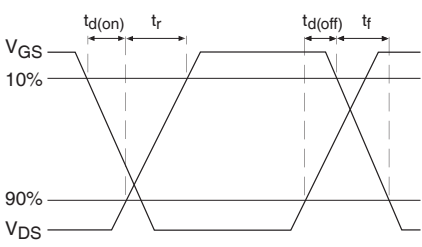


Fig 10b. Switching Time Waveforms

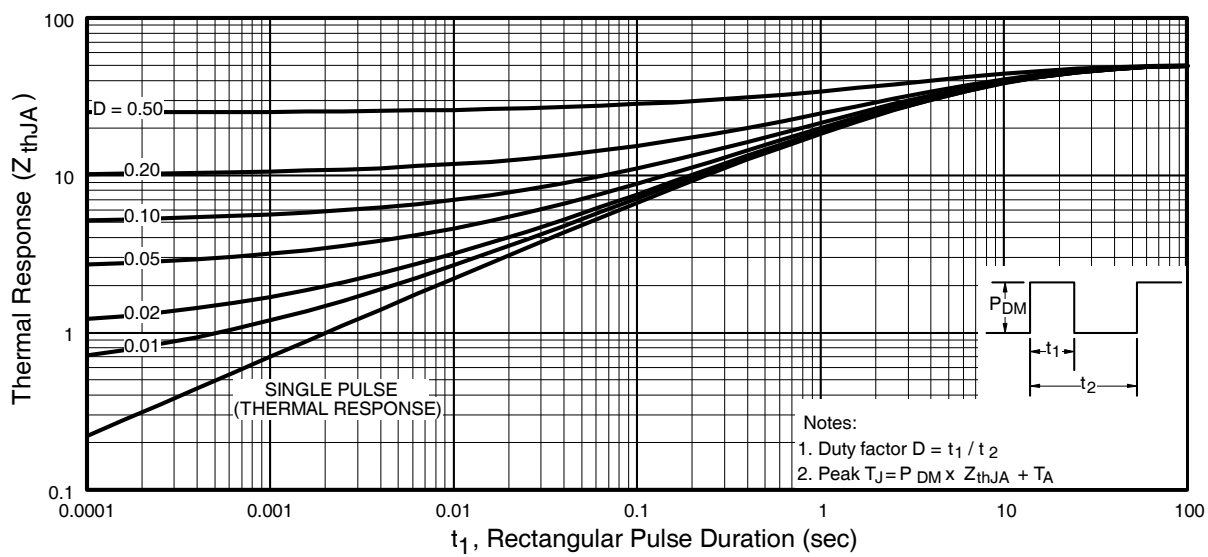


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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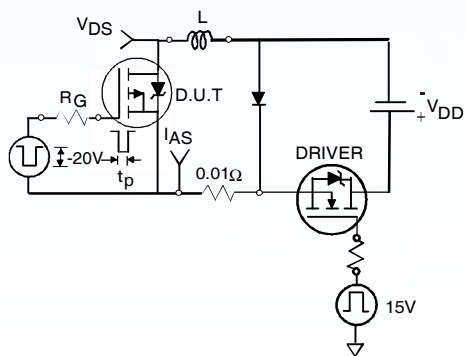


