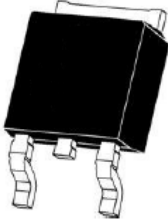
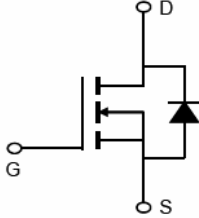


**QIAOXIN N-Channel Super Trench II Power MOSFET**

<p><b>Description</b></p> <p>The VCRR068N10AK uses <b>Super Trench II</b> 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 <math>R_{DS(ON)}</math> and <math>Q_g</math>. This device is ideal for high-frequency switching and synchronous rectification.</p> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>• DC/DC Converter</li> <li>• Ideal for high-frequency switching and synchronous rectification</li> </ul>	<p><b>General Features</b></p> <ul style="list-style-type: none"> <li>• <math>V_{DS} = 100V, I_D = 80A</math></li> <li>• <math>R_{DS(ON)} = 6.3m\Omega</math> (typical) @ <math>V_{GS} = 10V</math></li> <li>• <math>R_{DS(ON)} = 8.5m\Omega</math> (typical) @ <math>V_{GS} = 4.5V</math></li> <li>• Excellent gate charge x <math>R_{DS(on)}</math> product(FOM)</li> <li>• Very low on-resistance <math>R_{DS(on)}</math></li> <li>• 175 °C operating temperature</li> <li>• Pb-free lead plating</li> </ul>
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**TO-252-2L**

**Schematic Diagram**

**Package Marking and Ordering Information**

Device Marking	Device	Device Package
VCRR068N10AK		TO-252-2L

**Absolute Maximum Ratings ( $T_C = 25^\circ C$  unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	80	A
Drain Current-Continuous( $T_C = 100^\circ C$ )	$I_D(100^\circ C)$	61	A
Pulsed Drain Current	$I_{DM}$	320	A
Maximum Power Dissipation	$P_D$	125	W
Derating factor		0.83	W/ $^\circ C$
Single pulse avalanche energy <sup>(Note 5)</sup>	$E_{AS}$	320	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 175	$^\circ C$

**Thermal Characteristic**

Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	$R_{\theta JC}$	1.2	$^\circ C/W$
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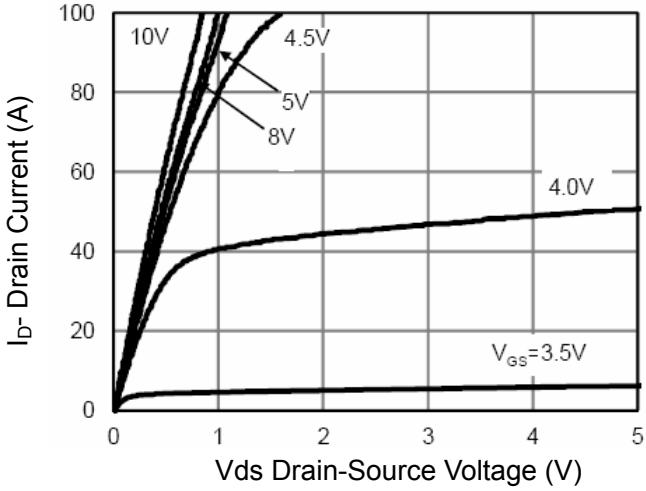
### Electrical Characteristics (T<sub>C</sub>=25 °C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	100		-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	1.8	2.4	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =40A	-	6.3	6.8	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =40A	-	8.5	9.8	mΩ
Gate resistance	R <sub>g</sub>	F=1.0MHz		1.3		Ω
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =40A		60	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, F=1.0MHz	-	4680	-	PF
Output Capacitance	C <sub>oss</sub>		-	316	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	14.5	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, I <sub>D</sub> =40A V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω	-	10	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	6	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	51	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	9	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =40A, V <sub>GS</sub> =10V	-	76	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	15.3		nC
Gate-Drain Charge	Q <sub>gd</sub>		-	17.3		nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =40A	-		1.2	V
Diode Forward Current (Note 2)	I <sub>S</sub>		-	-	80	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> =40	-	55	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100A/μs (Note 3)	-	135	-	nC

