

Product Summary

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

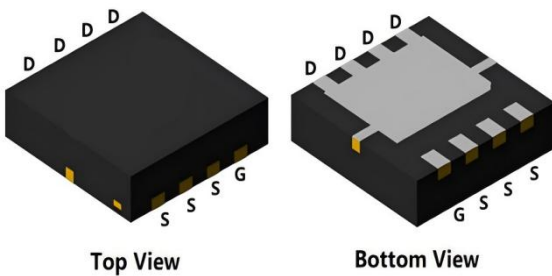
Feature

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(on)}$
- Suffix“-Q1”for AEC-Q101

Application

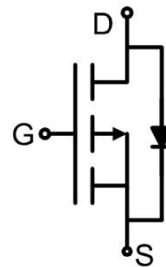
- Reverse polarity protection

Package

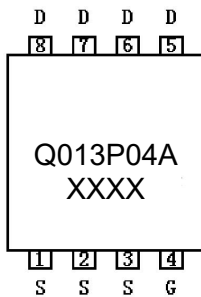


DFN3.3*3.3-8L

Circuit diagram



Marking



Absolute maximum ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{1,3)} ($V_{GS} = -10\text{V}$, Chip limitation)	I_D	-45	A
Continuous Drain Current ^{1,3)} ($V_{GS} = -10\text{V}$, $T_C = 100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	-28	A
Pulsed Drain Current ($t_p \leq 10\mu\text{s}$)	I_{DM}	-180	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	100	mJ
Power Dissipation ^{1,3)}	P_D	44.6	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	2.8	$^\circ\text{C}/\text{W}$
Operating Junction Temperature	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}$, $I_D = -250\mu\text{A}$	-40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -40\text{V}$, $V_{GS} = 0\text{V}$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$	-1.2	-1.7	-2.2	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -10\text{V}$, $I_D = -20\text{A}$		10.3	13	m Ω
		$V_{GS} = -4.5\text{V}$, $I_D = -20\text{A}$		17.2	25	
Dynamic characteristics⁴⁾						
Input Capacitance	C_{iss}	$V_{DS} = -20\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$		2590		pF
Output Capacitance	C_{oss}			264		
Reverse Transfer Capacitance	C_{rss}			241		
Total Gate Charge	Q_g	$V_{DS} = -20\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -20\text{A}$		55		nC
Gate-Source Charge	Q_{gs}			11		
Gate-Drain Charge	Q_{gd}			8		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = -20\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -20\text{A}$, $R_G = 3\Omega$		10		nS
Turn-on rise time	t_r			44		
Turn-off delay time	$t_{d(off)}$			68		
Turn-off fall time	t_f			48		
Source-Drain Diode characteristics						
Diode Forward Current	I_S	$T_C = 25^\circ\text{C}$			-45	A
Diode Forward voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = -20\text{A}$			-1.2	V
Reverse Recovery Time	T_{rr}	$V_{GS} = 0\text{V}$, $V_R = -20\text{V}$, $I_F = -20\text{A}$, $di/dt = -100\text{A}/\mu\text{s}$		25		nS
Reverse Recovery Charge	Q_{rr}				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) $T_J = 25^\circ\text{C}$, $V_G = -10\text{V}$, $L = 0.5\text{mH}$, $I_{AS} = -20\text{A}$, $R_G = 25\Omega$.
- 3) Thermal resistance from junction to soldering point (on the exposed drain pad).
- 4) Guaranteed by design, not subject to production testing.

