QIAOXIN N-Channel Super Trench II Power MOSFET

Description

The series of devices uses **Super Trench II** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g. This device is ideal for high-frequency switching and synchronous rectification.

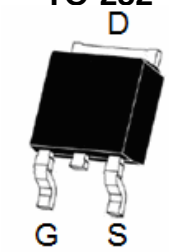
Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

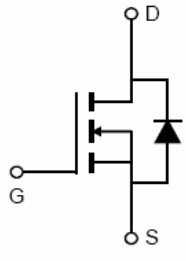
General Features

- V_{DS} =85V,I_D =75A
  $R_{DS(ON)}$=8.1mΩ , typical @ V_{GS}=10V
  $R_{DS(ON)}$=10.0mΩ , typical @ V_{GS}=4.5V
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 175 °C operating temperature
- Pb-free lead plating

TO-252



Top View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package
VCRR080N85AK		TO-252-2L

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	75	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	55	A
Pulsed Drain Current	I_{DM}	300	A
Maximum Power Dissipation	P_D	90	W
Derating factor		0.6	W/℃
Single pulse avalanche energy (Note 4)	E_{AS}	352	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	1.67	℃/W

Electrical Characteristics (T_C=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	85		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=85V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.2	1.7	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=37.5A	-	8.1	8.5	mΩ
		V_{GS}=4.5V, I_D=37.5A	-	10.0	11.0	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=37.5A		50	-	S
Dynamic Characteristics (Note3)						
Input Capacitance	C_{lss}	V_{DS}=40V,V_{GS}=0V, F=1.0MHz	-	2400	-	pF
Output Capacitance	C_{oss}		-	375	-	pF
Reverse Transfer Capacitance	C_{rss}		-	21	-	pF
Switching Characteristics (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=40V,I_D=37.5A V_{GS}=10V,R_G=1.6Ω	-	14	-	nS
Turn-on Rise Time	t_r		-	31	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29	-	nS
Turn-Off Fall Time	t_f		-	7	-	nS
Total Gate Charge	Q_g	V_{DS}=40V,I_D=37.5A, V_{GS}=10V	-	39	-	nC
Gate-Source Charge	Q_{gs}		-	13.5	-	nC
Gate-Drain Charge	Q_{gd}		-	11.4	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=37.5A	-	-	1.2	V
Diode Forward Current	I_S		-	-	75	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 37.5A di/dt = 100A/μs (Note3)	-	55	-	nS
Reverse Recovery Charge	Qrr		-	98	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production
4. EAS condition : Tj=25℃,V_{DD}=50V,V_G=10V,L=0.25mH,Rg=25Ω

