

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
40V	3.4mΩ@10V	90A

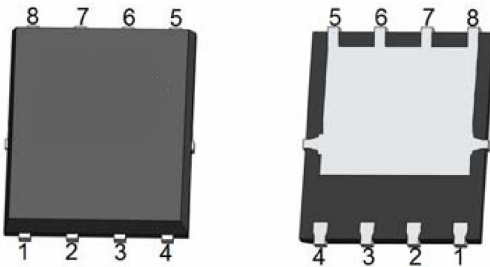
### Feature

- Excellent gate charge x  $R_{DS(on)}$  product(FOM)
- Very low on-resistance  $R_{DS(on)}$
- 150 °C operating temperature
- Suffix "-Q1" for AEC-Q101

### Application

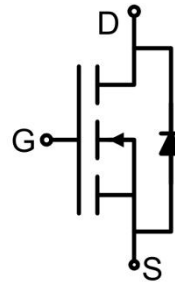
- DC/DC converter
- Ideal for high-frequency switching and synchronous rectification

### Package

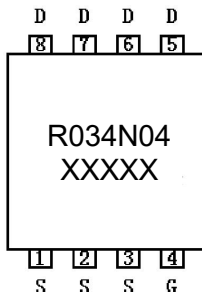


DFN5X6-8L

### 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	I <sub>D</sub>	90	A
Continuous Drain Current(T <sub>c</sub> =100°C)	I <sub>D</sub> (100°C)	63.6	A
Pulsed Drain Current	I <sub>DM</sub>	360	A
Power Dissipation	P <sub>D</sub>	70	W
Thermal Resistance,Junction-to-Case <sup>1)</sup>	R <sub>θJC</sub>	1.8	°C/W
Single pulse avalanche energy <sup>4)</sup>	E <sub>AS</sub>	500	mJ
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

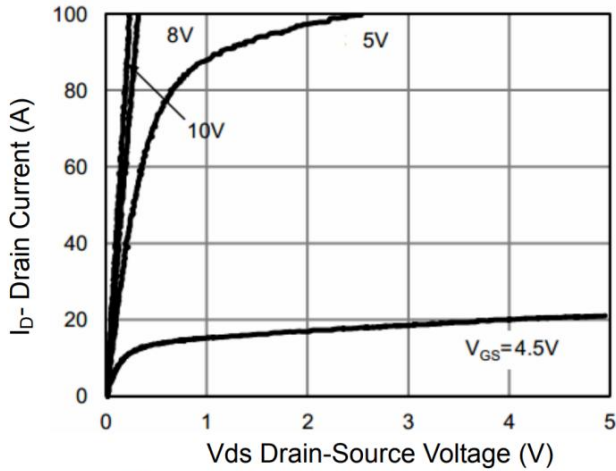
### Electrical characteristics (T<sub>c</sub>=25 °C, unless otherwise noted)

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>GS</sub> =±20V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage <sup>2)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	3.0	4.0	V
Drain-source on-resistance <sup>2)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A		2.9	3.4	mΩ
<b>Dynamic characteristics<sup>3)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f =1MHz		1695		pF
Output Capacitance	C <sub>oss</sub>			840		
Reverse Transfer Capacitance	C <sub>rss</sub>			34		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A		28		nC
Gate-Source Charge	Q <sub>gs</sub>			9.1		
Gate-Drain Charge	Q <sub>gd</sub>			5.8		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A, R <sub>G</sub> =1.6Ω		7.5		nS
Turn-on rise time	t <sub>r</sub>			4.0		
Turn-off delay time	t <sub>d(off)</sub>			37		
Turn-off fall time	t <sub>f</sub>			7.5		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current <sup>1)</sup>	I <sub>S</sub>				90	A
Diode Forward voltage <sup>2)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = I <sub>S</sub> di/dt = 100A/μs <sup>2)</sup>		14		nS
Reverse Recovery Charge	Q <sub>rr</sub>				21	

