EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

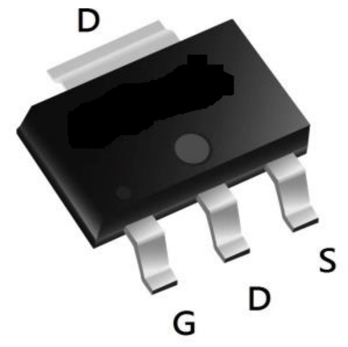
Domestic Part Number	IRFL4105
Overseas Part Number	IRFL4105
Equivalent Part Number	IRFL4105

EV is the abbreviation of name EVVO

60V N-Channel

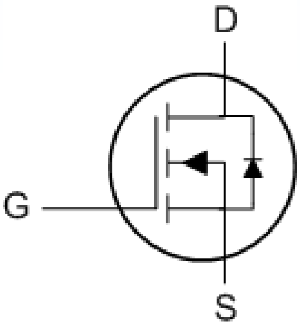
General Description

These logic level N-Channel enhancement This very high density process is especially tailored to minimize on-state resistance and provide superior switching performance, and withstand high energy pulse in the avalanche and commutation modes. These devices are particularly suited for low voltage applications such as DC motor control and DC/DC conversion where fast switching, low in-line power loss, and resistance to transients are needed.



Features

- V_{DS} (V) = 60V
- $R_{DS(ON)}$ ＜100mΩ (V_{GS} = 10V)
- $R_{DS(ON)}$ ＜50m Ω (V_{GS} = 4.5V)
- Low drive requirements allowing operation directly from logic drivers. $V_{GS(TH)} < 2V$.
- High density cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability in a widely used surface mount package.



Absolute Maximum Ratings $T_A = 25^{\circ}C$ unless otherwise noted

Symbol	Parameter	IRFL4105	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage - Continuous	±20	V
I_D	Maximum Drain Current - Continuous (Note 1a)	4	A
	- Pulsed	25	
P_D	Maximum Power Dissipation (Note 1a)	3	W
	(Note 1b)	1.3	
	(Note 1c)	1.1	
T_J,T_{STG}	Operating and Storage Temperature Range	-65 to 150	°C
THERMAL CHARACTERISTICS			
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)	42	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	12	°C/W

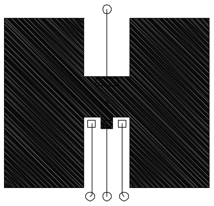
* Order option J23Z for cropped center drain lead.

Electrical Characteristics (T_A = 25 °C unless otherwise noted)

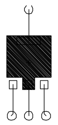
Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 µA	60			V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	I_D = 250 µA, Referenced to 25 °C		55		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		T_J =125°C			50	µA
I_{GSSF}	Gate - Body Leakage, Forward	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate - Body Leakage, Reverse	V_{GS} = -20 V, V_{DS} = 0 V			-100	nA
ON CHARACTERISTICS (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 µA	1	1.6	2	V
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Temp. Coefficient	I_D = 250 µA, Referenced to 25 °C		-4		mV /°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 4 A		70	100	mΩ
		V_{GS} = 4.5 V, I_D = 3.7 A		103	120	
$I_{D(ON)}$	On-State Drain Current	V_{GS} = 5 , V_{DS} = 10 V	10			A
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 4 A		7		S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 25, V_{GS} = 0 V, f = 1.0 MHz		345		pF
C_{oss}	Output Capacitance			110		pF
C_{rss}	Reverse Transfer Capacitance			30		pF
SWITCHING CHARACTERISTICS (Note 2)						
$t_{D(on)}$	Turn - On Delay Time	V_{DD} = 25, I_D = 1 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		5	20	ns
t_r	Turn - On Rise Time			7.5	20	ns
$t_{D(off)}$	Turn - Off Delay Time			20	50	ns
t_f	Turn - Off Fall Time			7	20	ns
Q_g	Total Gate Charge	V_{DS} = 40 V, I_D = 4 A, V_{GS} = 10 V		13	20	nC
Q_{gs}	Gate-Source Charge			1.7		nC
Q_{gd}	Gate-Drain Charge			3.2		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain-Source Diode Forward Current				2.5	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 2.5 A (Note 2)		0.8	1.2	V

