

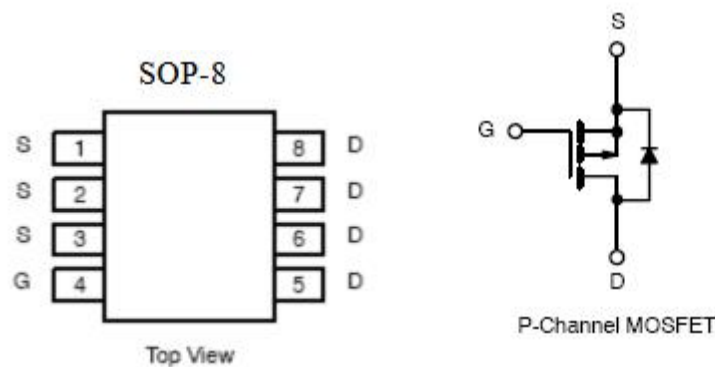
1. Features

- $R_{DS(on)}=50m\Omega(\text{typ})@ V_{GS}=-10\text{ V}$
- 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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
BV_{DSS} Temperature coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Reference to 25°C , $I_D=-1\text{mA}$	-	-0.023	-	V/ $^{\circ}\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-24V, V_{GS}=0V,$ $T_J=25^{\circ}\text{C}$	-	-	-1	μA
		$V_{DS}=-24V, V_{GS}=0V,$ $T_J=55^{\circ}\text{C}$	-	-	5	
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	-1.0	-1.6	-3.0	V
$V_{GS(th)}$ Temperature coefficient	$\Delta V_{GS(th)}$		-	4	-	mV/ $^{\circ}\text{C}$
Static drain-source on- resistance ²	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-4A$	-	50	65	m Ω
		$V_{GS}=-4.5V, I_D=-4A$	-	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	$t_{d(on)}$	$V_{DD}=-15V,$ $R_G=6\Omega, V_{GS}=-10V$ $I_D=-1A$	-	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}	$V_{GS}=0V, V_{DS}=-15V$ $F=1.0\text{MHZ}$	-	525	-	pF
Output capacitance	C_{oss}		-	132	-	
Reverse transfer capacitance	C_{rss}		-	70	-	
Diode characteristics						
Continuous source current ¹	I_S	$V_G=V_D=0V, \text{Force current}$	-	-	-5.3	A
Pulsed source current ^{2,5}	I_{SM}		-	-	-20	A
Diode forward voltage ²	V_{SD}	$V_{GS}=0V, I_S=-4A, T_J=25^{\circ}\text{C}$	-	-	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 $\leq 300\mu s$, duty cycle $\leq 2\%$.

