KL Silicon P-Channel Power MOSFET

General Description:

The KL4435-8 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applicaLtions. The package form is SOP-8, which accords with the RoHS standard.

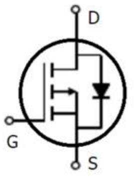
V_{DSS}	-30	V
I_D	-9.1	A
P_D	3.1	W
$R_{DS(ON)type}$	20	mΩ

SOP-8

Features:

- $R_{DS(ON)}$ <30mΩ @ V_{GS}=10V (Typ20mΩ)
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Inner Equivalent Principium Chart



Applications:

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute (Tc= 25℃ unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-30	V
I_D	Continuous Drain Current	-9	A
I_{DM}	Pulsed Drain Current	-50	A
V_{GS}	Gate-to-Source Voltage	±20	V
P_D	Power Dissipation	3.1	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	155, –55 to 155	℃

Electrical Characteristics (Tc= 25℃ unless otherwise specified):

OFF Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-30	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS}=-30V, V_{GS}= 0V,T_a=25℃	--	--	-1.0	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+20V	--	--	0.1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-20V	--	--	-0.1	μA

ON Characteristics[a3]

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=-10V,I_D=-9.1A	--	20	30	mΩ
		V_{GS}=-4.5V,I_D=-6.9A		25	40	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-1.0	--	-3.0	V
Pulse width tp≤380μs,δ≤2%						

Dynamic Characteristics[a4]

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=-15V,I_D=-9.1A	10	--	--	S
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=-15V f=1.0MHz	--	1600	--	pF
C_{oss}	Output Capacitance		--	350	--	
C_{rss}	Reverse Transfer Capacitance		--	300	--	

Resistive Switching Characteristics[a4]

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-15V,I_D=-1A V_{GS}=-10V,R_G=6Ω	--	10	--	ns
t_r	Rise Time		--	15	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	110	--	
t_f	Fall Time		--	70	--	
Q_g	Total Gate Charge	V_{DD}=-15V, I_D=-9.1A V_{GS}=-10V	--	30	--	nC
Q_{gs}	Gate to Source Charge		--	5.5	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	8	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current [a2](Body Diode)		--	--	-9.1	A
V_{SD}	Diode Forward Voltage[a3]	I_S=-2.1A,V_{GS}=0V	--	--	-1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case[a2]	40	℃/W

[a1]: Repetitive Rating: Pulse width limited by maximum junction temperature.

[a2]: Surface Mounted on FR4 Board, t≤10sec.

[a3]: Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.