Notes:

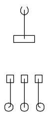
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a. 42°C/W when mounted on a 1 in² pad of 2oz Cu.



b. 95°C/W when mounted on a 0.066 in² pad of 2oz Cu.



c. 110°C/W when mounted on a 0.00123 in² pad of 2oz Cu.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2.0%

Typical Electrical Characteristics

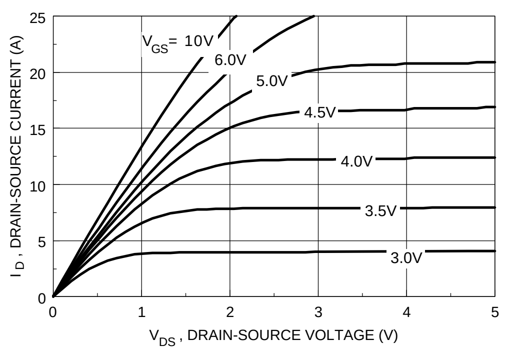


Figure 1. On-Region Characteristics.

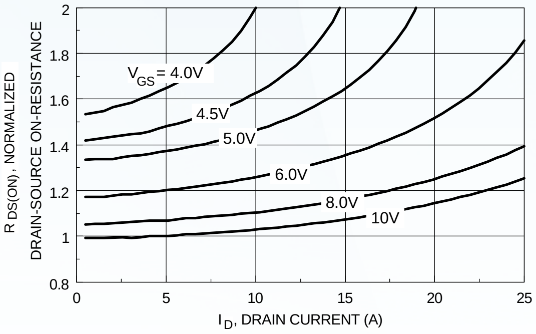


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

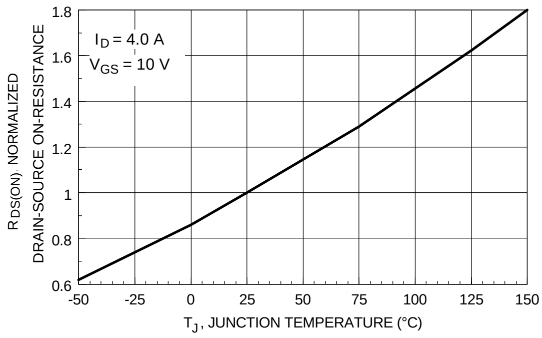


Figure 3. On-Resistance Variation with Temperature.

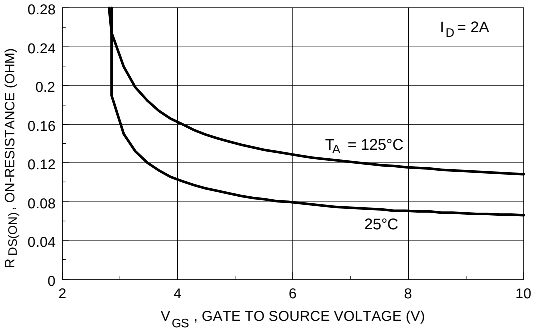


Figure 4. On-Resistance Variation with Gate-to- Source Voltage.

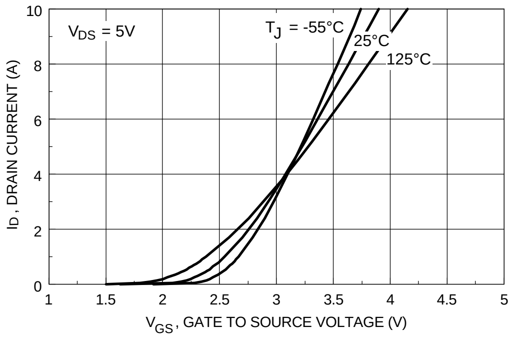


Figure 5. Transfer Characteristics.

