P-Channel Enhancement Mode Power MOSFET

Description

The HRX2319A uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

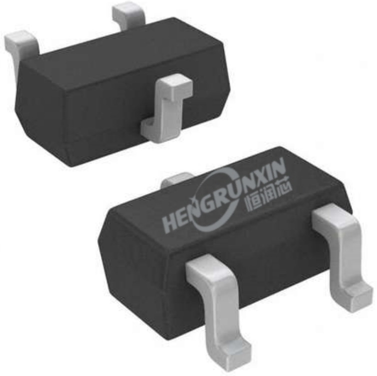
- V_{DS} = -17V, I_D = -6A

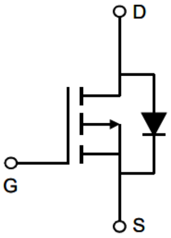
  $R_{DS(ON)} < 22m\Omega$ @V_{GS}=-4.5V
  $R_{DS(ON)} < 32m\Omega$ @V_{GS}=-2.5V

- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management





Schematic diagram

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-17	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-6	A
Pulsed Drain Current (Note 1)	I_{DM}	-24	A
Maximum Power Dissipation	P_D	1.6	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	78	℃/W

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=-250μA	-	-17	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-14V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-0.45	-0.7	-1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V,I_D=-5A	-	17	22	mΩ
		V_{GS}=-2.5V,I_D=-3A	-	23	32	mΩ
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz	-	1290	-	pF
Output Capacitance	C_{oss}		-	240	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	200	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V,R_L=1Ω, V_{GS}=-4.5V,R_G=3Ω	-	11	-	nS
Turn-on Rise Time	t_r		-	25	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	70	-	nS
Turn-Off Fall Time	t_f		-	42	-	nS
Total Gate Charge	Q_g	V_{DS}=-10V,I_D=-5A, V_{GS}=-4.5V	-	13	-	nC
Gate-Source Charge	Q_{gs}		-	2	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-1A	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-6	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to product.

