

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
40V	1.75m $\Omega$ @10V	130A
	2.5m $\Omega$ @4.5V	

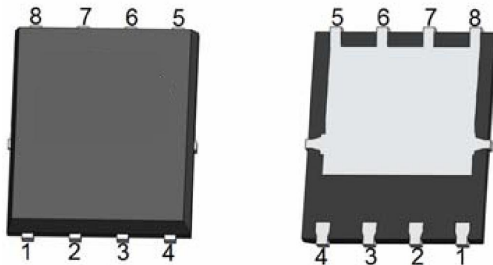
### Feature

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(on)}$
- Suffix "-Q1" for AEC-Q101

### Application

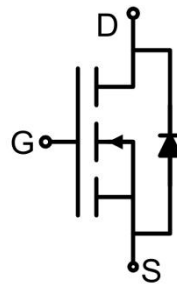
- DC/DC converters
- Power management functions
- Uninterruptible power supply

### Package

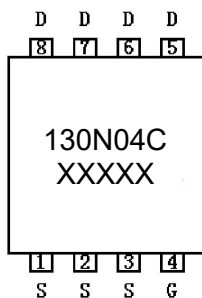


DFN5X6-8L

### Circuit diagram



### Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_C = 25^\circ\text{C}$ )	$I_D$	130	A
Continuous Drain Current ( $T_C = 100^\circ\text{C}$ )	$I_D$	82	A
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	450	A
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	125	W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1	$^\circ\text{C}/\text{W}$
Single pulse avalanche energy	$E_{AS}$	661	mJ
Junction Temperature	$T_J$	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
<b>Static Characteristics</b>						
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	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$			$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.0	1.8	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$		1.45	1.75	m $\Omega$
		$V_{GS} = 4.5\text{V}, I_D = 20\text{A}$		2.0	2.5	
Gate resistance	$R_G$	f=1.0MHz, Open drain		1.5		$\Omega$
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$		7400		pF
Output Capacitance	$C_{oss}$			1340		
Reverse Transfer Capacitance	$C_{rss}$			70		
Total Gate Charge	$Q_g$	$V_{DS} = 20\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}$		129		nC
Gate-Source Charge	$Q_{gs}$			18		
Gate-Drain Charge	$Q_{gd}$			32		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 20\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}, R_{GEN} = 2.2\Omega$		28		nS
Turn-on rise time	$t_r$			113		
Turn-off delay time	$t_{d(off)}$			56		
Turn-off fall time	$t_f$			21		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	$I_S$				130	A
Diode Forward voltage	$V_{SD}$	$V_{GS} = 0\text{V}, I_S = 20\text{A}$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 20\text{A}$		73		nS
Reverse Recovery Charge	$Q_{rr}$	$di/dt = 100\text{A}/\mu\text{s}$		120		nC

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2) Guaranteed by design, not subject to production testing.