Typical Characteristics

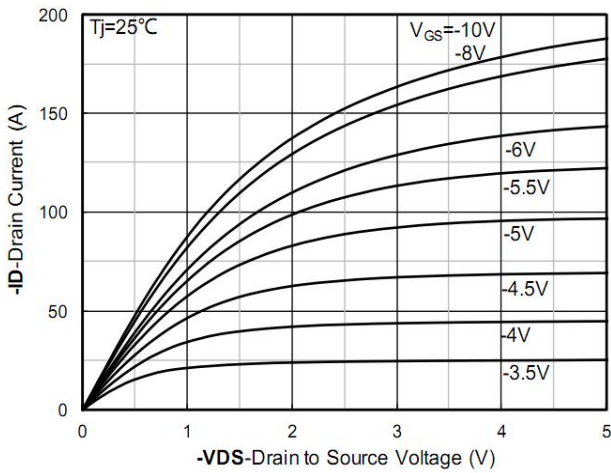


Figure 1. Output Characteristics; typical values

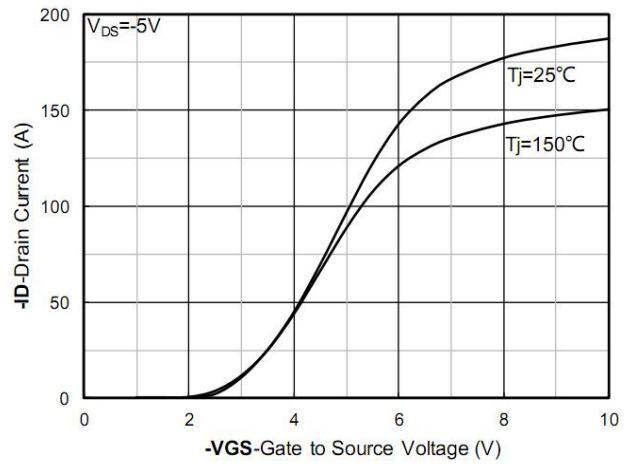


Figure 2. Transfer Characteristics; typical values

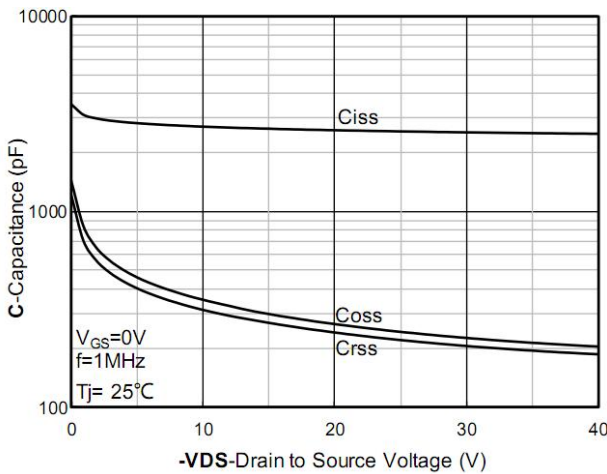


Figure 3. Capacitance Characteristics; typical values

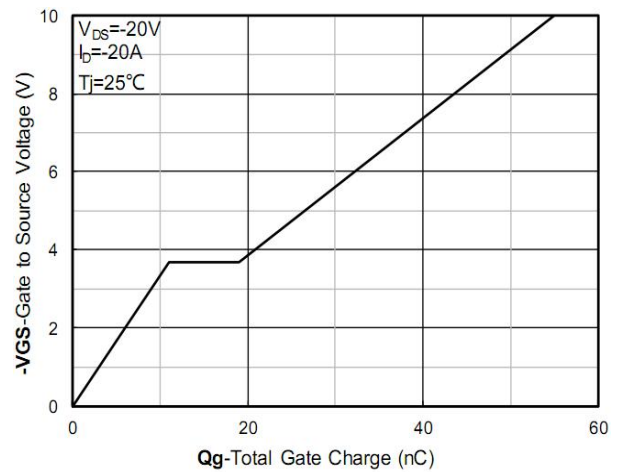


