

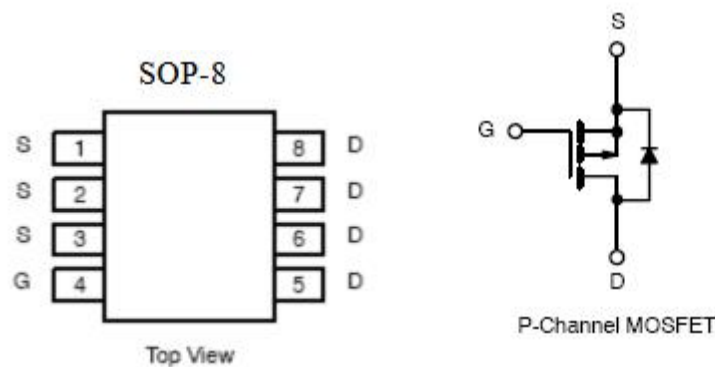
1. Features

- $R_{DS(on)}=50m\Omega(\text{typ})@ V_{GS}=-10\text{ V}$
- Super low gate charge
- Green device available
- Excellent Cdv/dt effect decline
- Advanced high cell density trench technology

2. Description

The KIA9435 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The KIA9435 meet the RoHs and Green Product requirement.

3. Symbol



4. Absolute maximum ratings

($T_A=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-source voltage	V_{DSS}	-30	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current $V_{GS}@10V^1$	I_D	-5.3	A
Pulsed drain current ²	I_{DM}	-20	A
Total power dissipation ⁴	P_D	2.5	W
Junction and storage temperature range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Thermal resistance-junction to case ¹	$R_{\theta JC}$	50	$^\circ\text{C/W}$

5. Electrical characteristics

(T_J=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-30	-	-	V
BV _{DSS} Temperature coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Reference to 25 °C, I _D =-1mA	-	-0.023	-	V/ °C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V, T _J =25°C	-	-	-1	μA
		V _{DS} =-24V, V _{GS} =0V, T _J =55°C	-	-	5	
Gate-source leakage current	I _{GSS}	V _{GS} =+20V, V _{DS} =0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	-1.0	-1.6	-3.0	V
V _{GS(th)} Temperature coefficient	$\Delta V_{GS(th)}$		-	4	-	mV/°C
Static drain-source on- resistance ²	R _{DS(on)}	V _{GS} =-10V, I _D =-4A	-	50	65	mΩ
		V _{GS} =-4.5V, I _D =-4A	-	75	105	
Forward transconductance	g _{FS}	V _{DS} =-15V, I _D =-4.5A	-	8	-	S
Total gate charge	Q _g	V _{DS} =-15V, V _{GS} =-20V I _D =-5.3A	-	12	-	nC
Gate-source charge	Q _{gs}		-	2.3	-	
Gate-drain charge	Q _{gd}		-	3.1	-	
Turn-on delay time	t _{d(on)}	V _{DD} =-15V, R _G =6Ω, V _{GS} =-10V I _D =-1A	-	15	-	ns
Rise time	t _r		-	13.2	-	
Turn-off delay time	t _{d(off)}		-	57	-	
Fall time	t _f		-	20	-	
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-15V F=1.0MHZ	-	525	-	pF
Output capacitance	C _{oss}		-	132	-	
Reverse transfer capacitance	C _{rss}		-	70	-	
Diode characteristics						
Continuous source current ¹	I _S	V _G =V _D =0V, Force current	-	-	-5.3	A
Pulsed source current ^{2,5}	I _{SM}		-	-	-20	A
Diode forward voltage ²	V _{SD}	V _{GS} =0V, I _S =-4A, T _J =25°C	-	-	1.5	V

Note:1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2. The data tested by pulsed, pulse width ≤300us, duty cycle ≤2%.

