

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

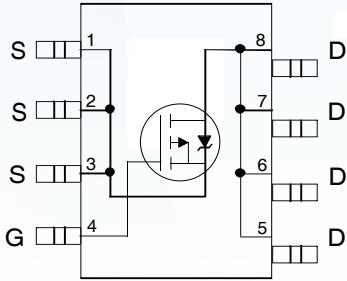
▶ Domestic	Part Number	IRF7404
▶ Overseas	Part Number	IRF7404
▶ Equivalent	Part Number	IRF7404

EV is the abbreviation of name EVVO

P-Channel MOSFET

Features

- $V_{DS}(V)=-55V$
- $R_{DS(ON)} < 20\ m\ \Omega\ (V_{GS}=-4.5V)$
- $R_{DS(ON)} < 60\ m\ \Omega\ (V_{GS}=-2.7V)$
- Generation V Technology
- Ultra Low On-Resistance
- Surface Mount
- Dynamic dv/dt Rating
- Fast Switching
- Lead-Free



SOP-8

Description

The SOP-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infra red, or wave soldering techniques. Power dissipation of greater than 0.8W is possible in a typical PCB mount application.

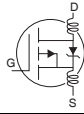
Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^{\circ}C$	10 Sec. Pulsed Drain Current, $V_{GS} @ -4.5V$	-7.7	A
$I_D @ T_A = 25^{\circ}C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-6.7	
$I_D @ T_A = 70^{\circ}C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-5.4	
I_{DM}	Pulsed Drain Current ①	-27	
$P_D @ T_A = 25^{\circ}C$	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	± 12	V
dv/dt	Peak Diode Recovery dv/dt ②	-5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

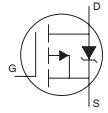
Thermal Resistance Ratings

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient④		50	°C/W

P-Channel MOSFET
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	-20			V	$V_{GS} = 0V$, $I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		-0.012		V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1mA$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance			40	$m\Omega$	$V_{GS} = -4.5V$, $I_D = -3.2A$ ③
				60		$V_{GS} = -2.7V$, $I_D = -2.7A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	-0.70			V	$V_{DS} = V_{GS}$, $I_D = -250\mu A$
g_{fs}	Forward Transconductance	6.8			S	$V_{DS} = -15V$, $I_D = -3.2A$
I_{DSS}	Drain-to-Source Leakage Current			-1.0	μA	$V_{DS} = -16V$, $V_{GS} = 0V$
				-25		$V_{DS} = -16V$, $V_{GS} = 0V$, $T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage			-100	nA	$V_{GS} = -12V$
	Gate-to-Source Reverse Leakage			100		$V_{GS} = 12V$
Q_g	Total Gate Charge			50	nC	$I_D = -3.2A$
Q_{gs}	Gate-to-Source Charge			5.5		$V_{DS} = -16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge			21		$V_{GS} = -4.5V$, See Fig. 6 and 12 ③
$t_{d(on)}$	Turn-On Delay Time		14		ns	$V_{DD} = -10V$
t_r	Rise Time		32			$I_D = -3.2A$
$t_{d(off)}$	Turn-Off Delay Time		100			$R_G = 6.0\Omega$
t_f	Fall Time		65			$R_D = 3.1\Omega$, See Fig. 10 ③
L_D	Internal Drain Inductance		2.5		nH	Between lead tip and center of die contact 
L_S	Internal Source Inductance		4.0			
C_{iss}	Input Capacitance		1500		pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance		730			$V_{DS} = -15V$
C_{rss}	Reverse Transfer Capacitance		340			$f = 1.0MHz$, See Fig. 5

Source-Drain Ratings and 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			-27		
V_{SD}	Diode Forward Voltage			-1.0	V	$T_J = 25^\circ\text{C}$, $I_S = -2.0A$, $V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time		69	100	ns	$T_J = 25^\circ\text{C}$, $I_F = -3.2A$
Q_{rr}	Reverse Recovery Charge		71	110	μC	$di/dt = 100A/\mu s$ ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② $I_{SD} \leq -3.2A$, $di/dt \leq -65A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ\text{C}$
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ④ Surface mounted on FR-4 board, $t \leq 10sec$.