Figure 4. Gate Charge; typical values

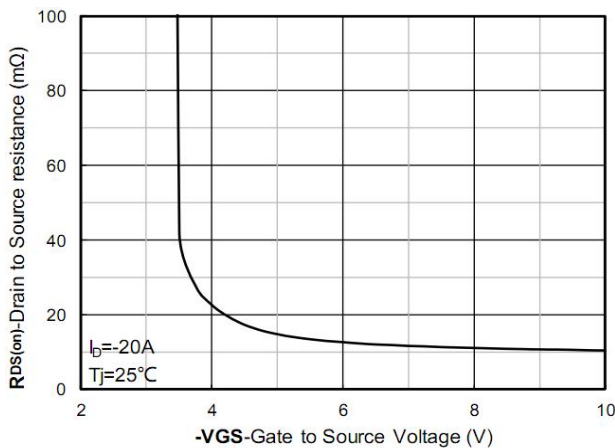


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

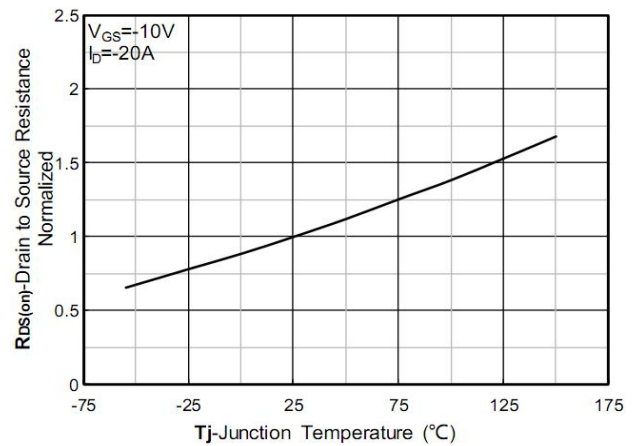


Figure 6. Normalized On-Resistance

Typical Characteristics

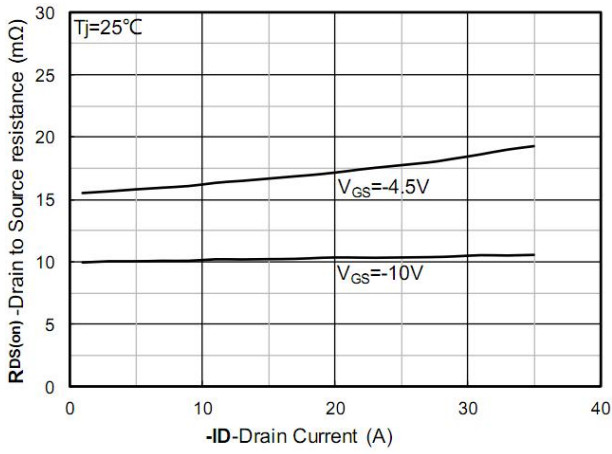


Figure 7. $R_{DS(on)}$ VS Drain Current; typical values