3. The power dissipation is limited by 150 °C junction temperature.

4. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

6. Test circuits and waveforms

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

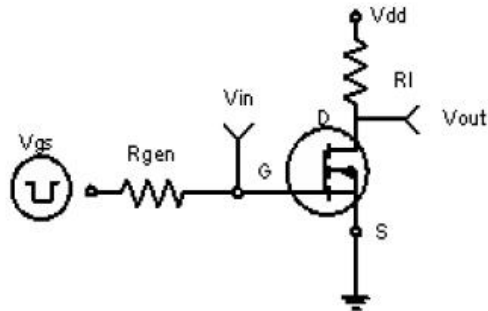


Figure 1: Switching Test Circuit

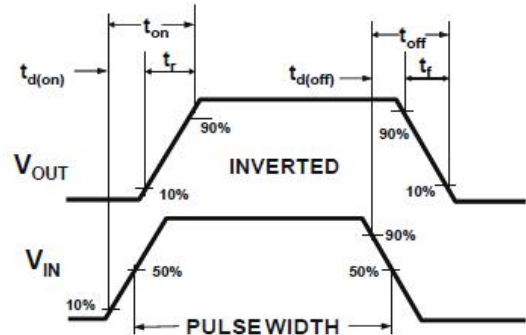


Figure 2: Switching Waveforms

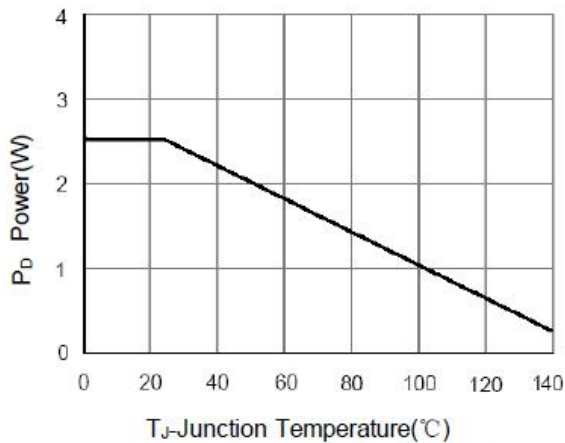


Figure 3 Power Dissipation