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

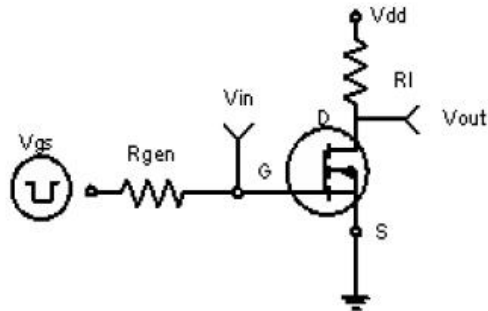


Figure 1: Switching Test Circuit

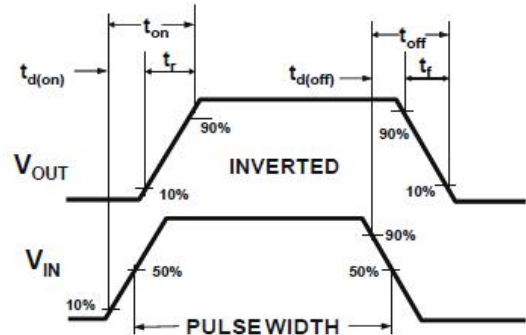


Figure 2: Switching Waveforms

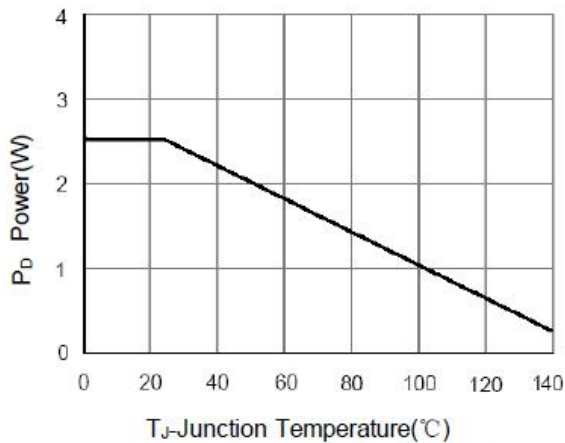


Figure 3 Power Dissipation

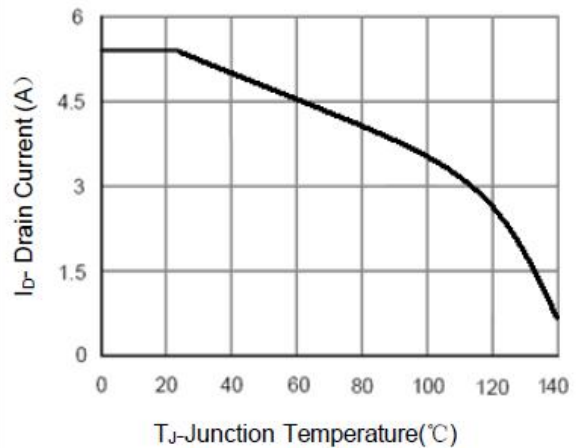


Figure 4 Drain Current

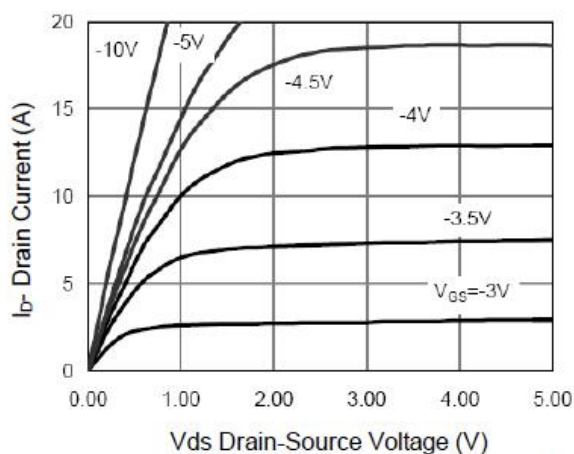