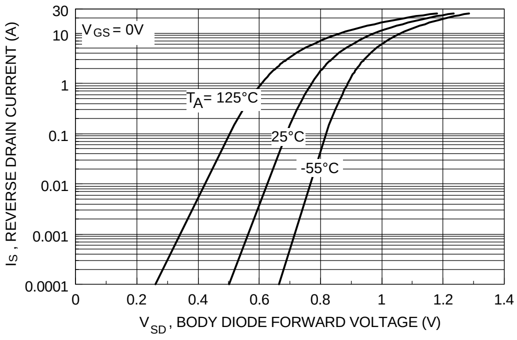


Figure 6. Body Diode Forward Voltage Variation with Current and Temperature.

Typical Electrical Characteristics (continued)

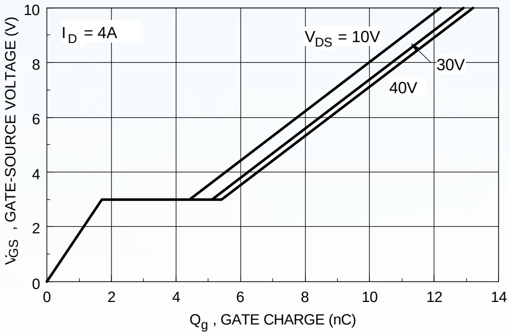


Figure 7. Gate Charge Characteristics.

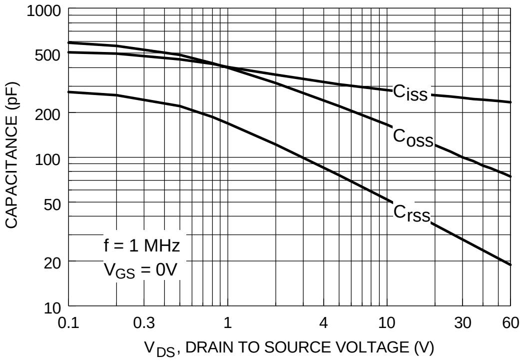


Figure 8. Capacitance Characteristics.

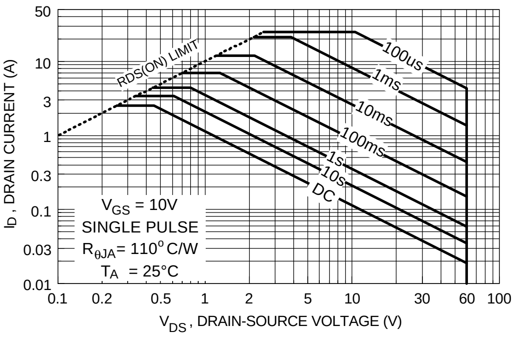


Figure 9. Maximum Safe Operating Area.

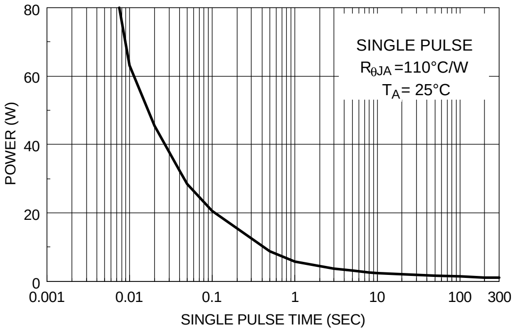


Figure 10. Single Pulse Maximum Power Dissipation.