P-Channel MOSFET

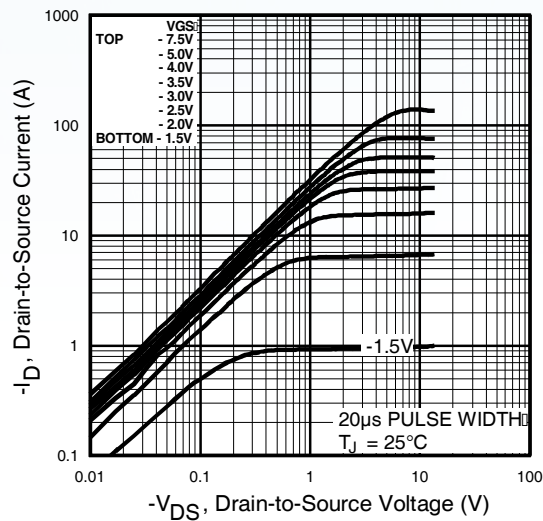


Fig 1. Typical Output Characteristics

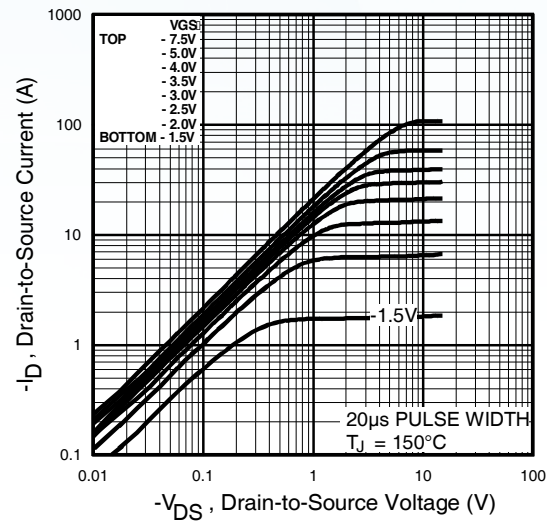


Fig 2. Typical Output Characteristics

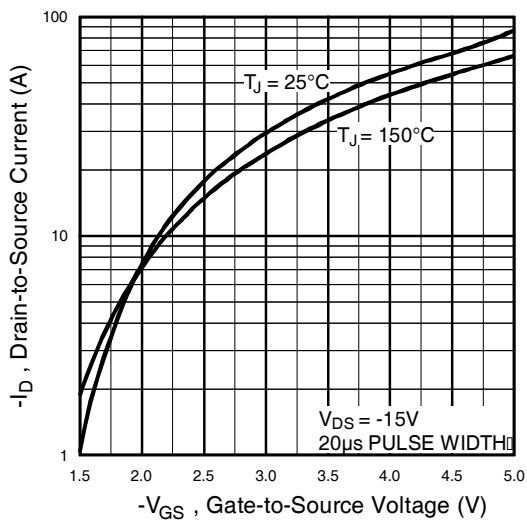


Fig 3. Typical Transfer Characteristics

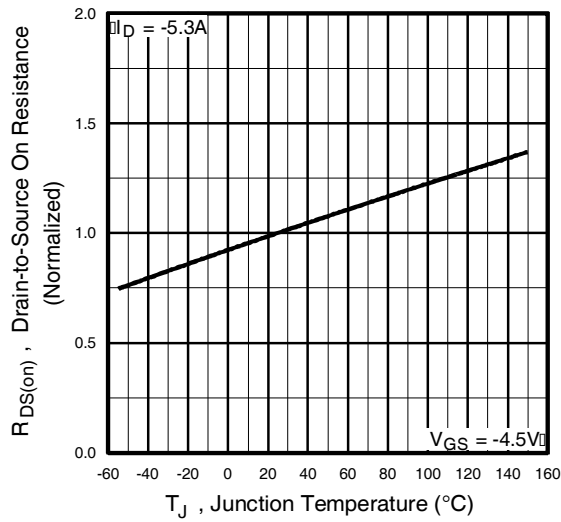


Fig 4. Normalized On-Resistance Vs. Temperature

P-Channel MOSFET

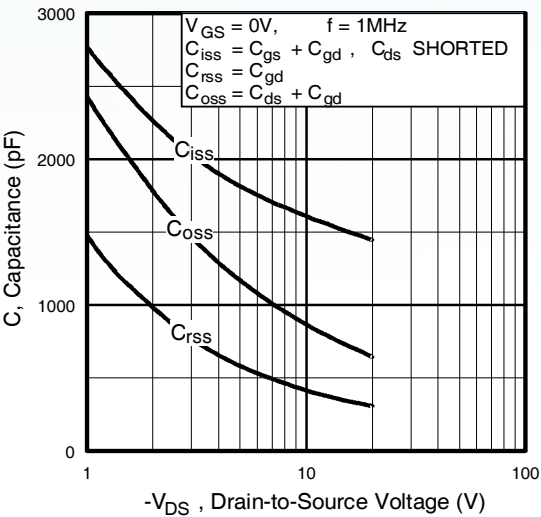


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

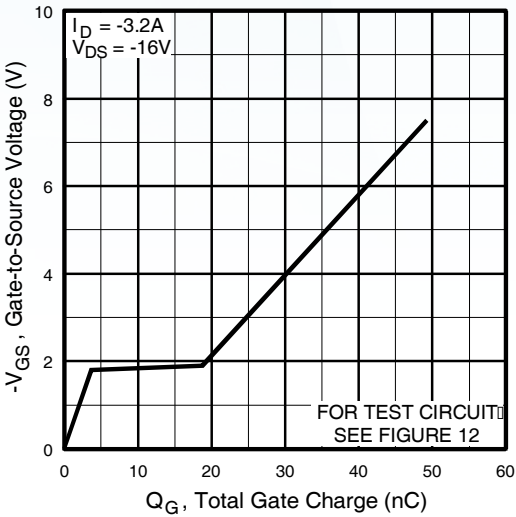


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

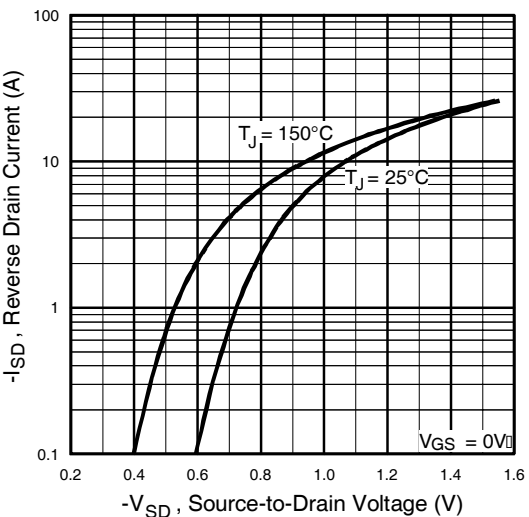


Fig 7. Typical Source-Drain Diode Forward Voltage

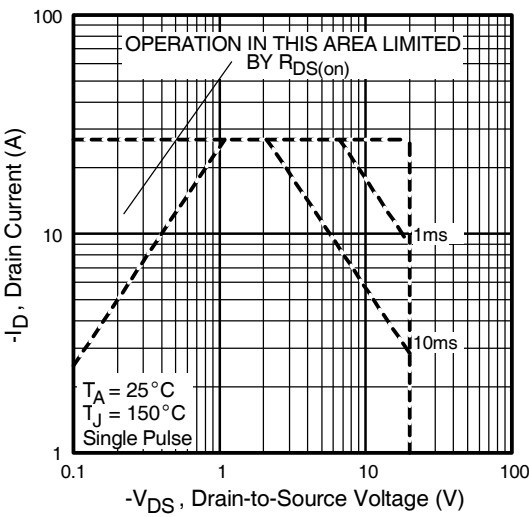