Typical Electrical and Thermal Characteristics

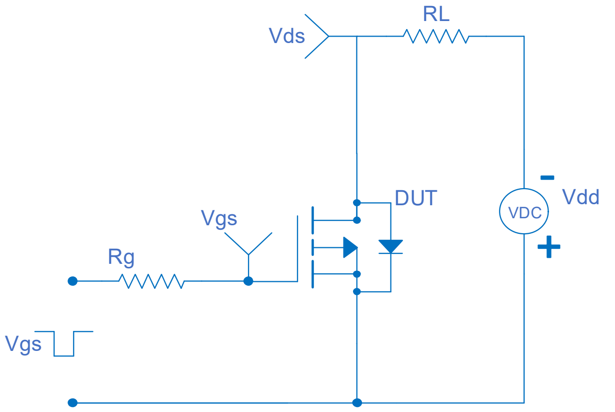


Figure 1 Switching Test Circuit

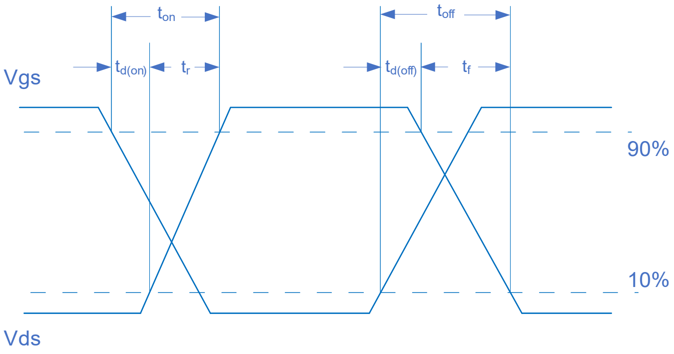


Figure 2 Switching Waveform

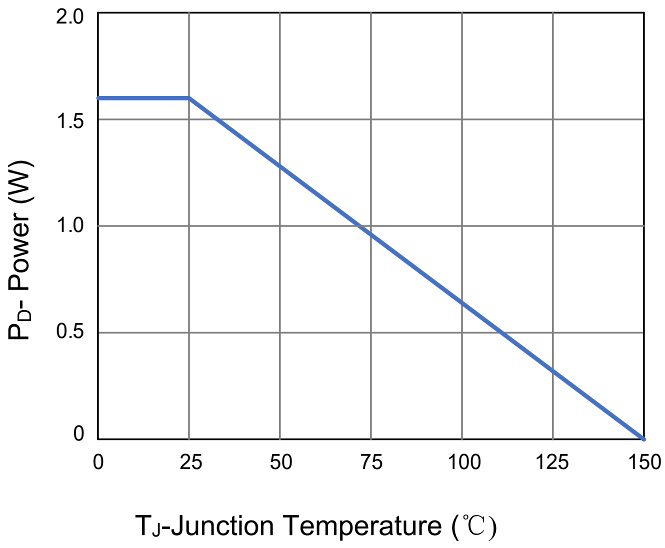


Figure 3 Power De-rating

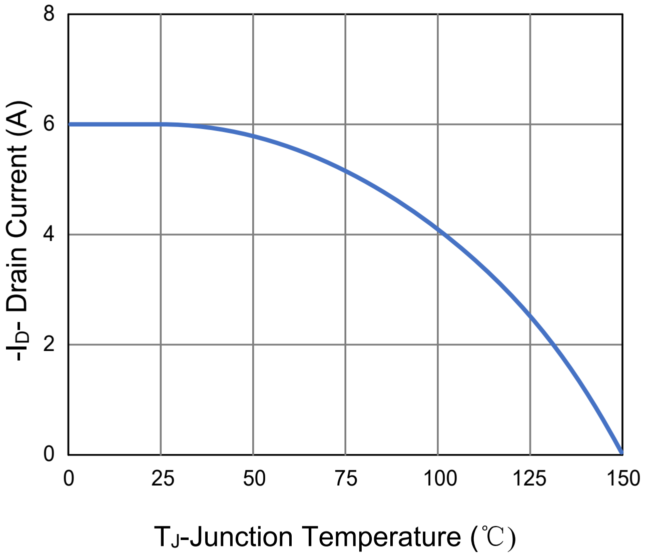


Figure 4 Drain Current

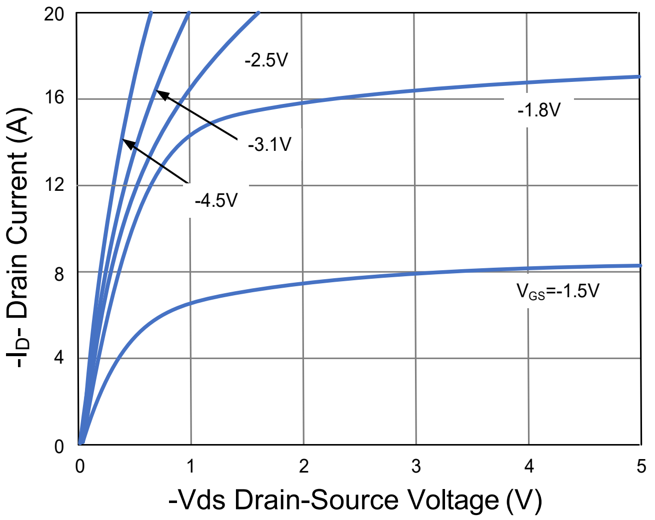