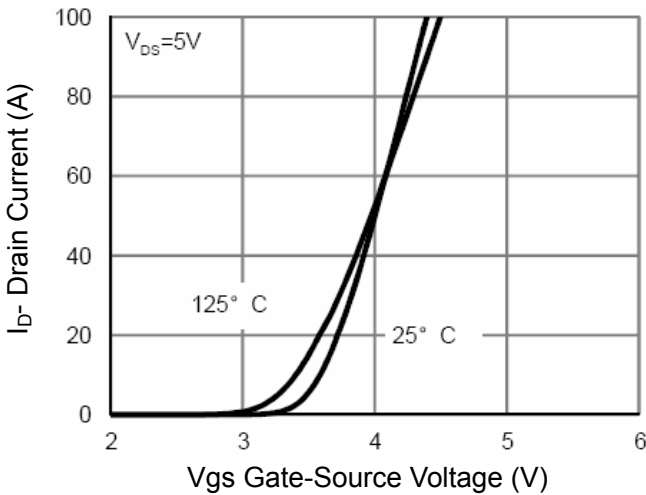
#### Notes:

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 production
5. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>G</sub>=10V, L=0.5mH, R<sub>g</sub>=25Ω

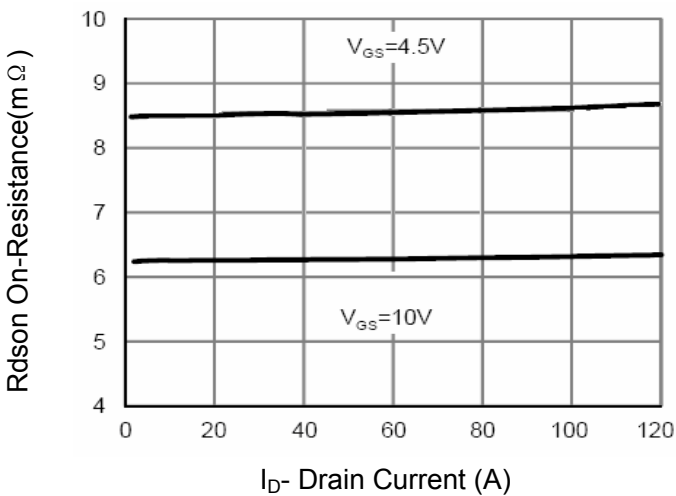
**Typical Electrical and Thermal Characteristics**