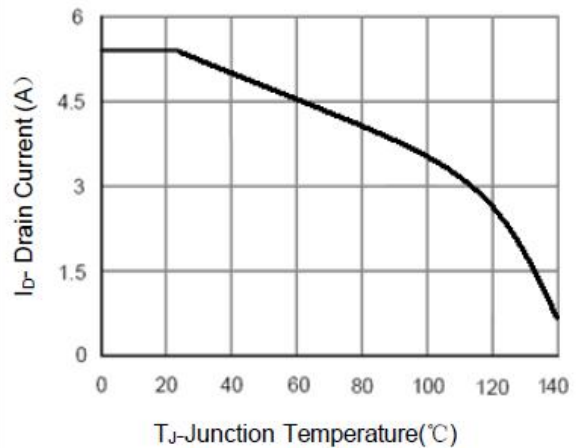


Figure 4 Drain Current

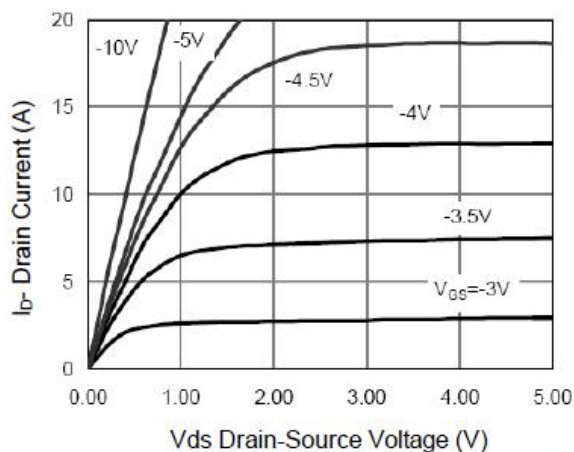


Figure 5 Output CHARACTERISTICS

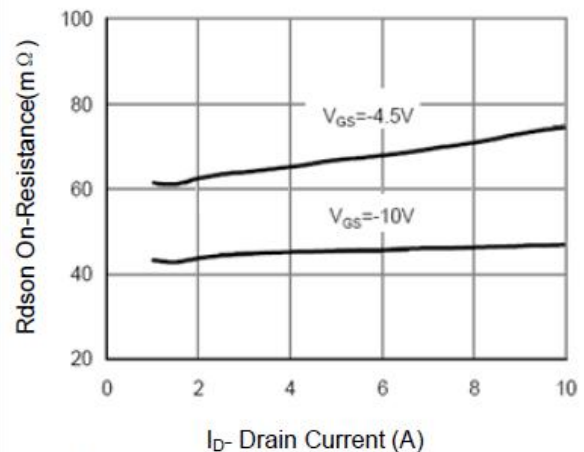


Figure 6 Drain-Source On-Resistance

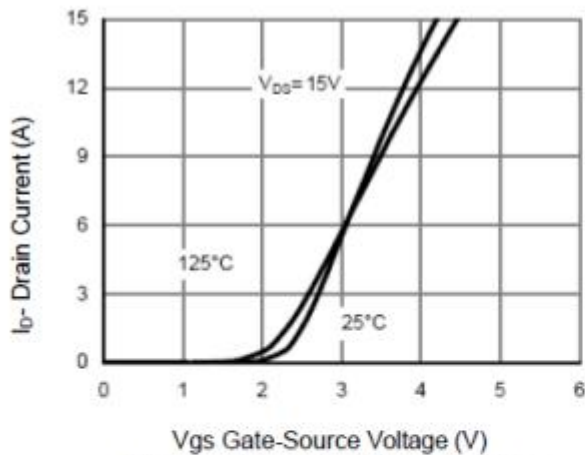


Figure 7 Transfer Characteristics

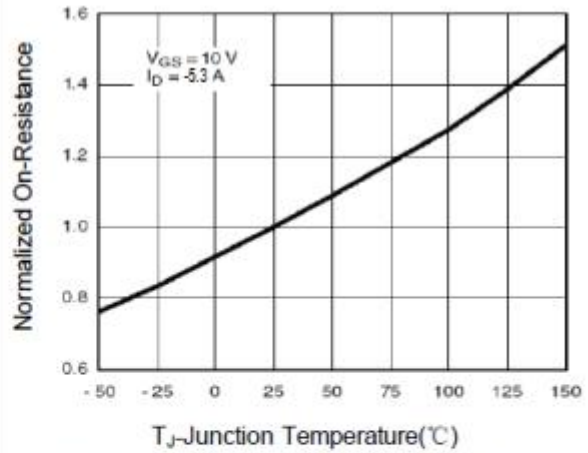


Figure 8 Drain-Source On-Resistance

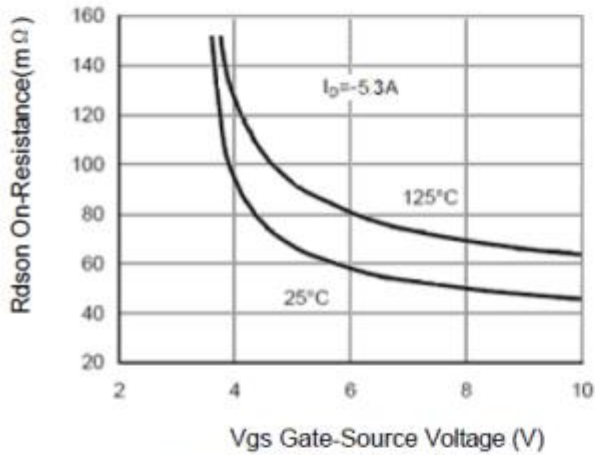