## Typical Characteristics

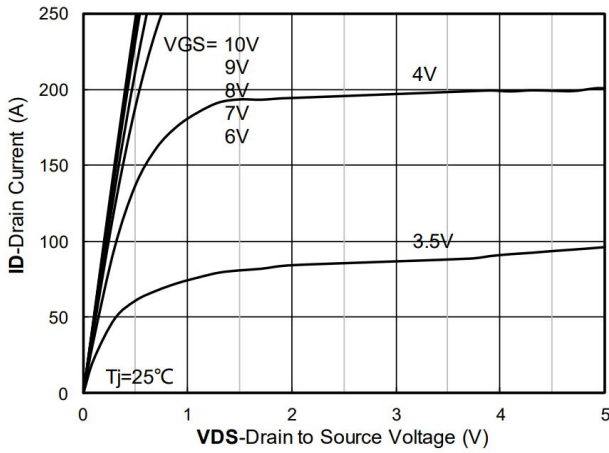


Figure 1. Output Characteristics

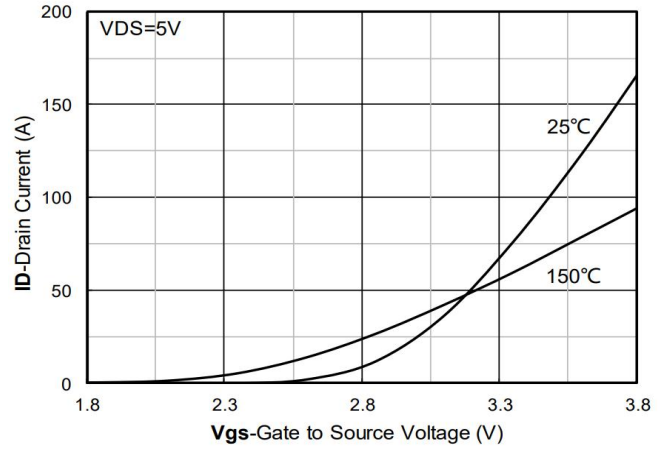


Figure 2. Transfer Characteristics

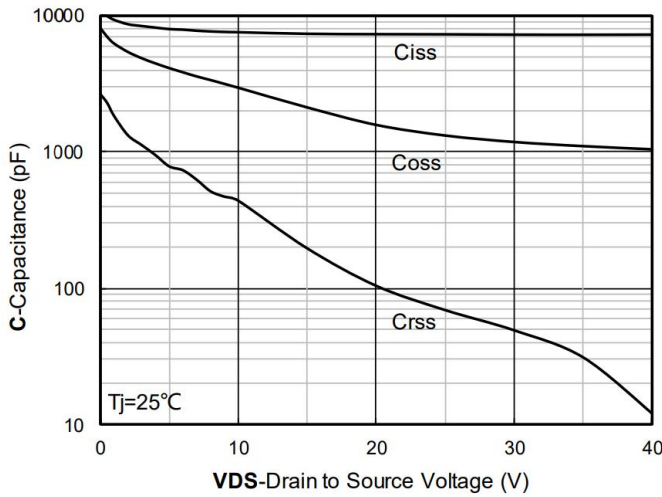


Figure 3. Capacitance Characteristics

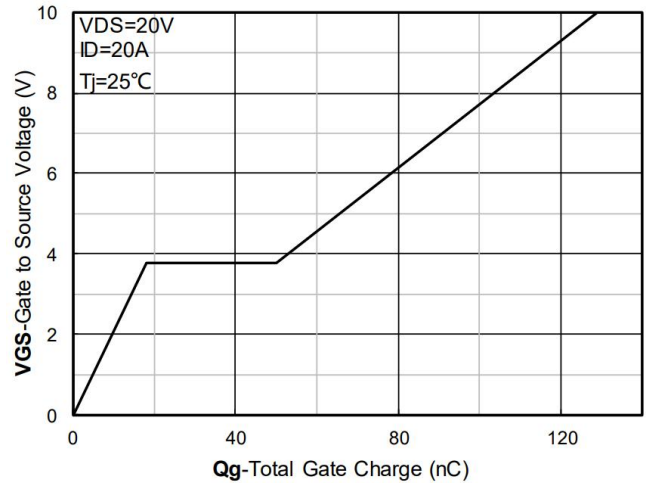


Figure 4. Gate Charge

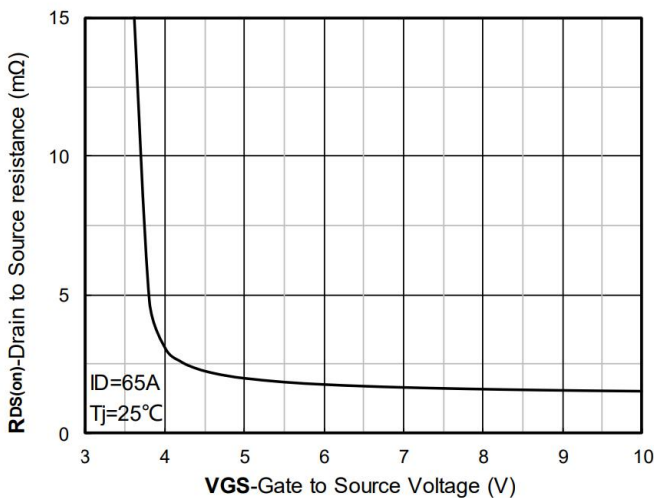


Figure 5. On-Resistance vs Gate to Source Voltage