[a4]: Guaranteed by design, not subject to production

Test circuit & Thermal Characteristics

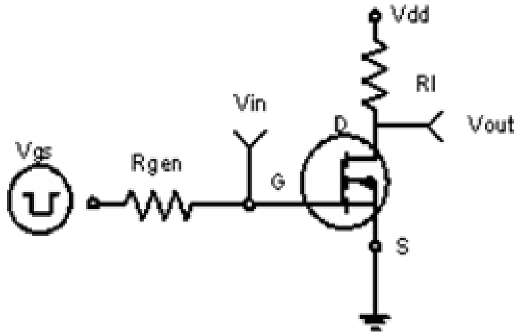


Figure 1:Switching Test Circuit

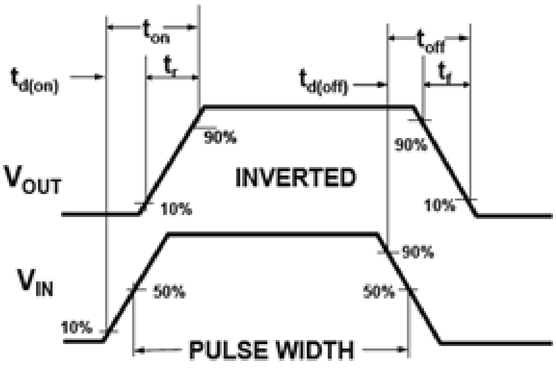


Figure 2:Switching Waveforms

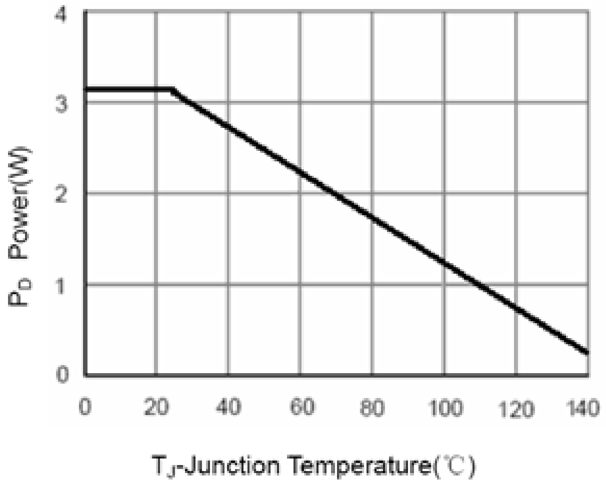


Figure 3 Power Dissipation

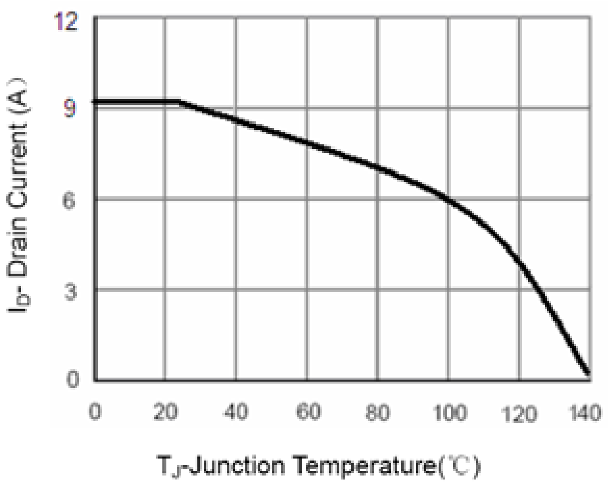


Figure 4 Drain Current

