

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
-40V	13mΩ@-10V	-45A
	25mΩ@-4.5V	

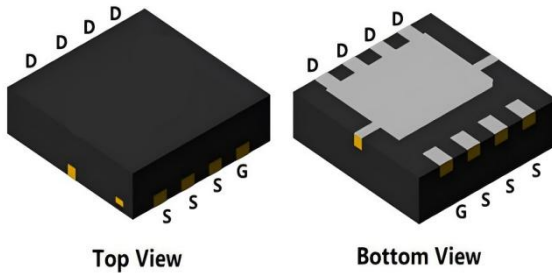
## Feature

- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(on)}$

## Application

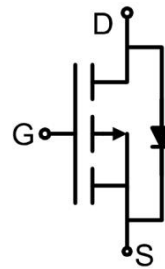
- Reverse polarity protection

## Package

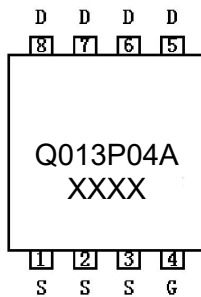


DFN3.3\*3.3-8L

## Circuit diagram



## Marking



### Absolute maximum ratings (T<sub>C</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	-40	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current <sup>1,3)</sup> (V <sub>GS</sub> = -10V, Chip limitation)	I <sub>D</sub>	-45	A
Continuous Drain Current <sup>1,3)</sup> (V <sub>GS</sub> = -10V, T <sub>C</sub> = 100°C)	I <sub>D</sub> (100°C)	-28	A
Pulsed Drain Current (t <sub>p</sub> ≤ 10μs)	I <sub>DM</sub>	-180	A
Single Pulse Avalanche Energy <sup>2)</sup>	E <sub>AS</sub>	100	mJ
Power Dissipation <sup>1,3)</sup>	P <sub>D</sub>	44.6	W
Thermal Resistance Junction to Case	R <sub>θJC</sub>	2.8	°C/W
Operating Junction Temperature	T <sub>J</sub>	-55 ~ +150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

### Electrical characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-40			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V			-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.2	-1.7	-2.2	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -20A		10.3	13	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -20A		17.2	25	
<b>Dynamic characteristics<sup>4)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V, f = 1MHz		2590		pF
Output Capacitance	C <sub>oss</sub>			264		
Reverse Transfer Capacitance	C <sub>rss</sub>			241		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = -10V I <sub>D</sub> = -20A		55		nC
Gate-Source Charge	Q <sub>gs</sub>			11		
Gate-Drain Charge	Q <sub>gd</sub>			8		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = -10V I <sub>D</sub> = -20A, R <sub>G</sub> = 3Ω		10		nS
Turn-on rise time	t <sub>r</sub>			44		
Turn-off delay time	t <sub>d(off)</sub>			68		
Turn-off fall time	t <sub>f</sub>			48		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>S</sub>	T <sub>C</sub> = 25°C			-45	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = -20A			-1.2	V
Reverse Recovery Time	T <sub>rr</sub>	V <sub>GS</sub> = 0V, V <sub>R</sub> = -20V, I <sub>F</sub> = -20A di/dt = -100A/μs		25		nS
Reverse Recovery Charge	Q <sub>rr</sub>				27	

Notes:

- 1) The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2) T<sub>J</sub> = 25°C, V<sub>G</sub> = -10V, L = 0.5mH, I<sub>AS</sub> = -20A, R<sub>G</sub> = 25Ω.
- 3) Thermal resistance from junction to soldering point (on the exposed drain pad).
- 4) Guaranteed by design, not subject to production testing.