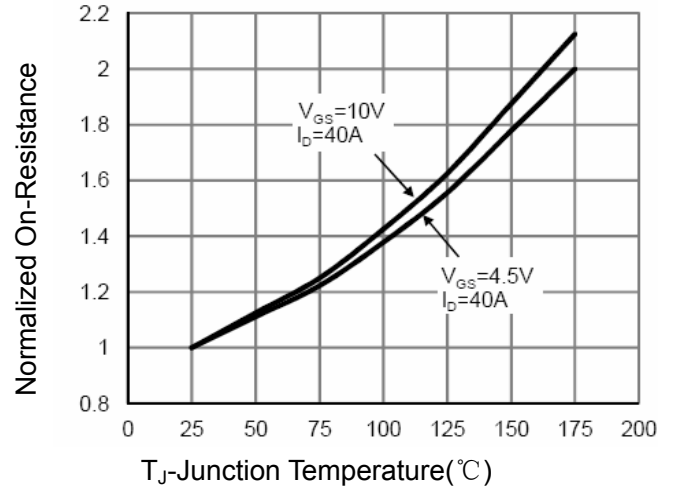
**Figure 1 Output Characteristics**



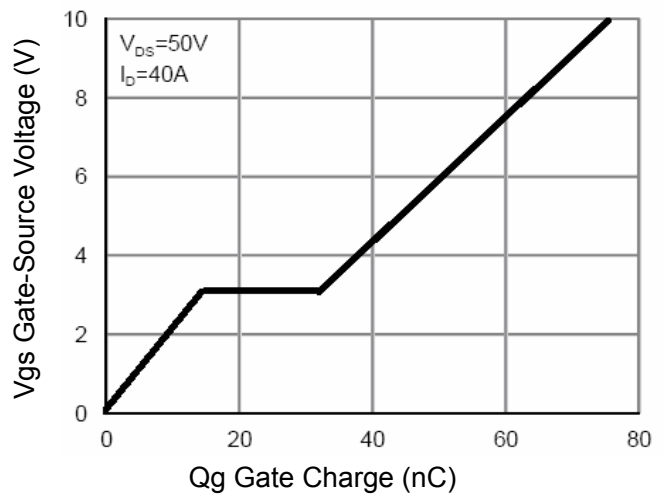
**Figure 2 Transfer Characteristics**



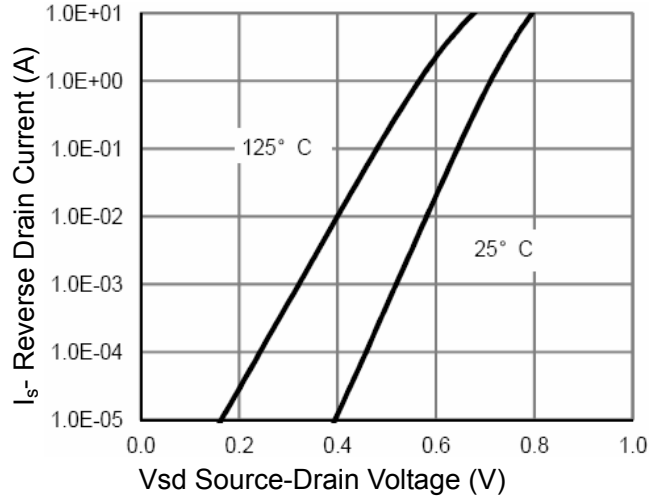
**Figure 3 Rdson- Drain Current**