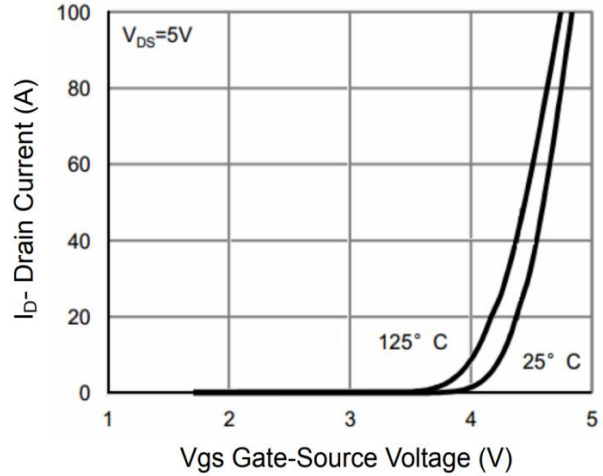
Notes:

- 1) Surface Mounted on FR4 Board, t ≤ 10 sec.
- 2) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- 3) Guaranteed by design, not subject to production.
- 4) EAS condition : T<sub>J</sub>=25 °C, V<sub>DD</sub>=20V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω.

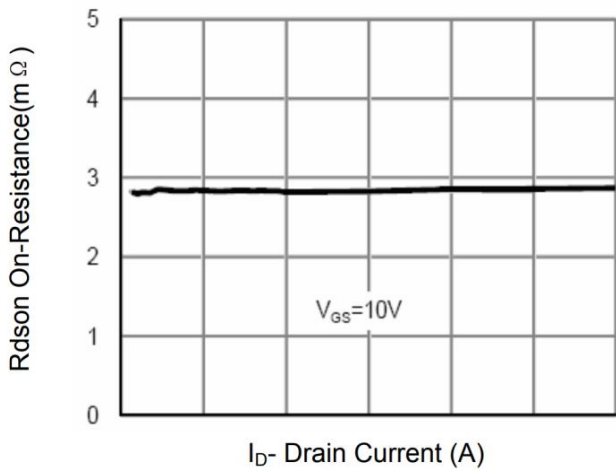
## Typical Characteristics



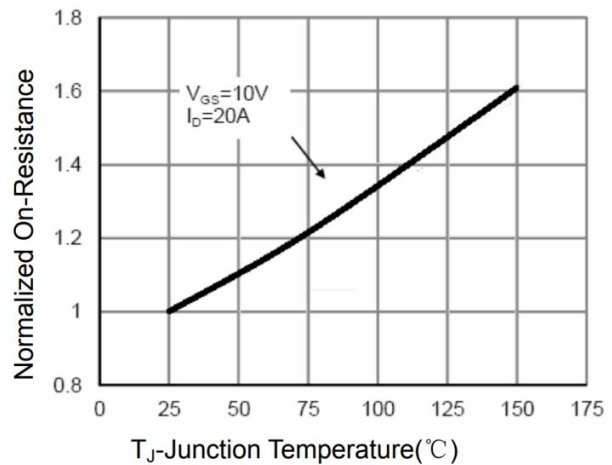
**Figure 1 Output Characteristics**



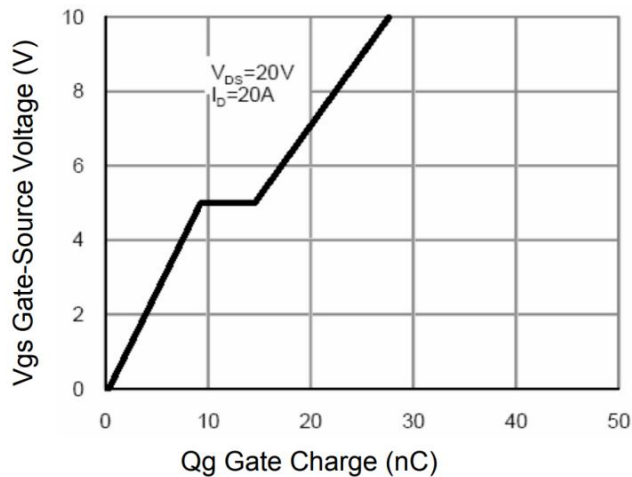