Figure 5 Output CHARACTERISTICS

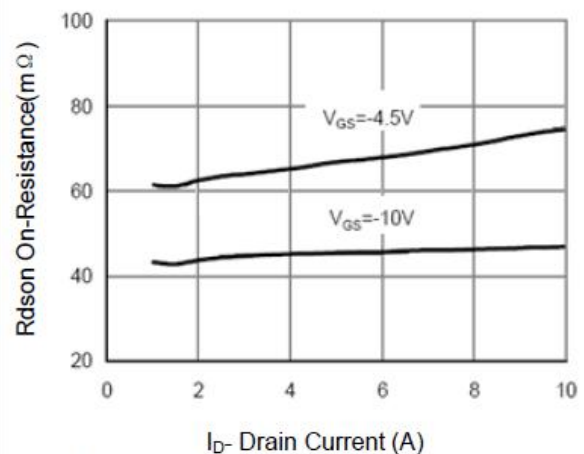


Figure 6 Drain-Source On-Resistance

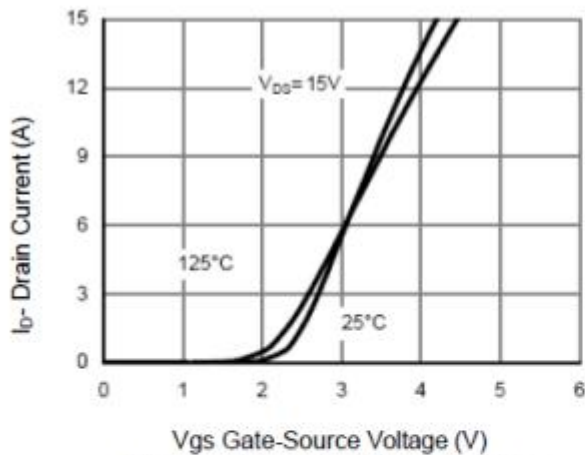


Figure 7 Transfer Characteristics

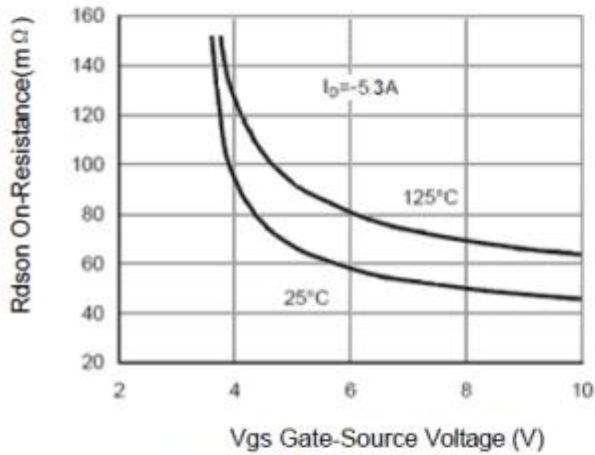


Figure 9 $R_{DS(on)}$ vs V_{GS}

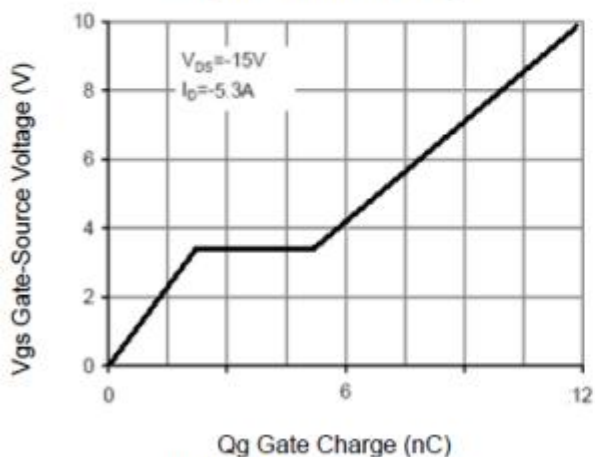


Figure 11 Gate Charge

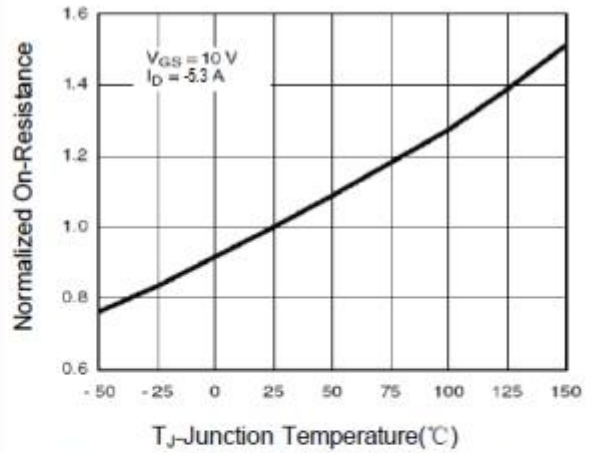