Typical Electrical and Thermal Characteristics

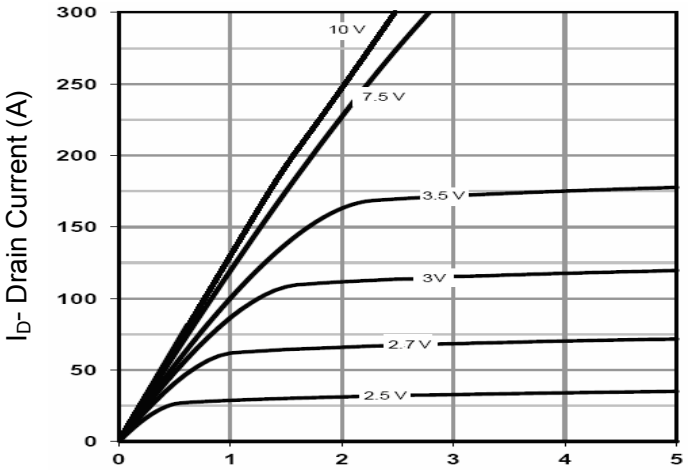


Figure 1 Output Characteristics

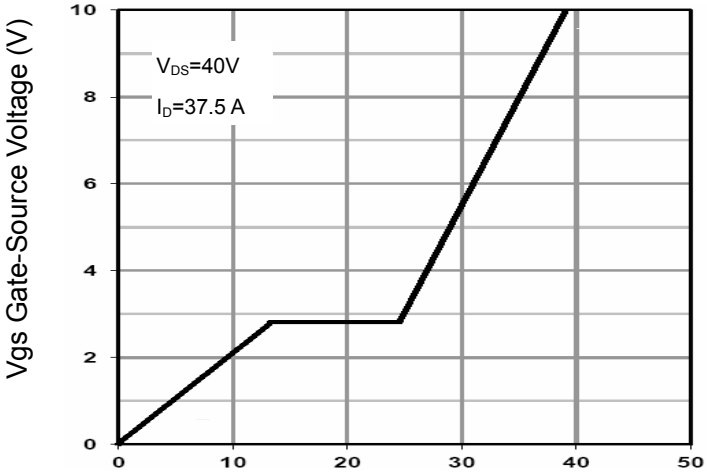


Figure 4 Gate Charge

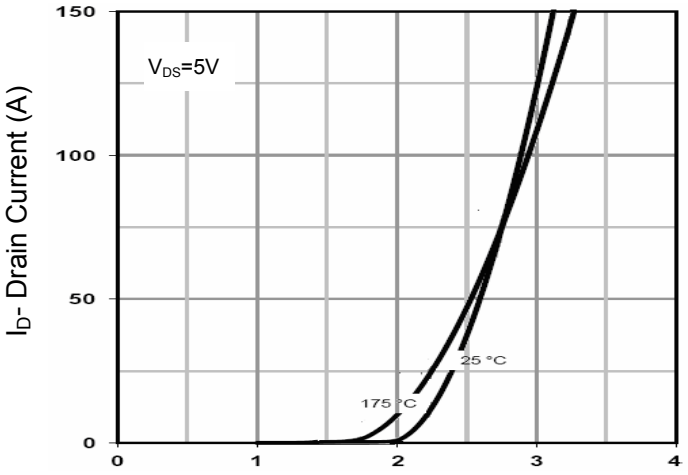


Figure 2 Transfer Characteristics

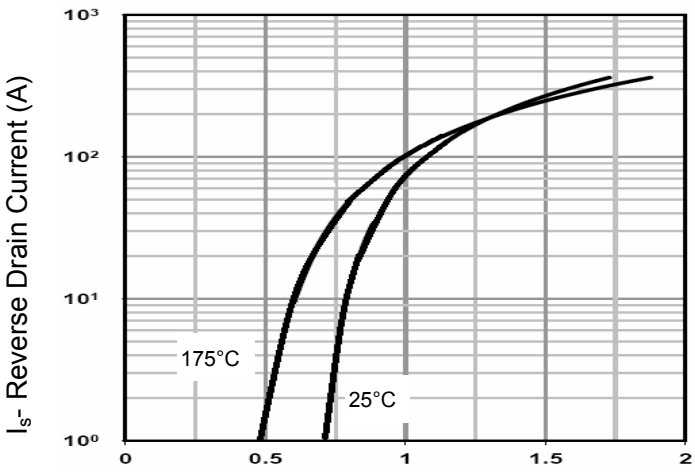


Figure 5 Source- Drain Diode Forward