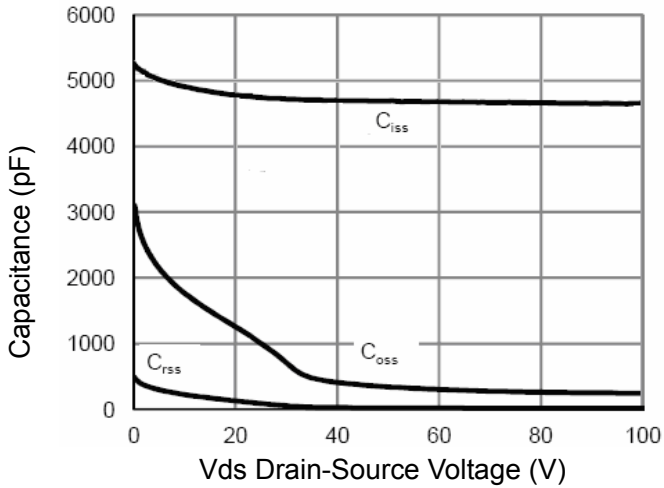
**Figure 4 Rdson-Junction Temperature**



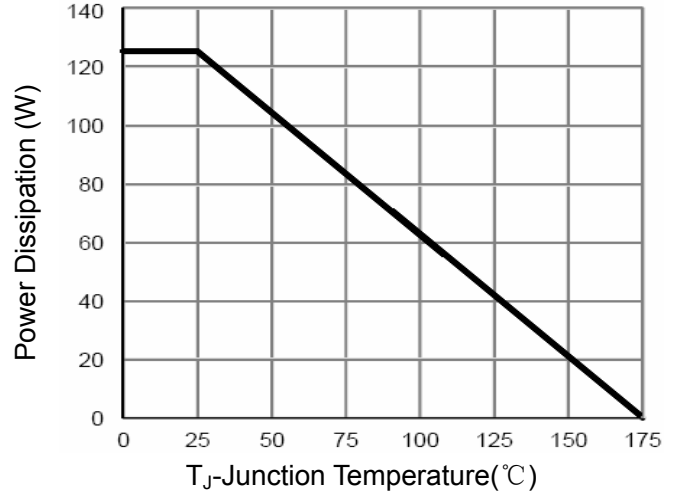
**Figure 5 Gate Charge**



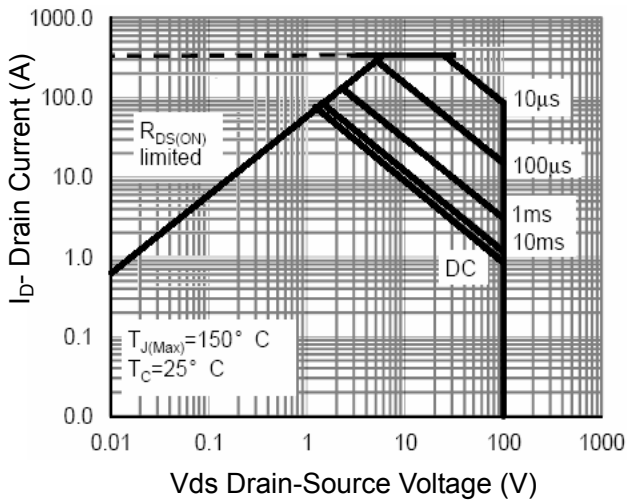
**Figure 6 Source- Drain Diode Forward**