Figure 5 Output Characteristics

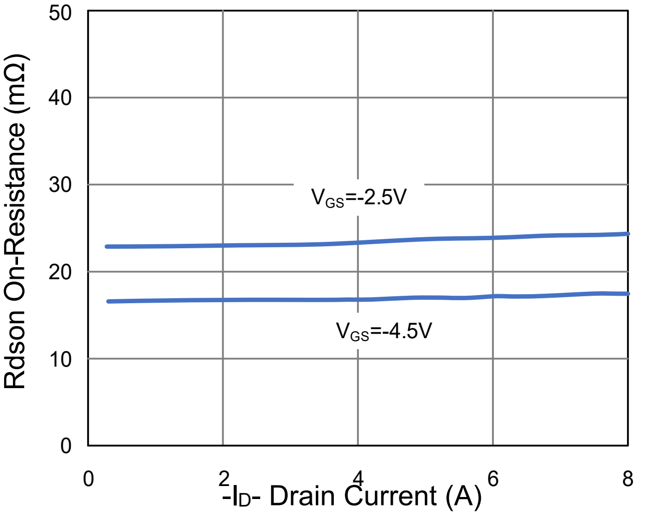


Figure 6 Rdson vs Drain Current

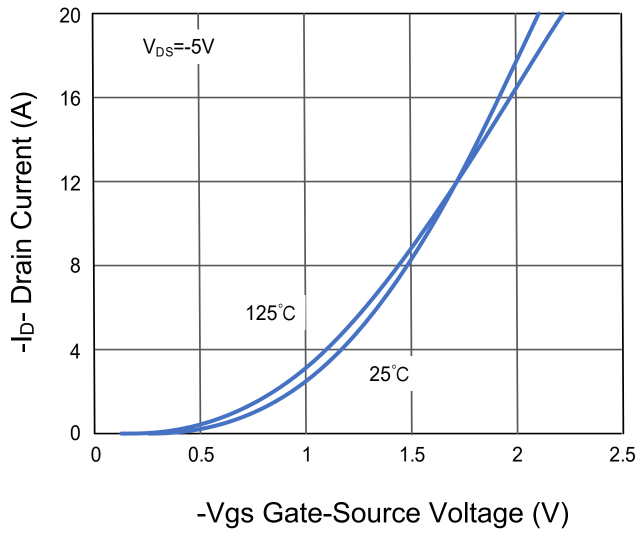


Figure 7 Transfer Characteristics

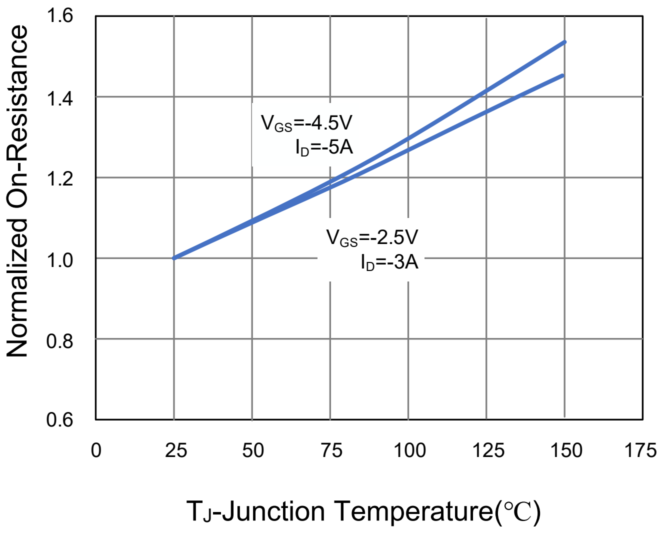


Figure 8 Rdson vs Junction Temperature

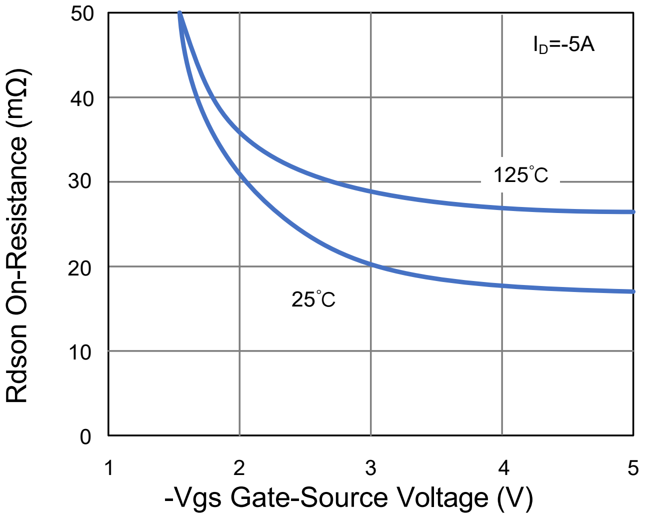


Figure 9 Rdson vs Vgs

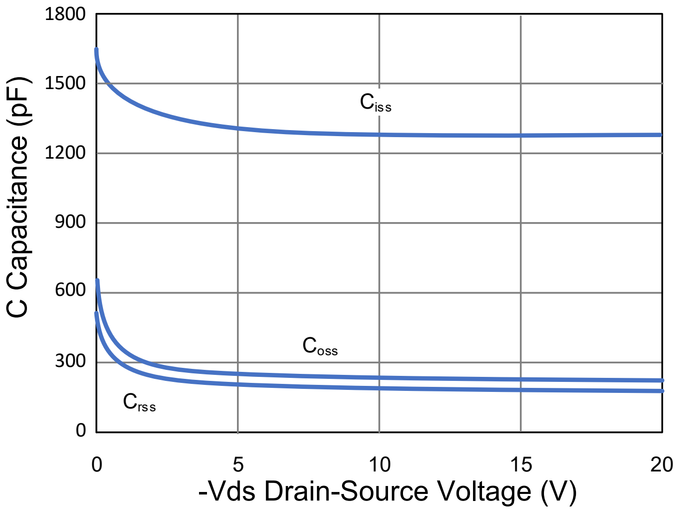


Figure 10 Capacitance vs Vds