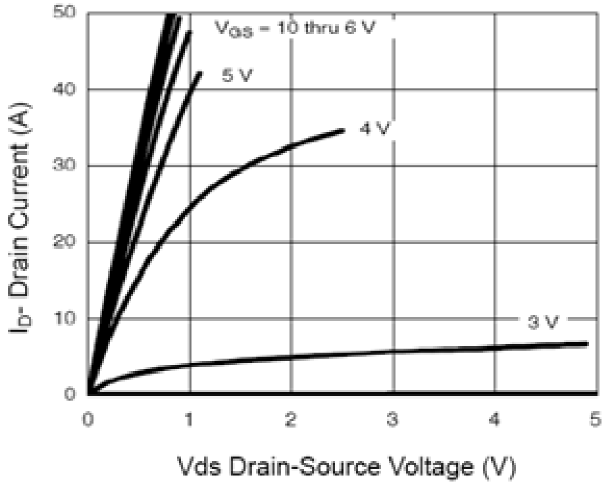


Figure 5 Output Characteristics

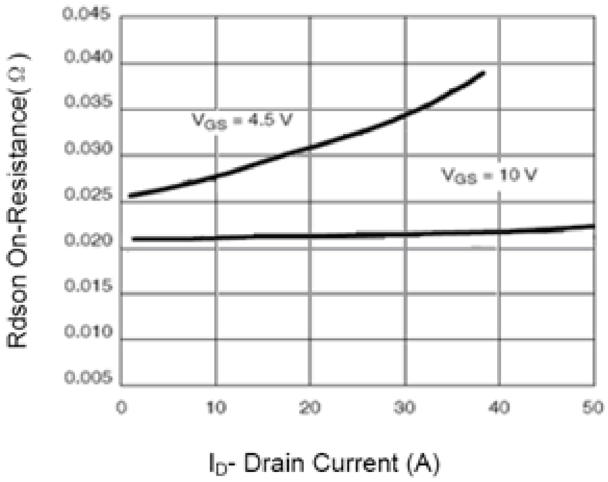


Figure 6 Drain-Source On-Resistance

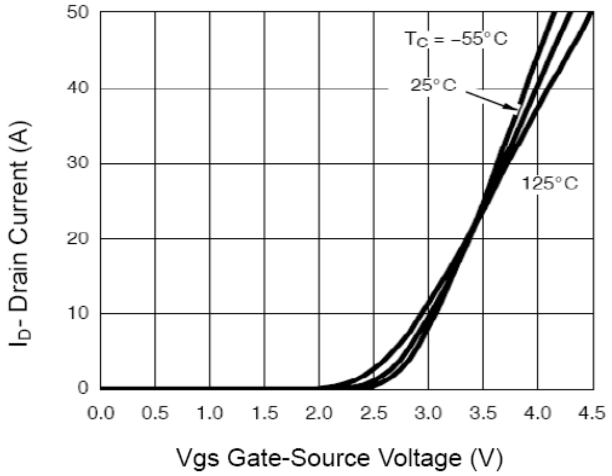


Figure 7 Transfer Characteristics

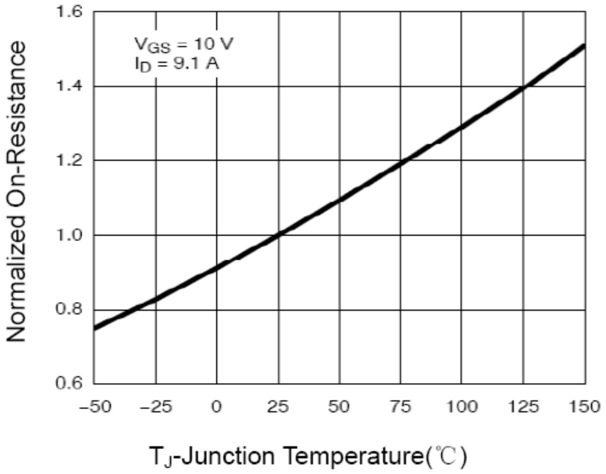


Figure 8 Drain-Source On-Resistance

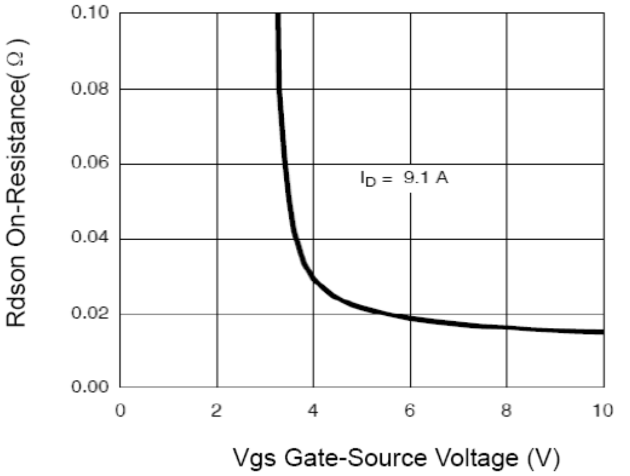


Figure 9 Rdson vs Vgs

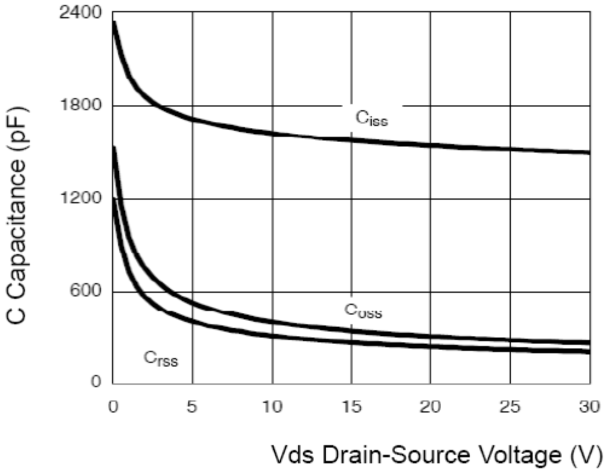