Figure 8 Drain-Source On-Resistance

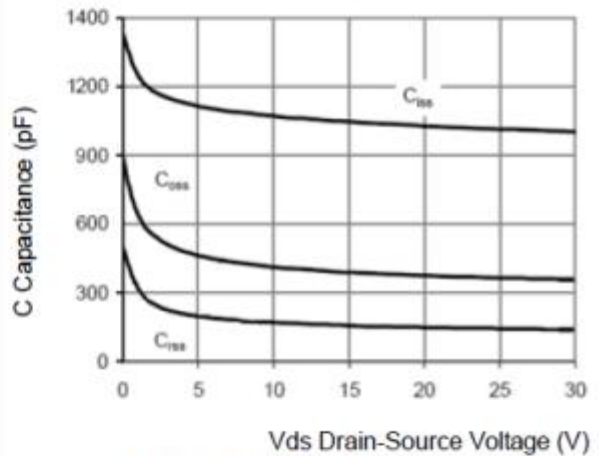


Figure 10 Capacitance vs V_{DS}

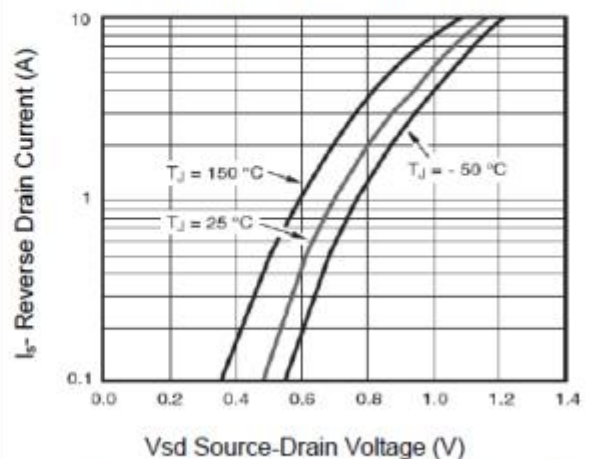


Figure 12 Source- Drain Diode Forward

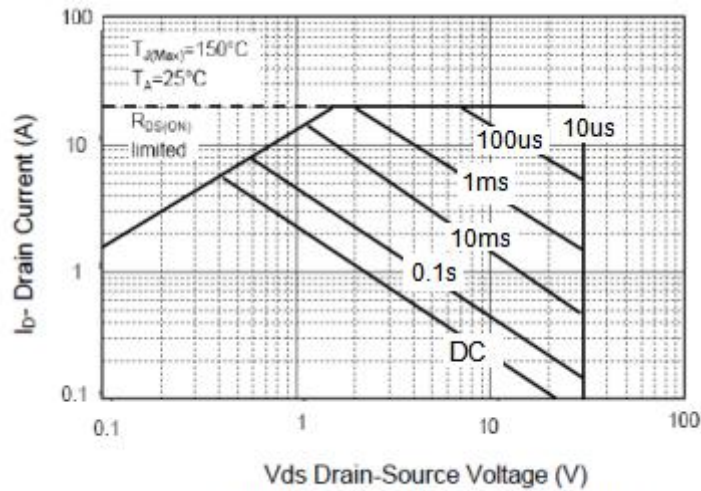


Figure 13 Safe Operation Area

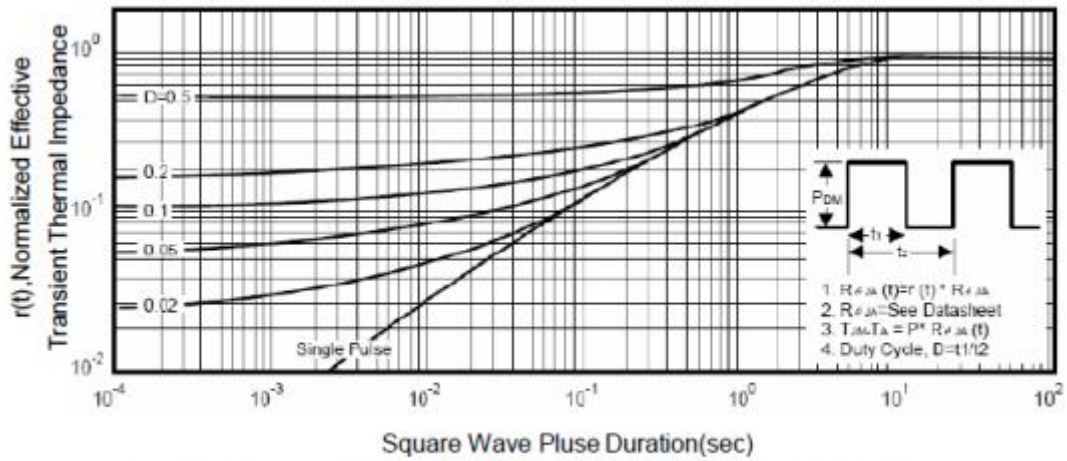


Figure 14 Normalized Maximum Transient Thermal Impedance