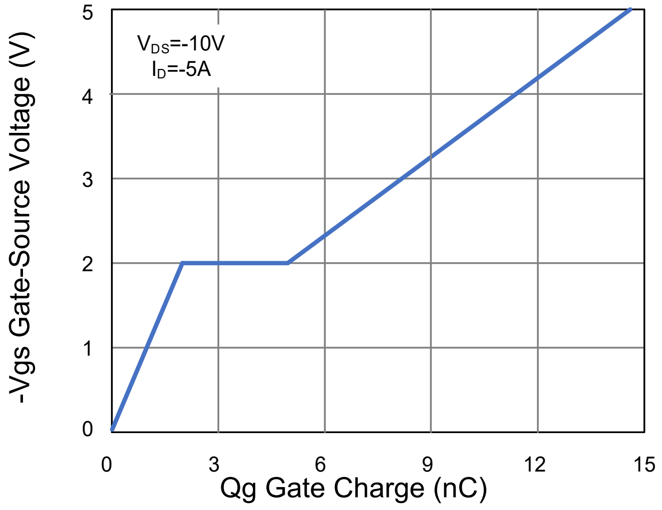


Figure 11 Gate Charge

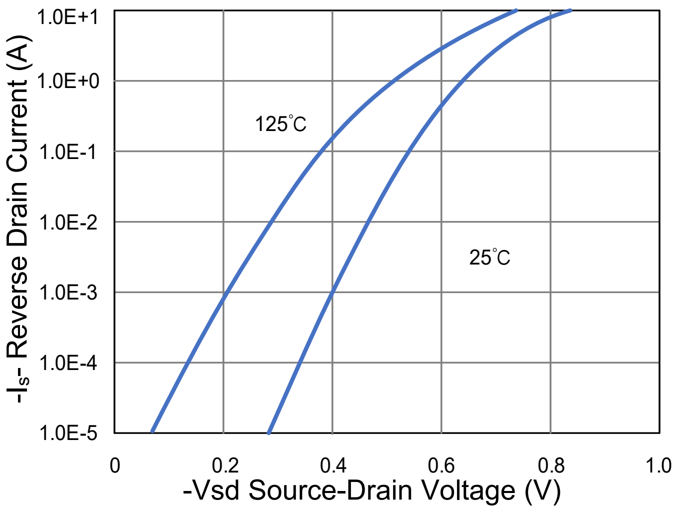


Figure 12 Source- Drain Diode Forward

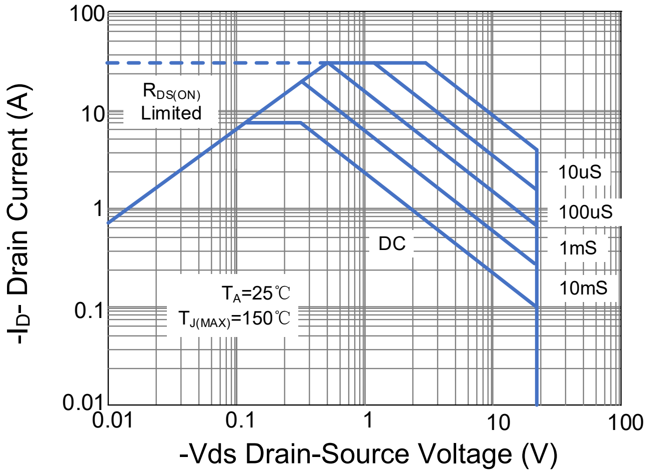


Figure 13 Safe Operation Area

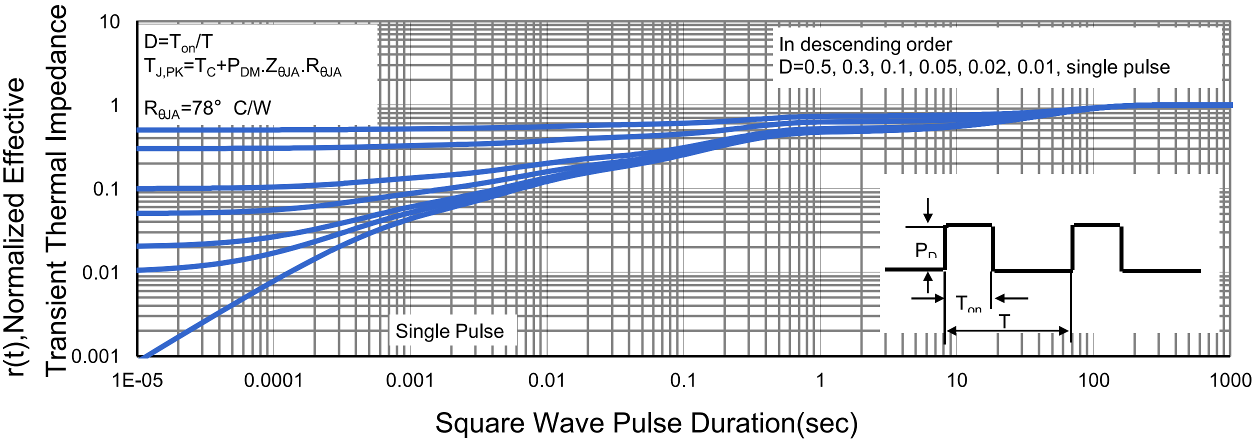


Figure 14 Normalized Maximum Transient Thermal Impedance

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