## Typical Characteristics

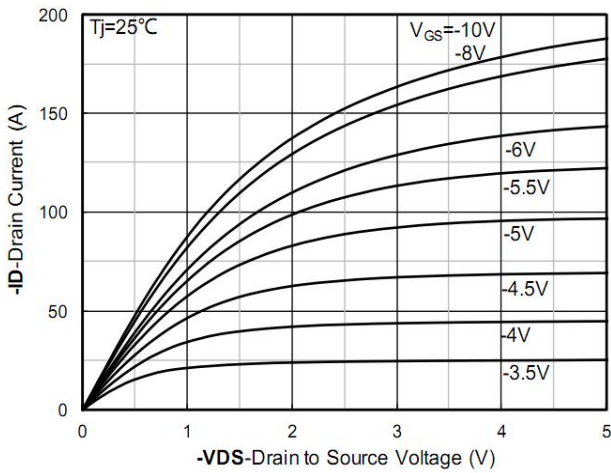


Figure 1. Output Characteristics; typical values

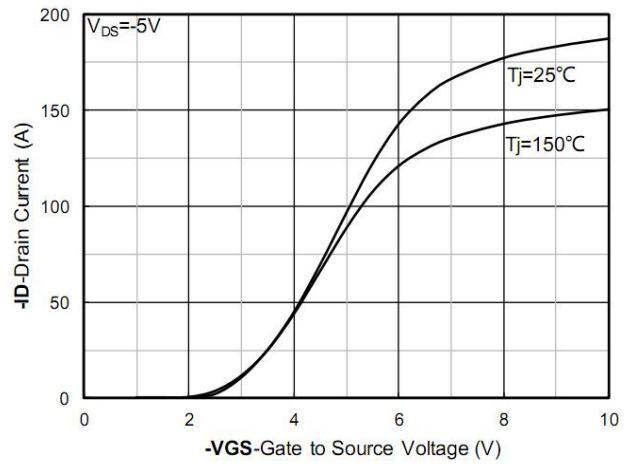


Figure 2. Transfer Characteristics; typical values

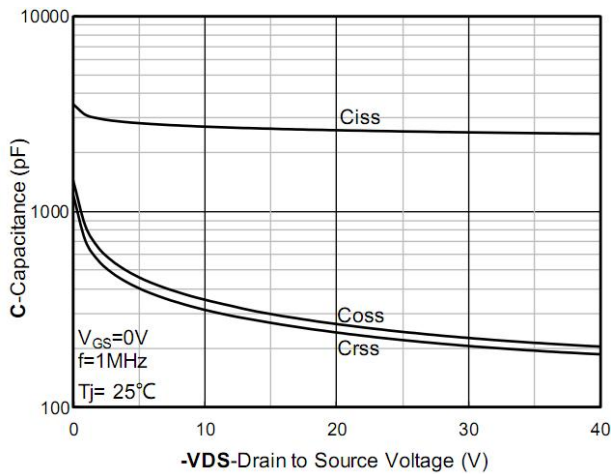


Figure 3. Capacitance Characteristics; typical values

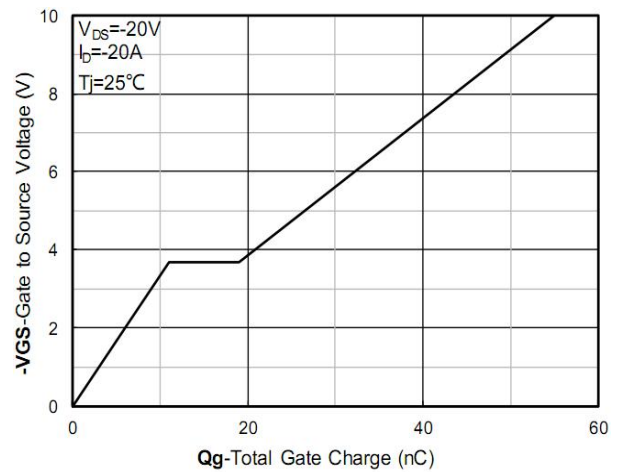


Figure 4. Gate Charge; typical values

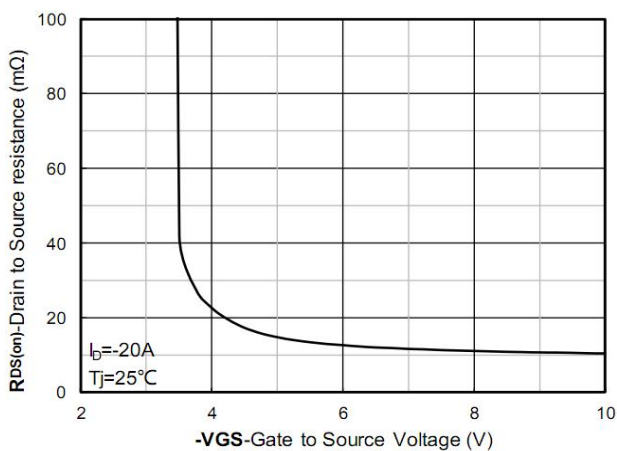