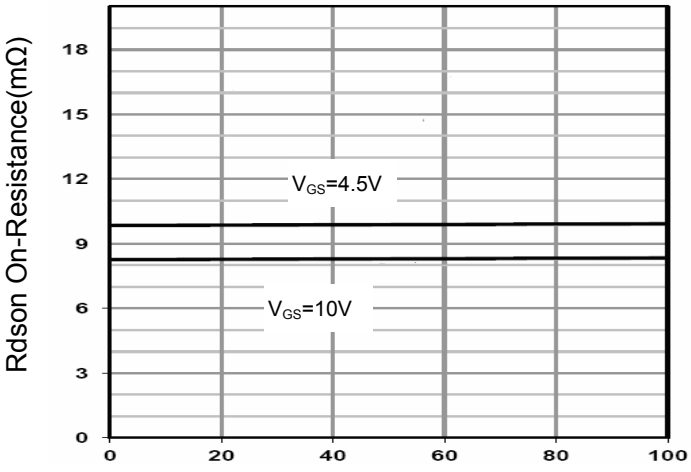


Figure 3 Rdson- Drain Current

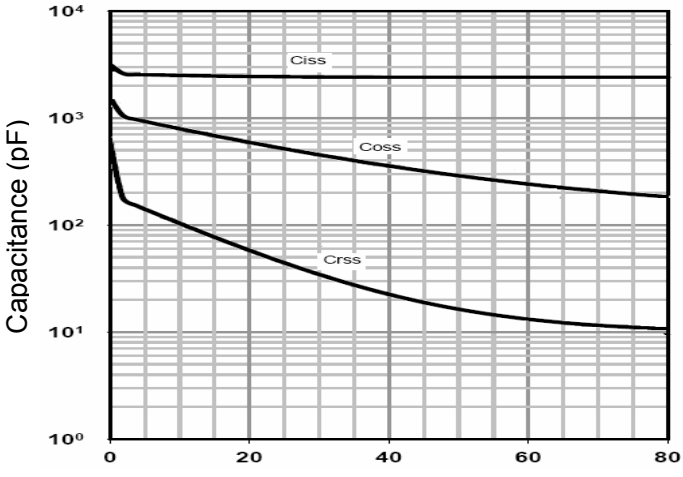


Figure 6 Capacitance vs Vds

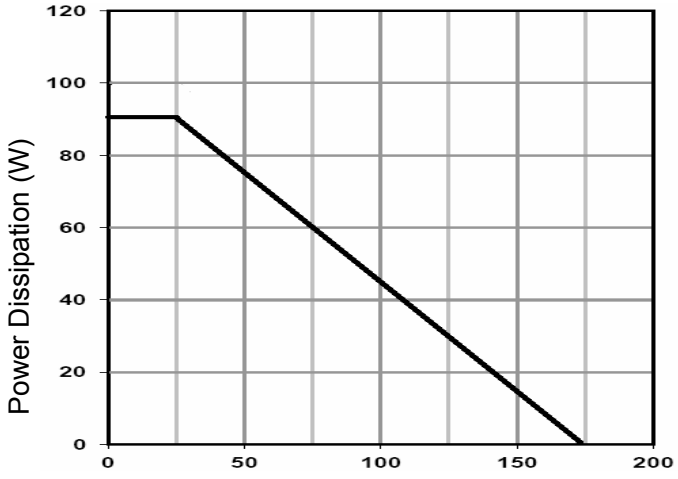


Figure 7 Power De-rating

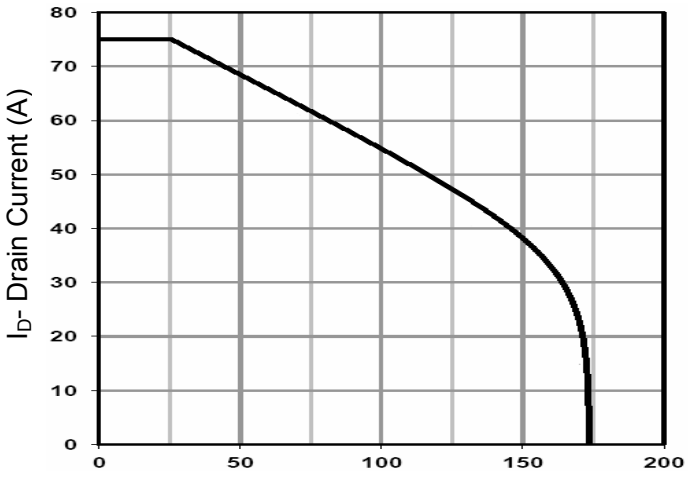


Figure 9 Current De-rating

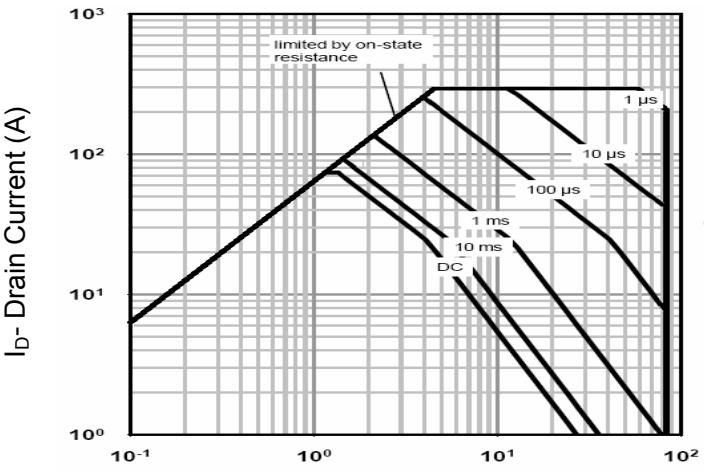