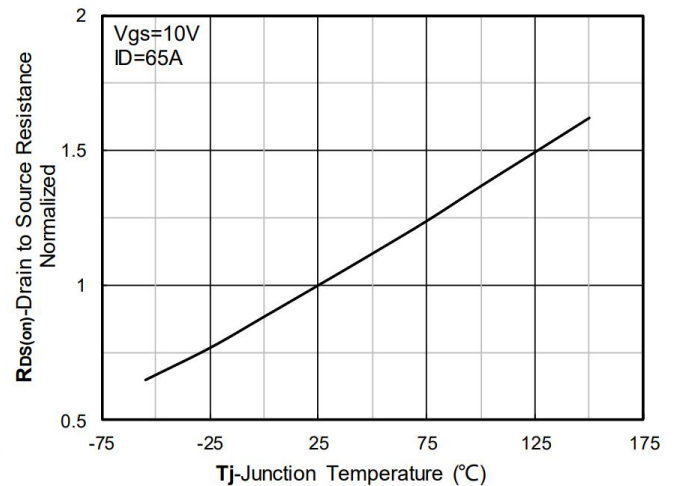


Figure 6. Normalized On-Resistance

## Typical Characteristics

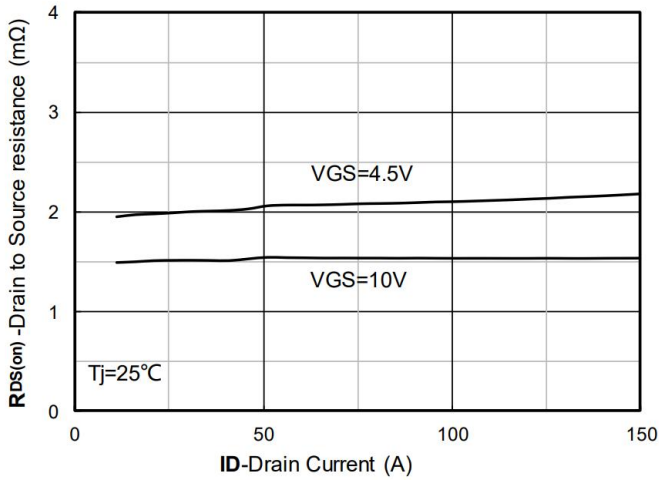


Figure 7. RDS(on) VS Drain Current

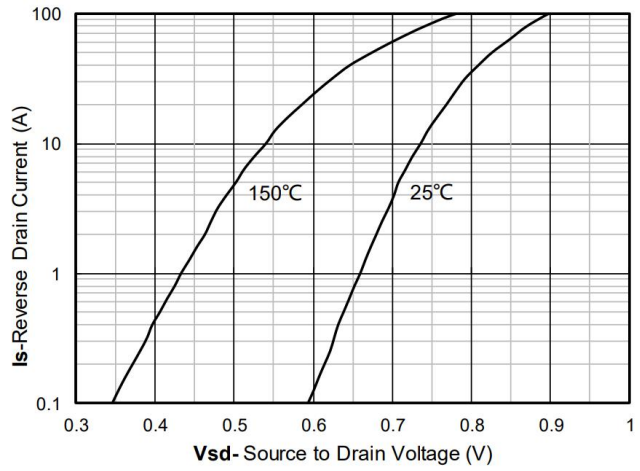


Figure 8. Forward characteristics of reverse diode

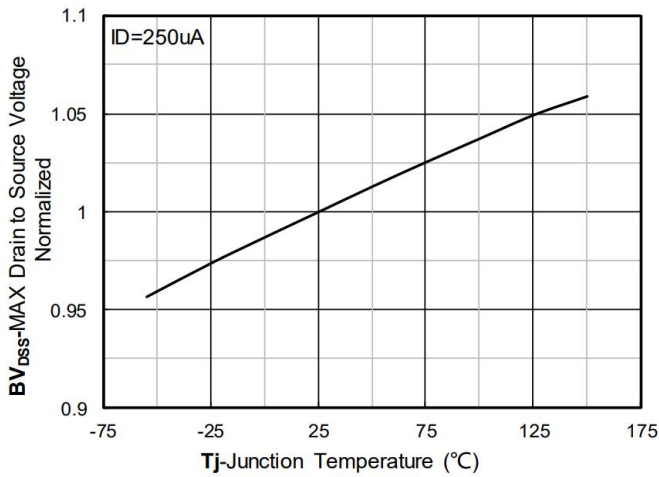


Figure 9. Normalized breakdown voltage

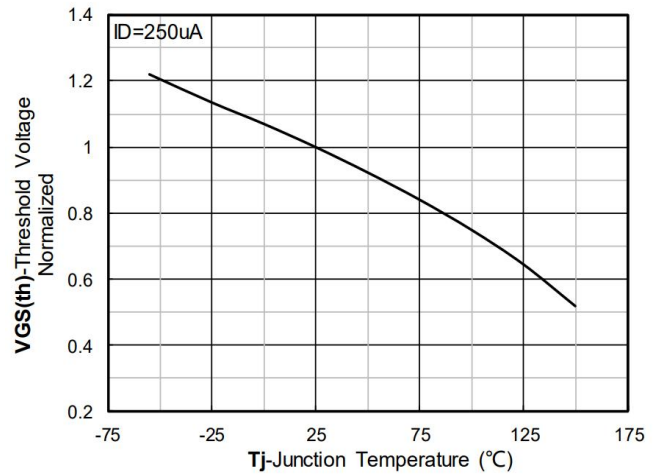