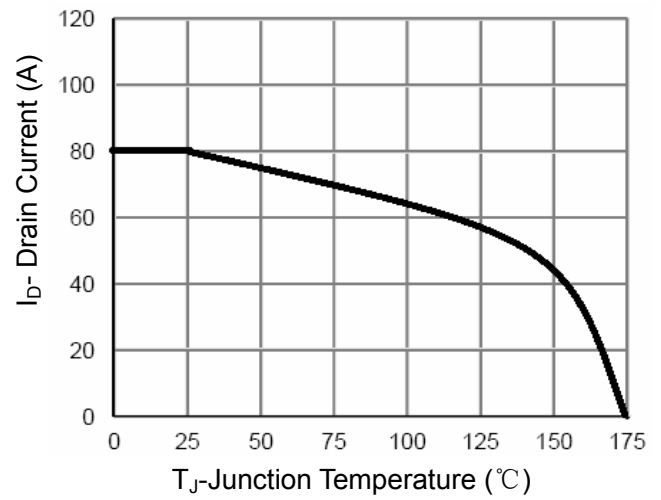
**Figure 7 Capacitance vs Vds**



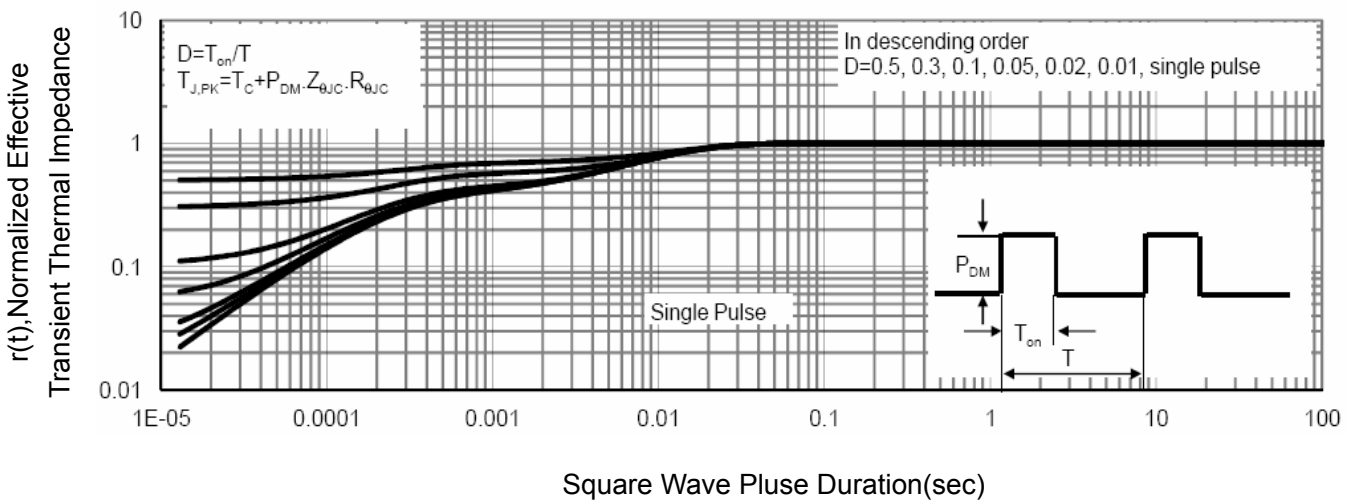
**Figure 9 Power De-rating**



**Figure 8 Safe Operation Area**

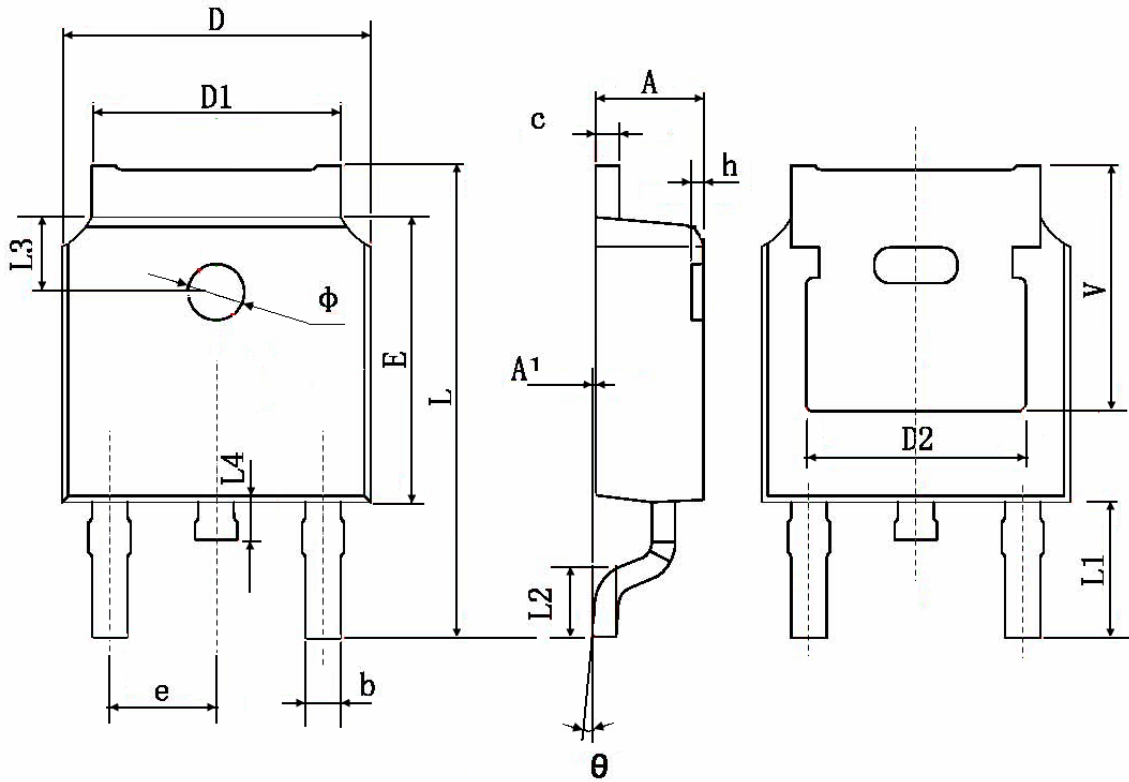


**Figure 10 Current De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

**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	0.660	0.860	0.026	0.034
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	4.83 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
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	5.350 TYP.		0.211 TYP.	

## Attention

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