Figure 9 Rdson vs Vgs

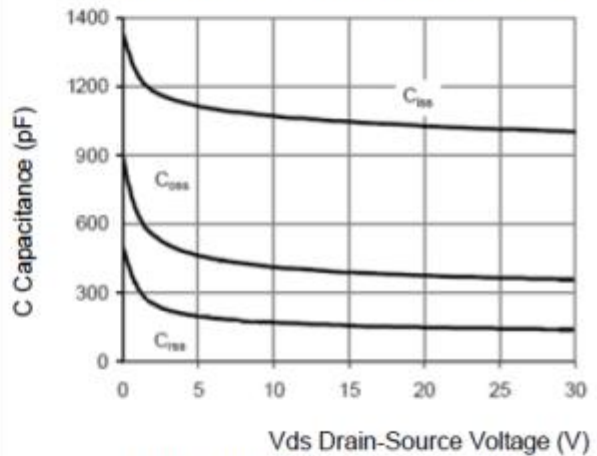


Figure 10 Capacitance vs Vds

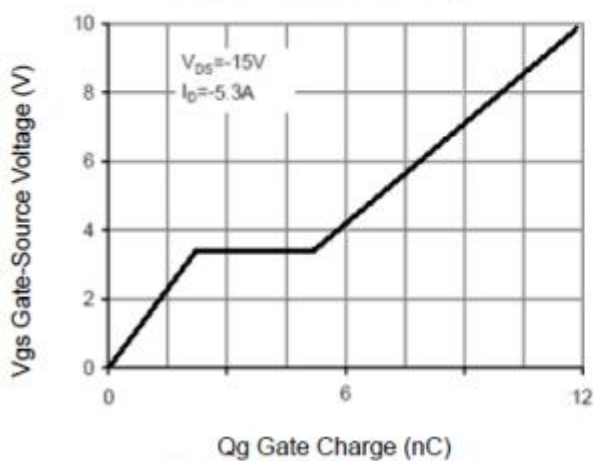


Figure 11 Gate Charge

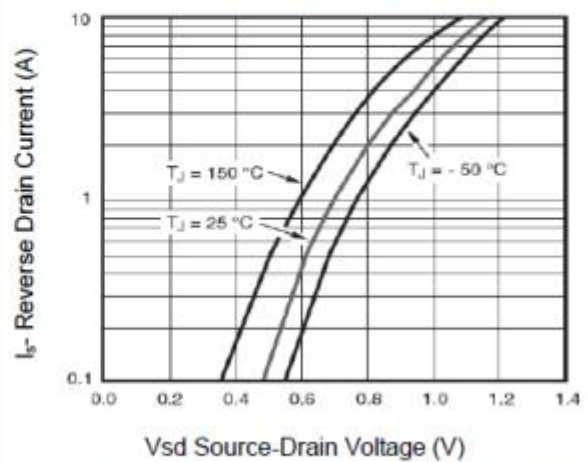


Figure 12 Source- Drain Diode Forward

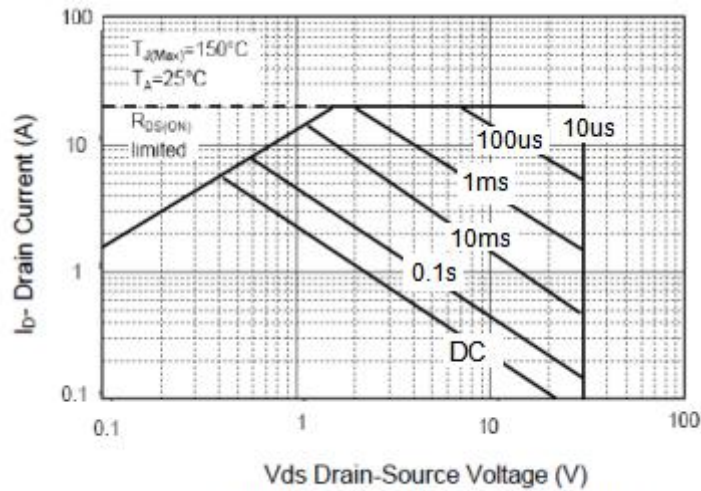


Figure 13 Safe Operation Area

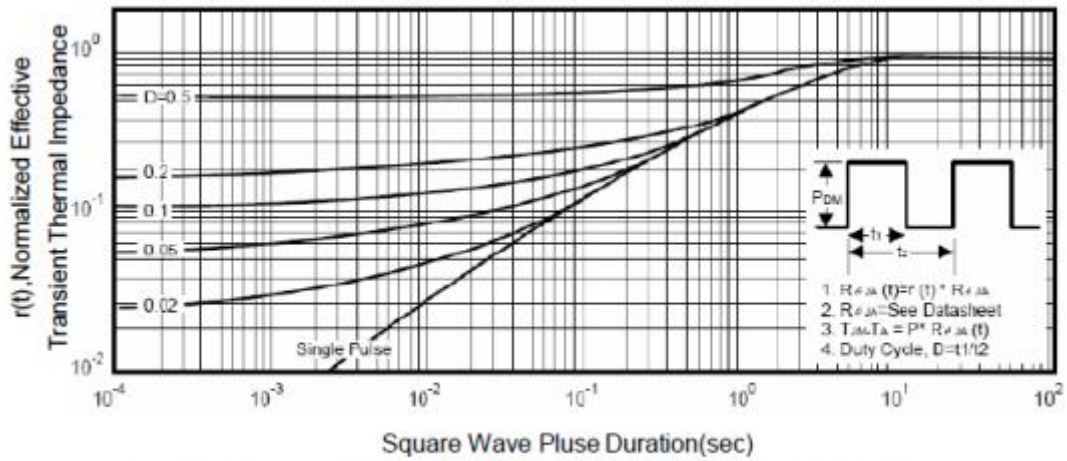


Figure 14 Normalized Maximum Transient Thermal Impedance