Figure 10. Normalized Threshold voltage

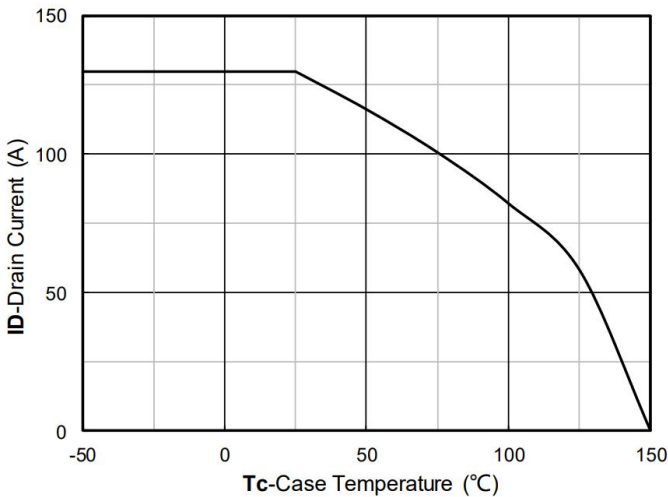


Figure 11. Current dissipation

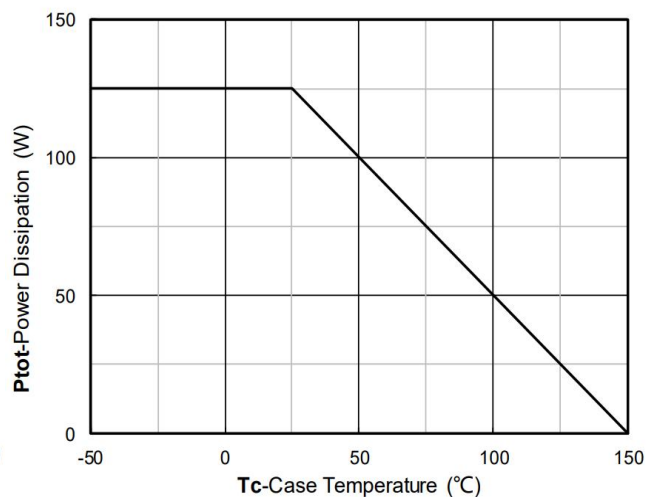


Figure 12. Power dissipation

## Typical Characteristics

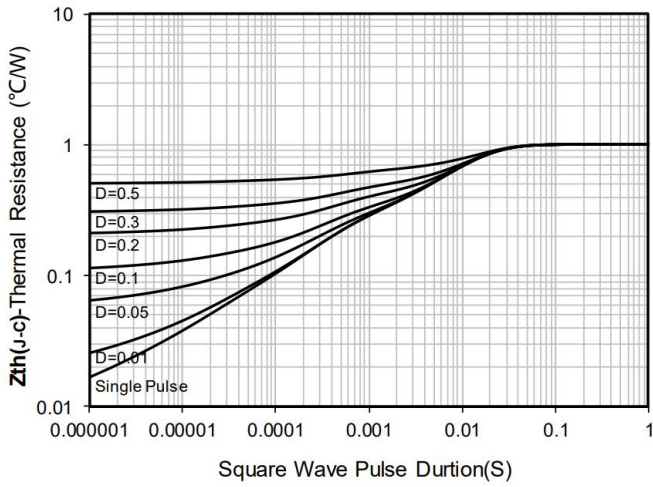


Figure 13. Maximum Transient Thermal Impedance

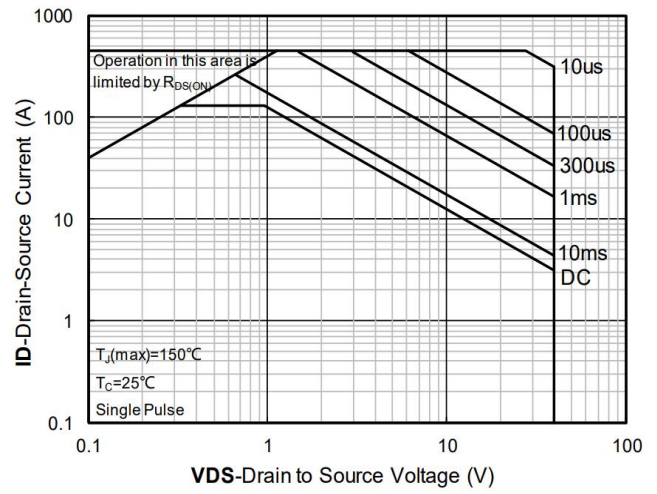
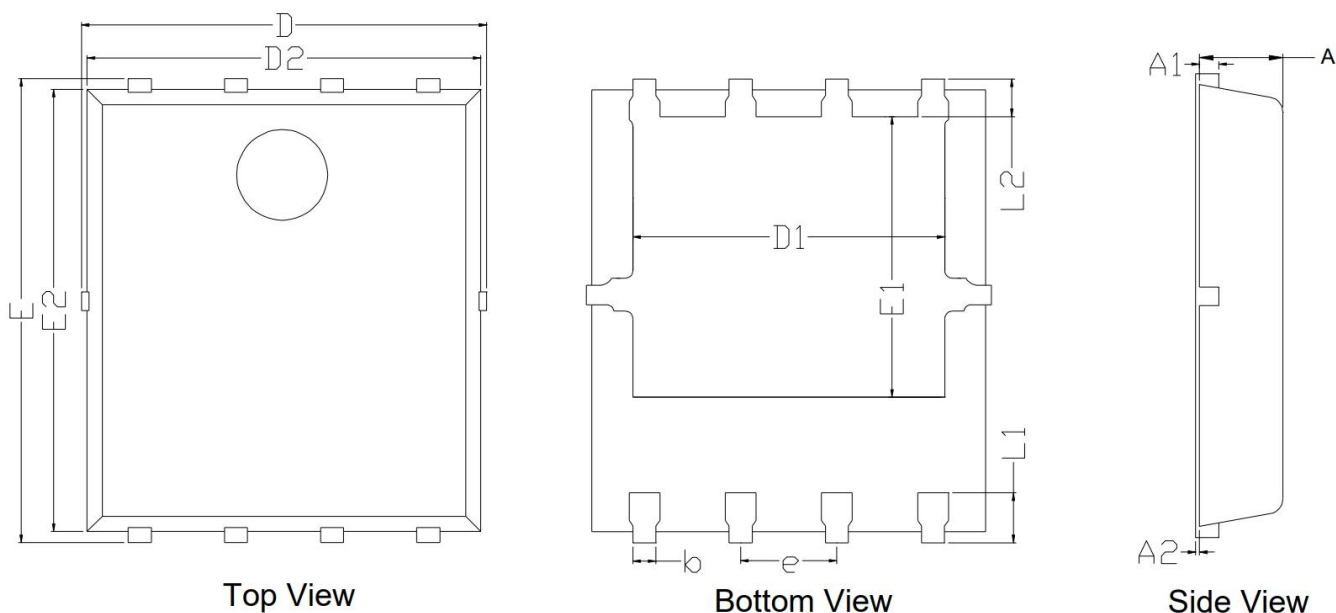


Figure 14. Safe Operation Area

### DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.200	0.035	0.047
A1	0.254BSC.		0.010BSC.	
A2	0.000	0.100	0.000	0.004
D	4.850	5.550	0.191	0.219
E	5.800	6.350	0.228	0.250
D1	3.920	4.400	0.154	0.173
E1	3.350	3.920	0.132	0.154
D2	4.700	5.400	0.197	0.212
E2	5.550	6.060	0.219	0.239
b	0.200	0.510	0.008	0.020
e	1.270BSC.		0.050BSC.	
L1	0.550	0.760	0.022	0.030
L2	0.538BSC.		0.021BSC.	