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

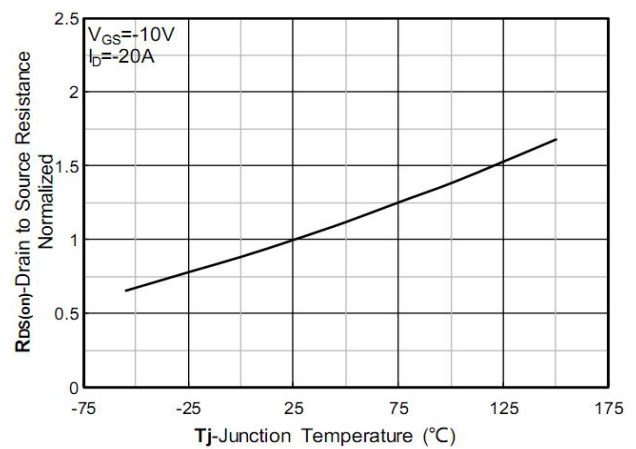


Figure 6. Normalized On-Resistance

## Typical Characteristics

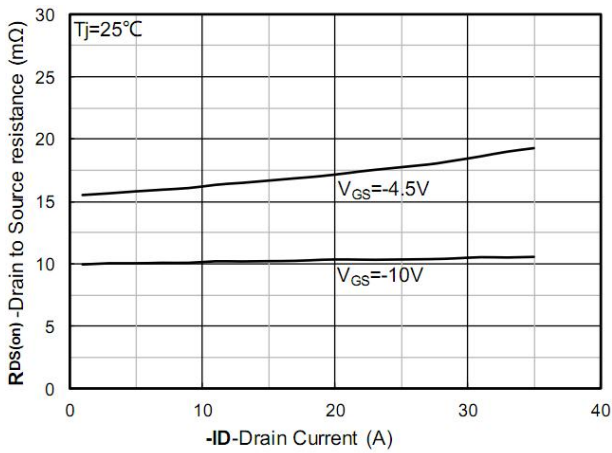


Figure 7.  $R_{DS(on)}$  VS Drain Current; typical values

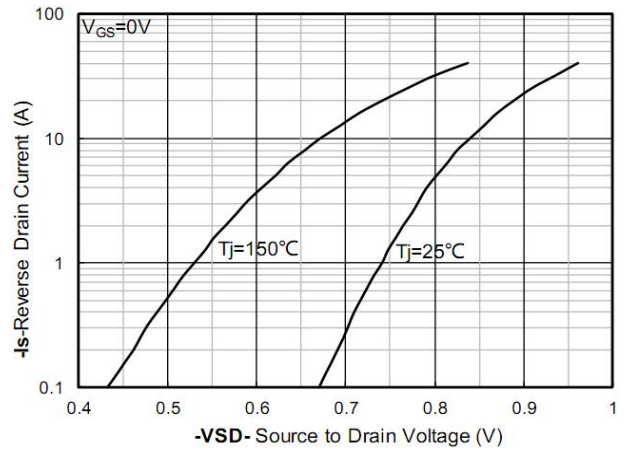


Figure 8. Forward characteristics of reverse diode; typical values

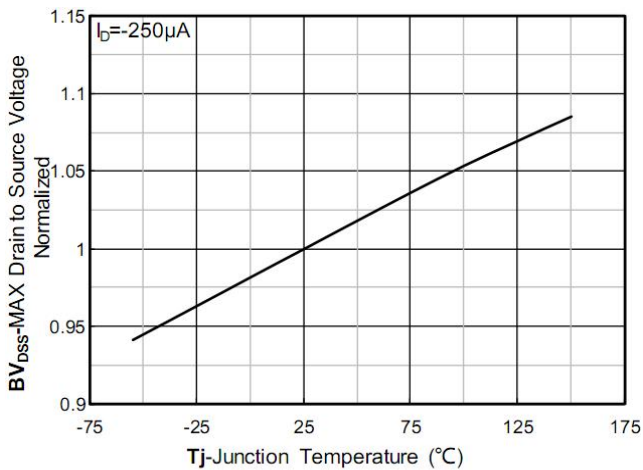


Figure 9. Normalized breakdown voltage