Figure 10 Capacitance vs Vds

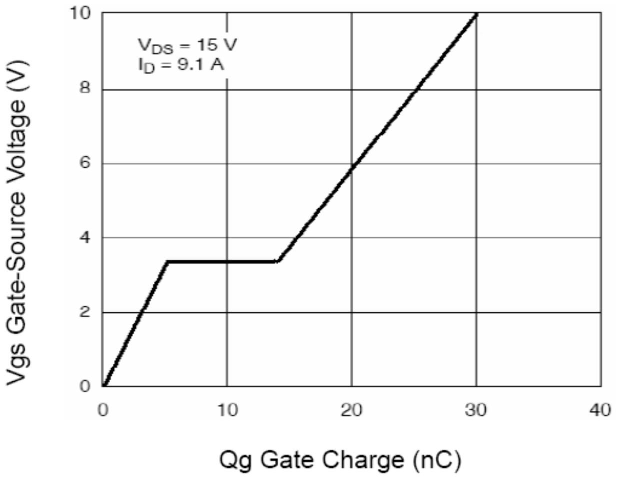


Figure 11 Gate Charge

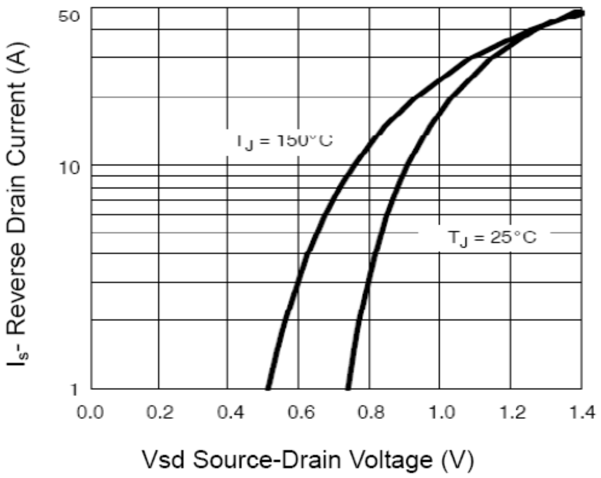


Figure 12 Source- Drain Diode Forward

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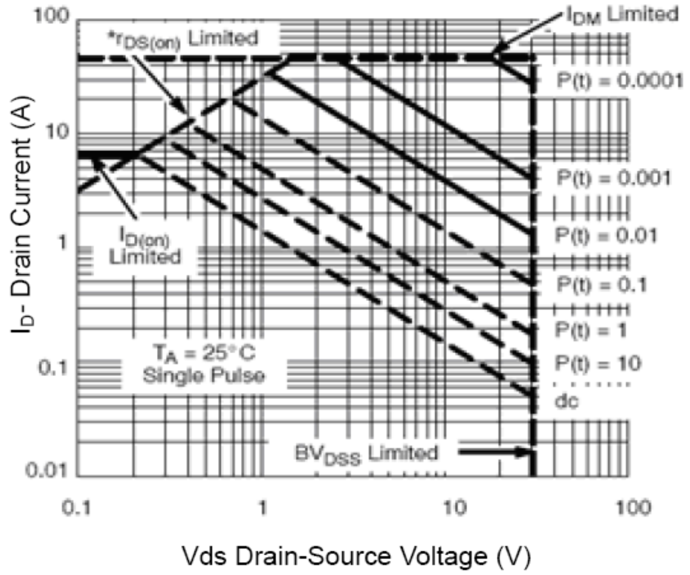

Figure 13 Safe Operation Area

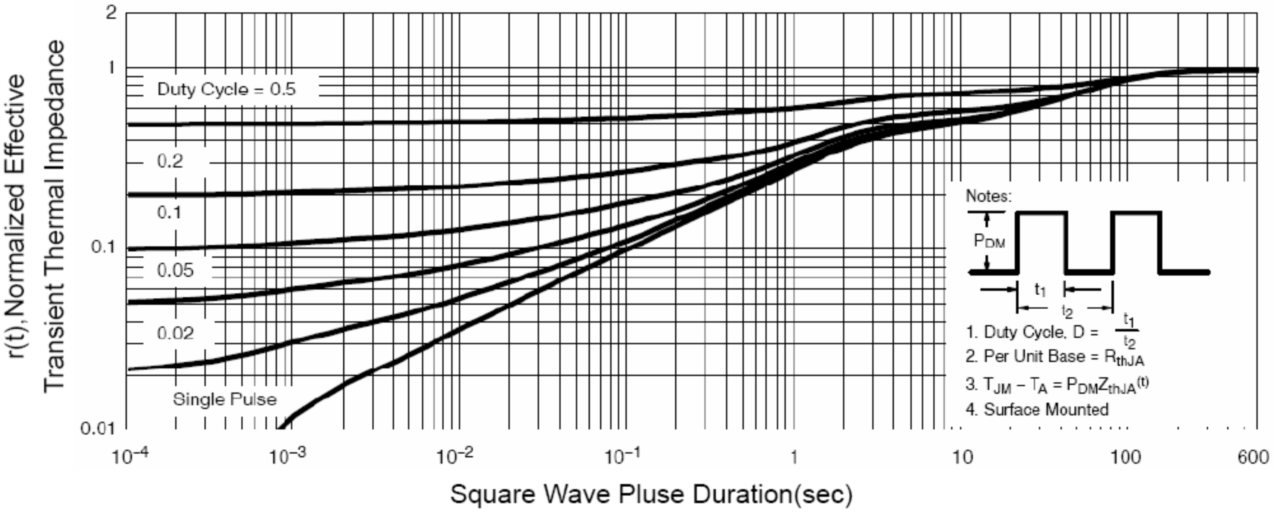

Figure 14 Normalized Maximum Transient Thermal Impedance