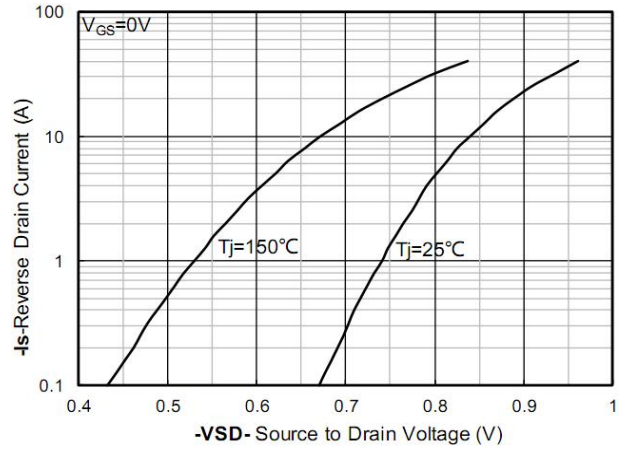


Figure 8. Forward characteristics of reverse diode; typical values

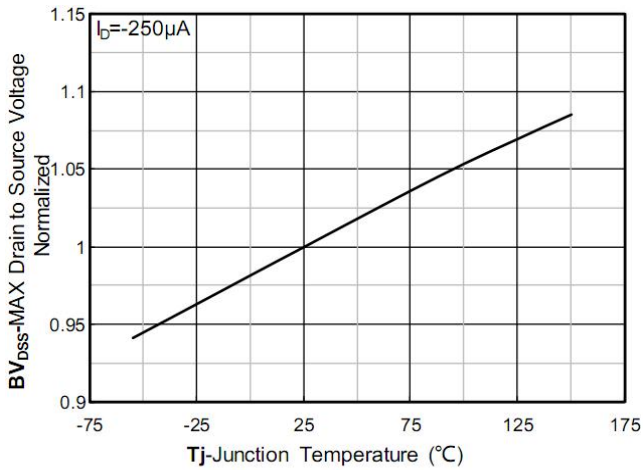


Figure 9. Normalized breakdown voltage

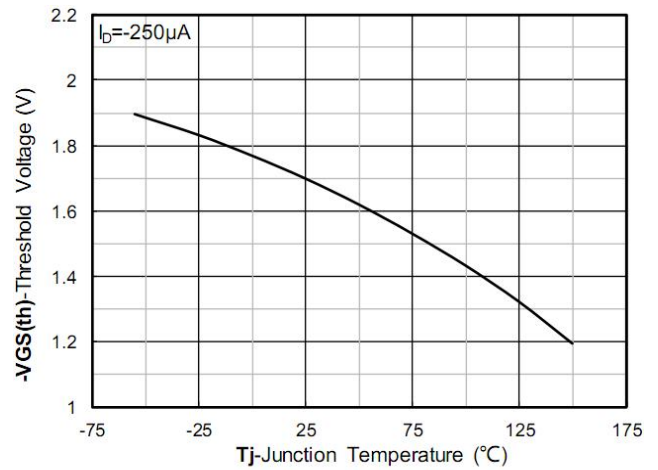


Figure 10. Gate Threshold voltage; typical values

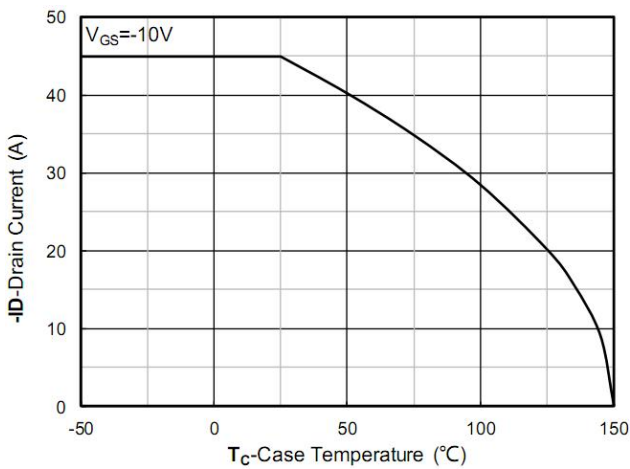


Figure 11. Current dissipation