Fig 12a. Unclamped Inductive Test Circuit

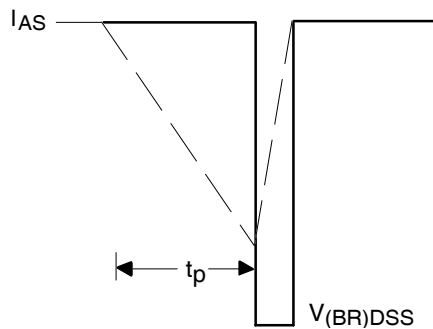


Fig 12b. Unclamped Inductive Waveforms

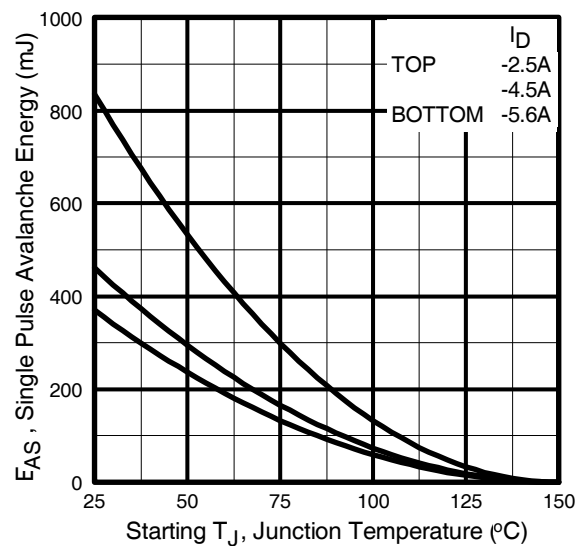
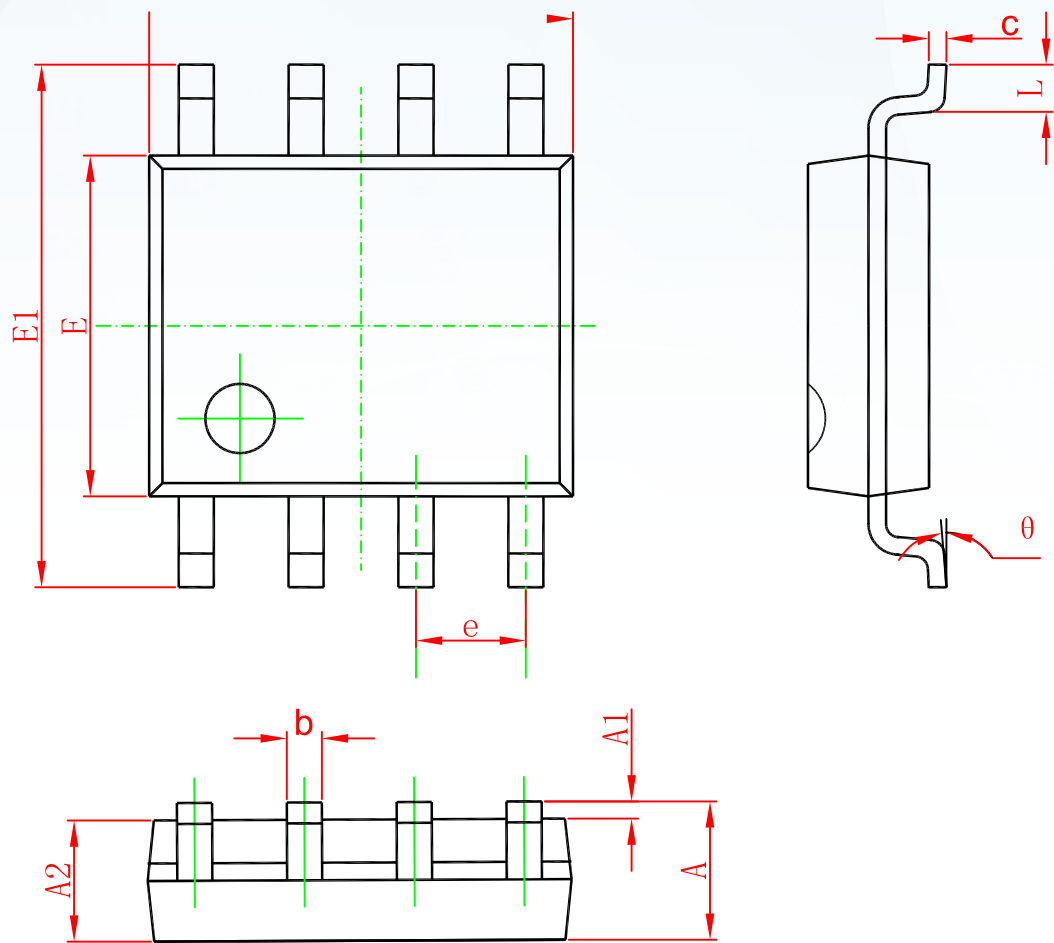


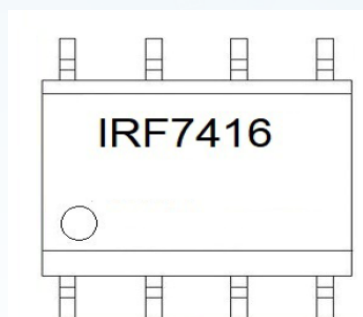
Fig 12c. Maximum Avalanche Energy Vs. Drain Current

P-Channel 30 V (D-S) MOSFET



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

P-Channel 30 V (D-S) MOSFET



Ordering information

Order code	Package	Baseqty	Deliverymode
IRF7416	SOP-8	3000	Tape and reel

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