Figure 8 Safe Operation Area

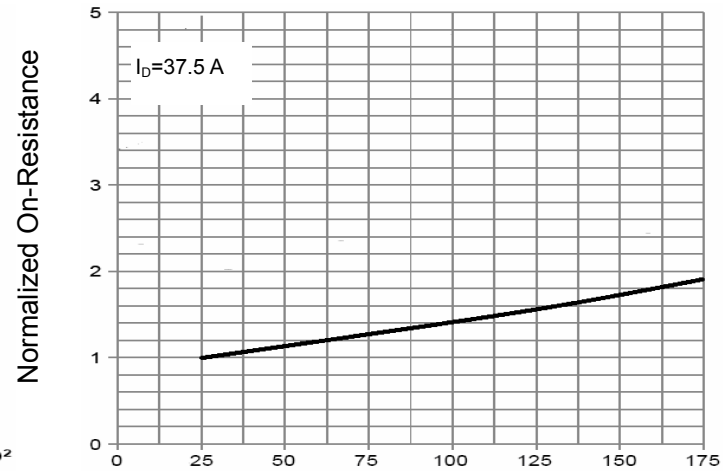
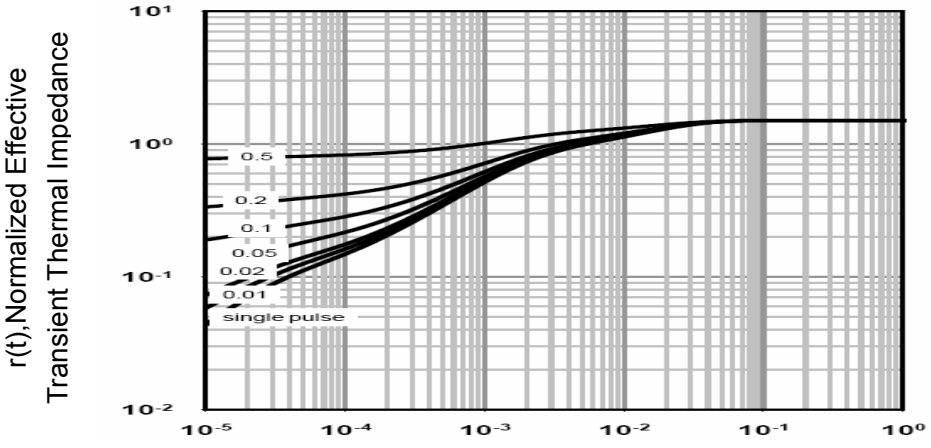
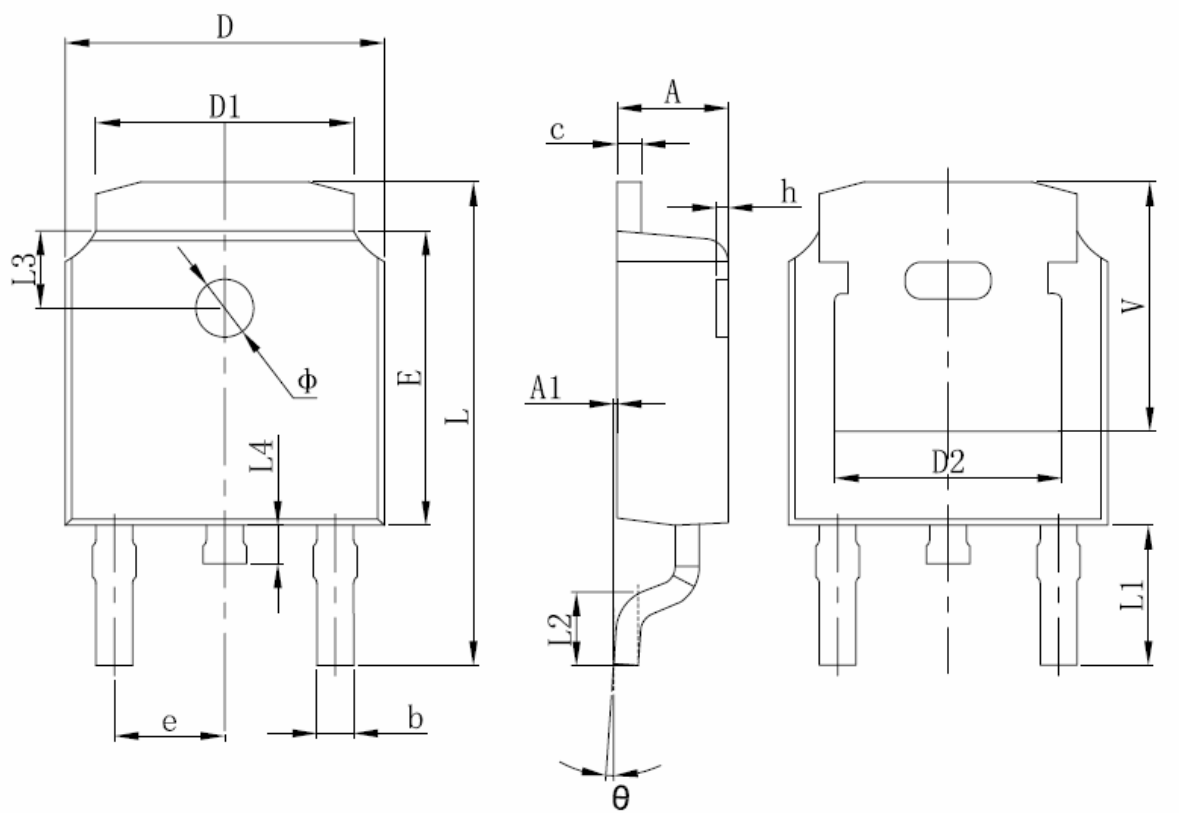


Figure 10 Rdson-Junction Temperature



TO-252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

Attention

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