**Figure 2 Transfer Characteristics**



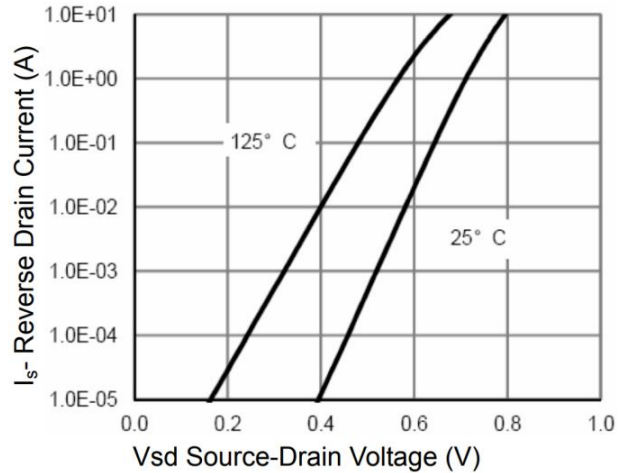
**Figure 3 Rdson- Drain Current**



**Figure 4 Rdson-Junction Temperature**

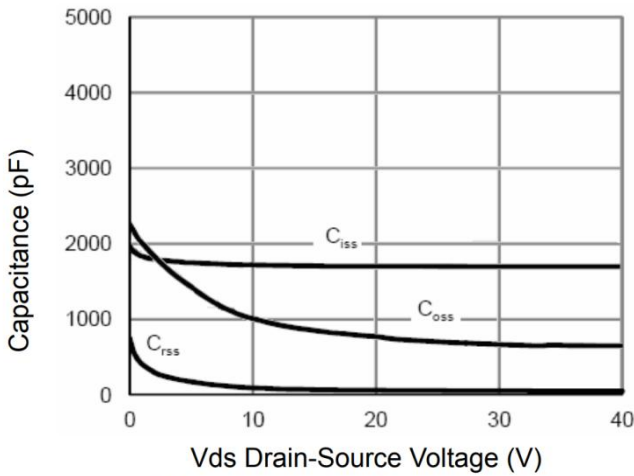


**Figure 5 Gate Charge**

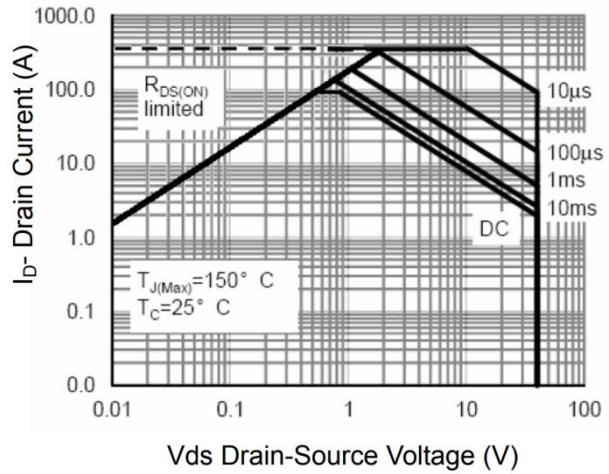


**Figure 6 Source- Drain Diode Forward**

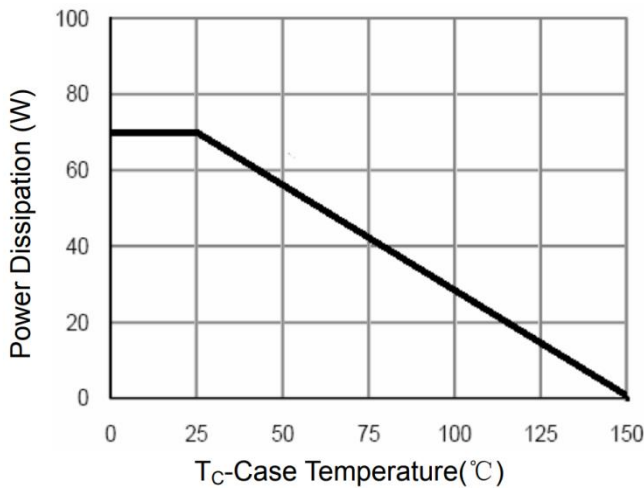
## Typical Characteristics



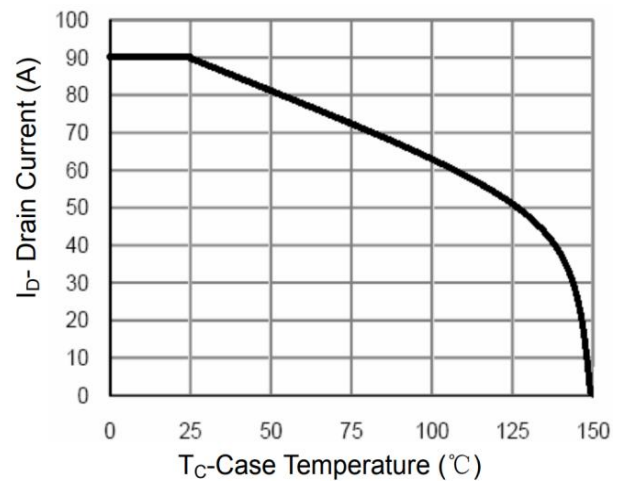
**Figure 7 Capacitance vs Vds**



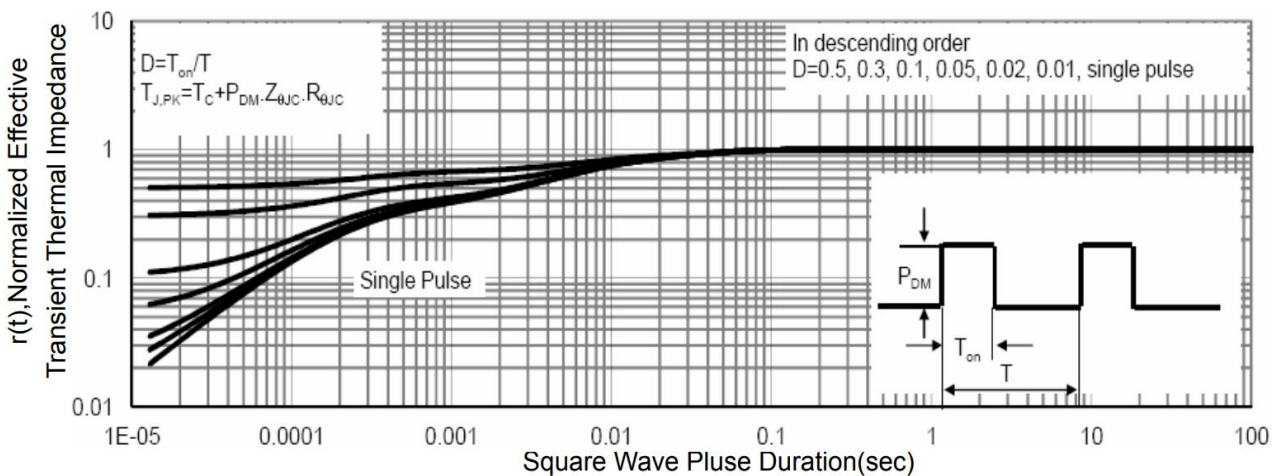