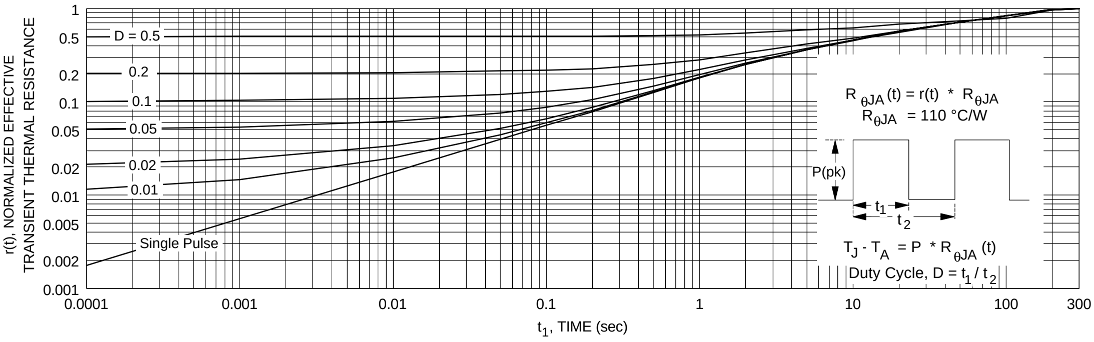
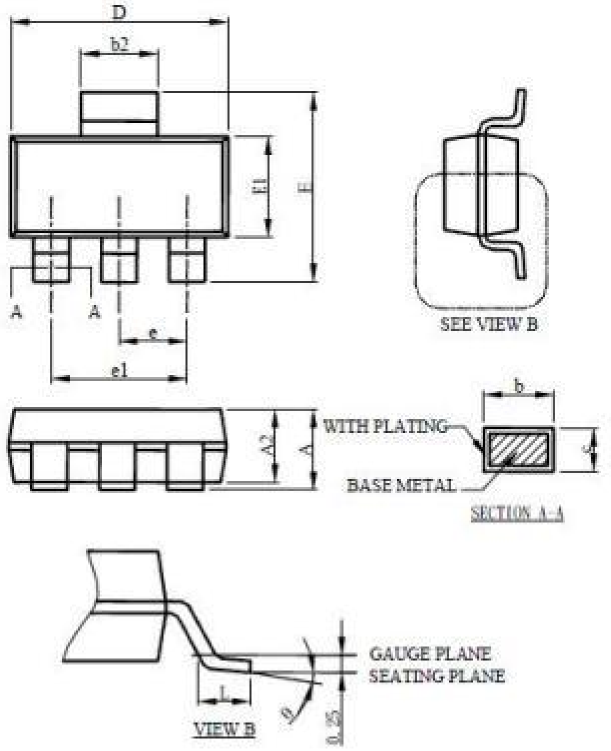
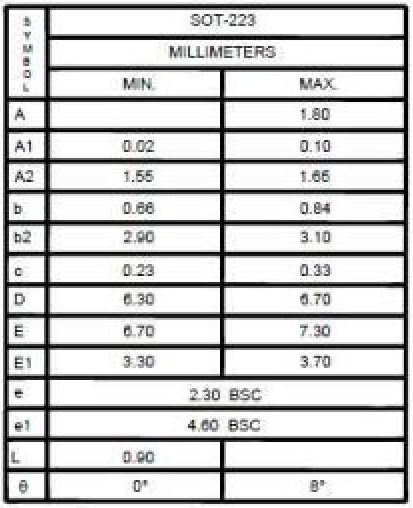


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in note 1c.
Transient thermal response will change depending on the circuit board design.

SOT-223



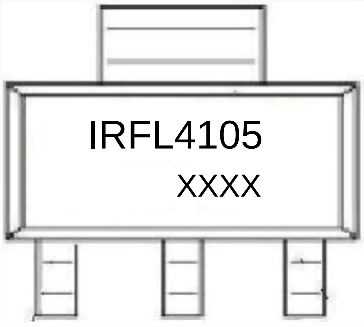


SYMBOL	SOT-223	
	MILLIMETERS	
	MIN.	MAX.
A		1.80
A1	0.02	0.10
A2	1.55	1.65
b	0.66	0.84
b2	2.90	3.10
c	0.23	0.33
D	6.30	6.70
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.90	
θ	0°	8°

Note:
1.Refer to JEDEC TO-261AA.
2.Dimension D and E1 are determined at the outermost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs, and interlead flash, but including any mismatch between the top and bottom of the plastic body.
3.Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

60V N-Channel

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
IRFL4105	SOT-223	2500	Tape and reel

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