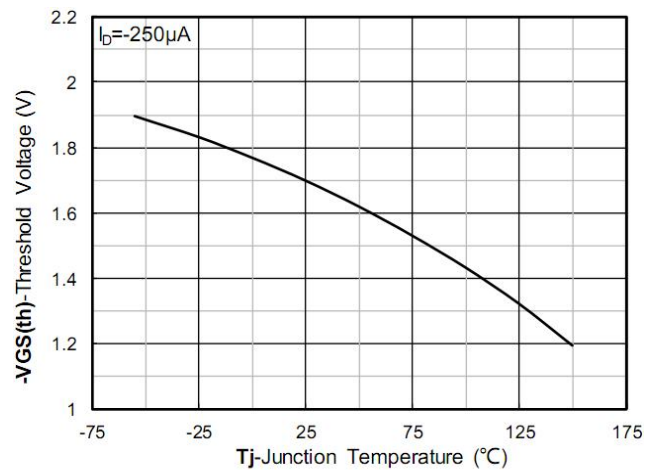


Figure 10. Gate Threshold voltage; typical values

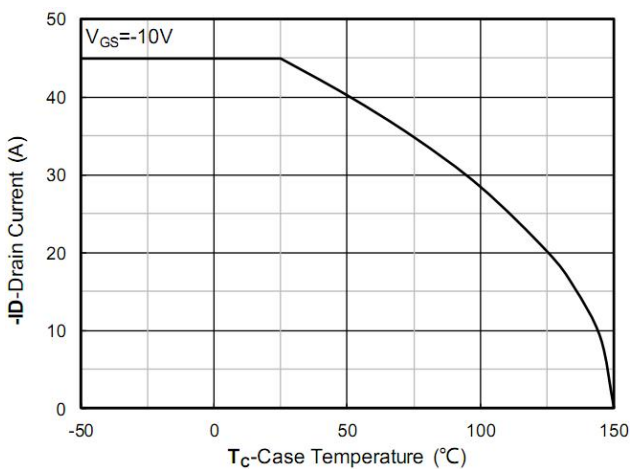


Figure 11. Current dissipation

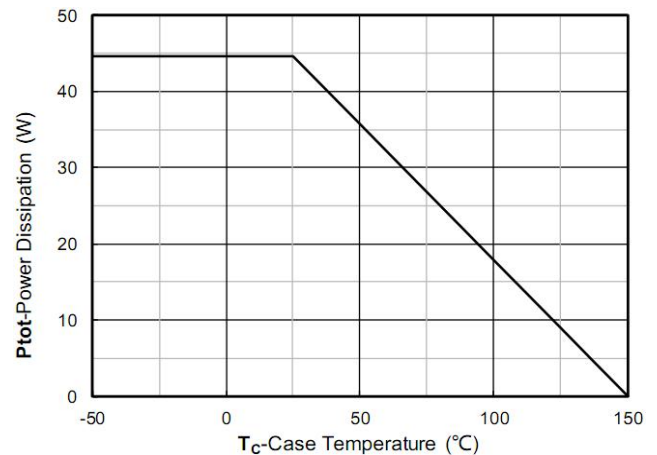


Figure 12. Power dissipation

## Typical Characteristics

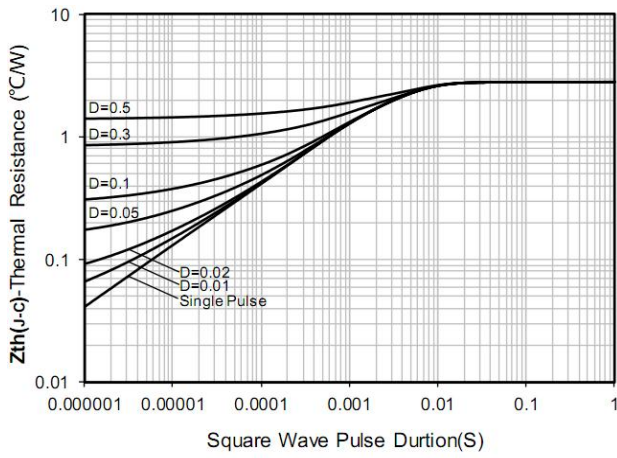


Figure 13. Maximum Transient Thermal Impedance

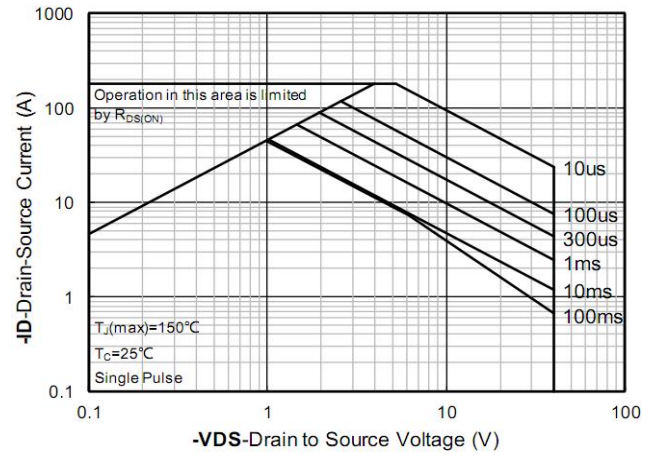
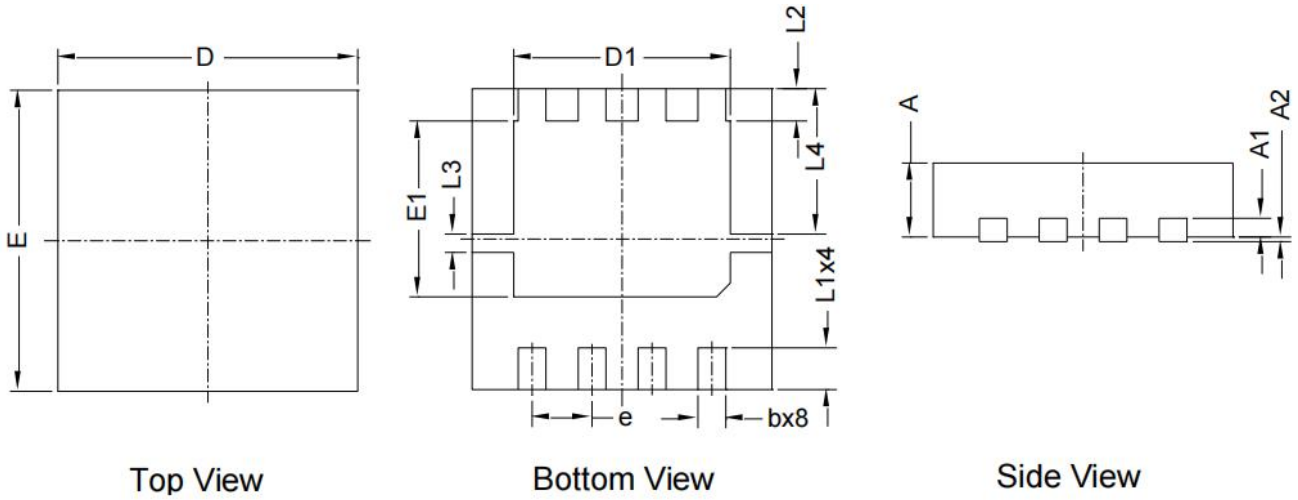


Figure 14. Safe Operation Area

## DFN3.3\*3.3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
D	3.150	3.350	0.124	0.132
E	3.150	3.350	0.124	0.132
A	0.700	0.900	0.027	0.035
A1	0.200 BSC.		0.008 BSC.	
A2	0.000	0.100	0.000	0.004
D1	2.200	2.500	0.086	0.098
E1	1.800	2.000	0.071	0.079
L1	0.350	0.550	0.013	0.022
L2	0.350 BSC.		0.014 BSC.	
L3	0.200 BSC.		0.008 BSC.	
L4	1.570 BSC.		0.062 BSC.	
b	0.200	0.400	0.008	0.016
e	0.650 BSC.		0.026 BSC.	