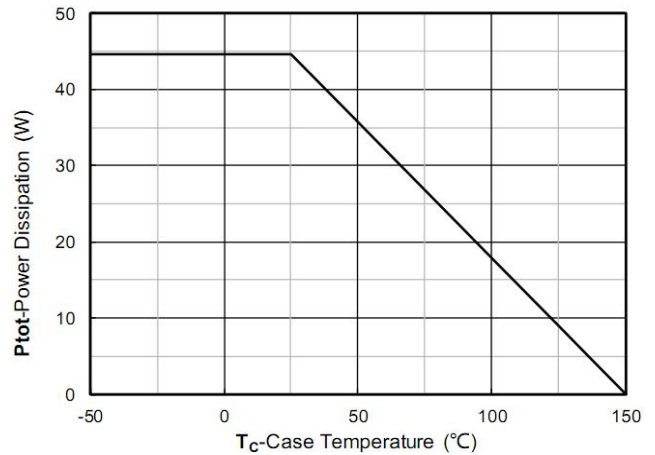


Figure 12. Power dissipation

Typical Characteristics

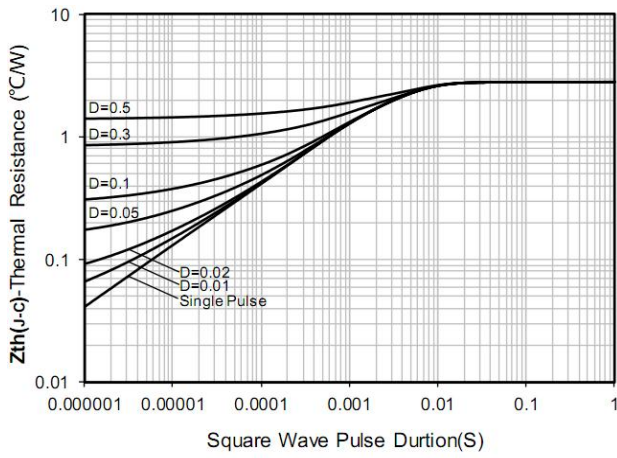


Figure 13. Maximum Transient Thermal Impedance

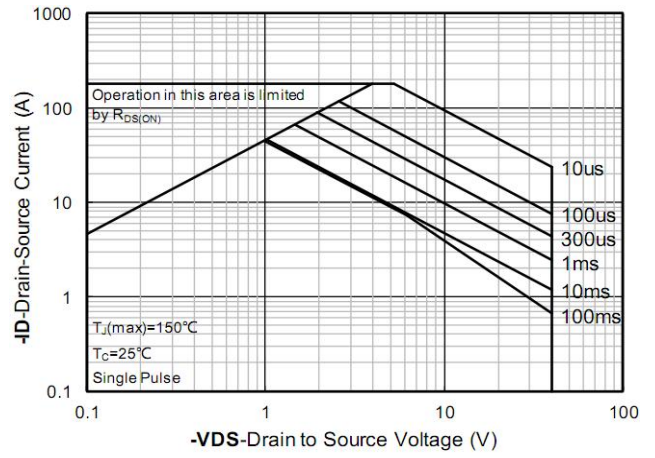
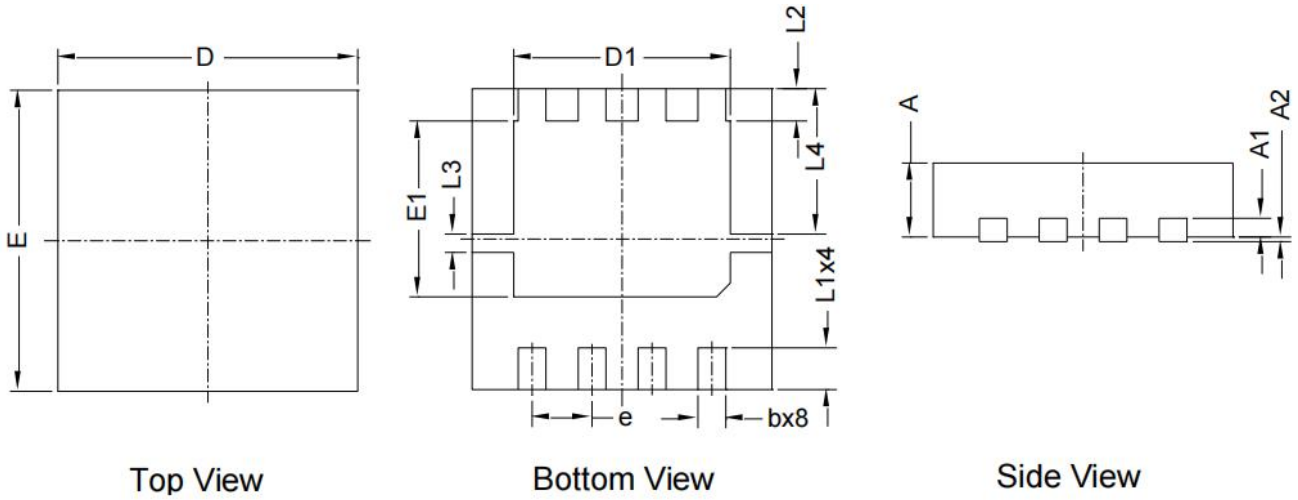


Figure 14. Safe Operation Area

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.	