Fig 8. Maximum Safe Operating Area

P-Channel MOSFET

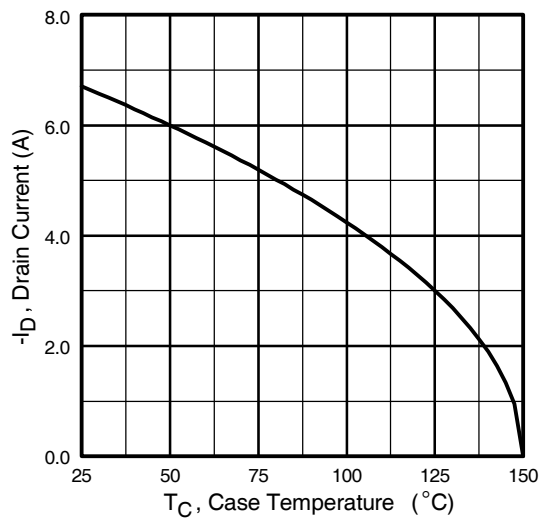


Fig 9. Maximum Drain Current Vs. Ambient Temperature

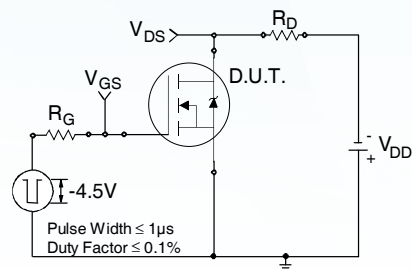


Fig 10a. Switching Time Test Circuit

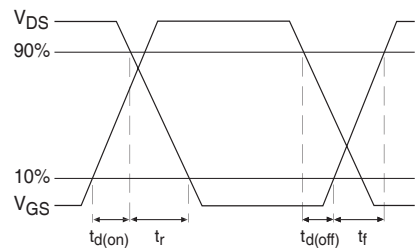


Fig 10b. Switching Time Waveforms

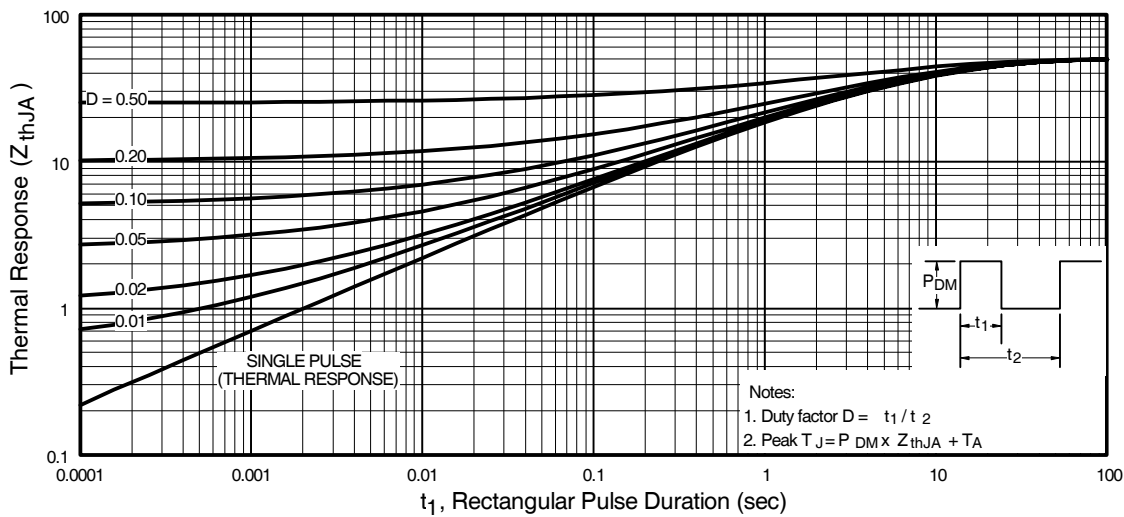


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

P-Channel MOSFET

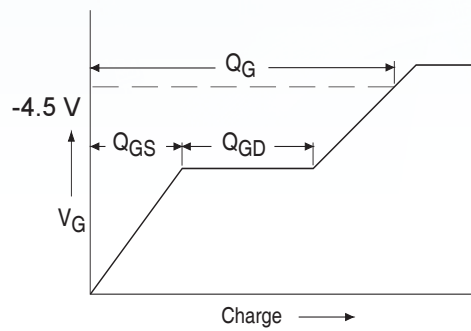


Fig 12a. Basic Gate Charge Waveform

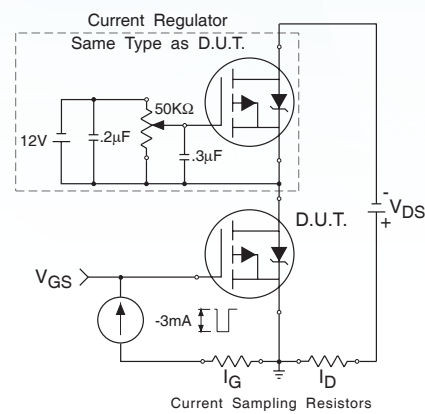
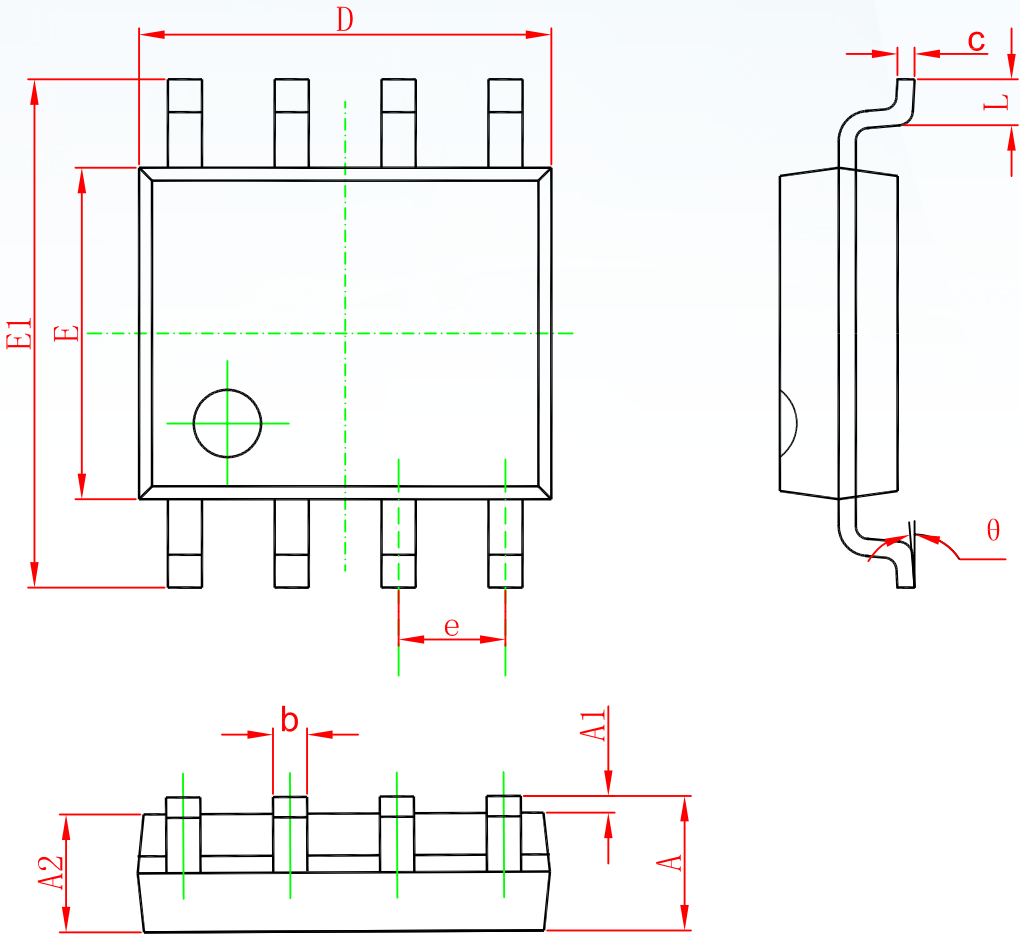


Fig 12b. Gate Charge Test Circuit

P-Channel MOSFET

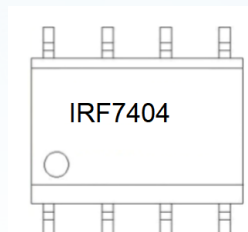
SOP-8



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°

Marking

P-Channel MOSFET



Ordering information

Order code	Package	Baseqty	Deliverymode
IRF7404	SOP-8	3000	Tape and reel

Disclaimer

EVVOSEMI ("EVVO") reserves the right to make corrections, enhancements, improvements, and other changes to its products and services at any time, and to discontinue any product or service without notice.

EVVO warrants the performance of its hardware products to the specifications applicable at the time of sale in accordance with its standard warranty. Testing and other quality control techniques are used as deemed necessary by EVVO to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Customers should obtain and confirm the latest product information and specifications before final design, purchase, or use. EVVO makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does EVVO assume any liability for application assistance or customer product design. EVVO does not warrant or accept any liability for products that are purchased or used for any unintended or unauthorized application.

EVVO products are not authorized for use as critical components in life support devices or systems without the express written approval of EVVOSEMI.

The EVVO logo and EVVOSEMI are trademarks of EVVOSEMI or its subsidiaries in relevant jurisdictions. EVVO reserves the right to make changes without further notice to any products herein.