**Figure 8 Safe Operation Area**



**Figure 9 Power De-rating**

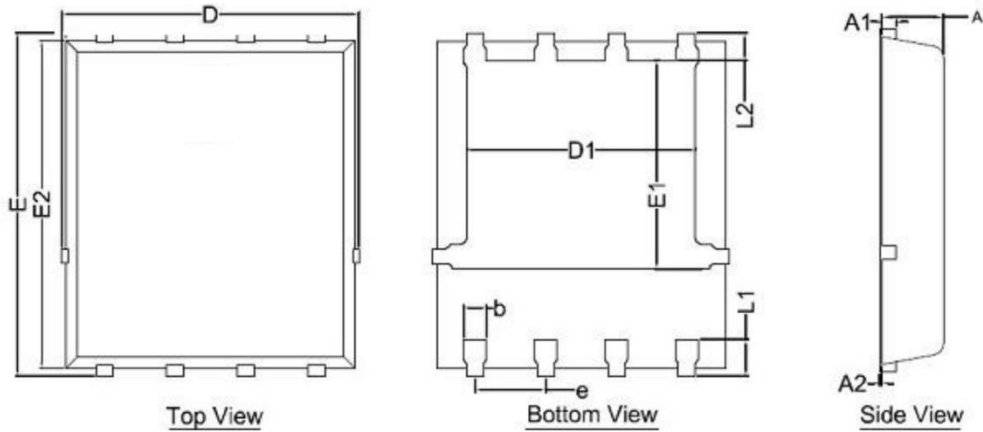


**Figure 10 Current De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

### DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.200	0.300	0.008	0.012
A2	0.000	0.050	0.000	0.002
D	4.800	5.000	0.189	0.197
E	5.900	6.100	0.232	0.240
D1	3.610	3.960	0.142	0.156
E1	3.380	3.780	0.133	0.149
E2	5.700	5.800	0.224	0.228
b	0.330	0.510	0.013	0.020
e	1.270BSC.		0.050BSC	
L1	0.510	0.710	0.020	0.028
L2	0.410	0.610	0.016	0.024