

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
60V	35mΩ@10V	18A
	40mΩ@4.5V	

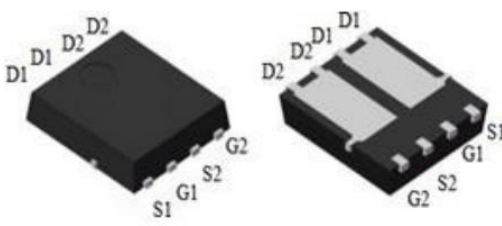
### Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Suffix “-Q1” for AEC-Q101

### Application

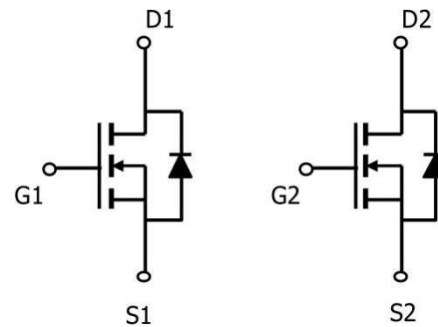
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

### 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>	60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	18	A
Continuous Drain Current(T <sub>c</sub> =100°C)	I <sub>D</sub> (100°C)	12.7	A
Pulsed Drain Current	I <sub>DM</sub>	60	A
Power Dissipation	P <sub>D</sub>	45	W
Thermal Resistance,Junction-to-Case <sup>1)</sup>	R <sub>θJC</sub>	3.3	°C/W
Single pulse avalanche energy <sup>4)</sup>	E <sub>AS</sub>	72	mJ
Junction Temperature	T <sub>J</sub>	175	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +175	°C

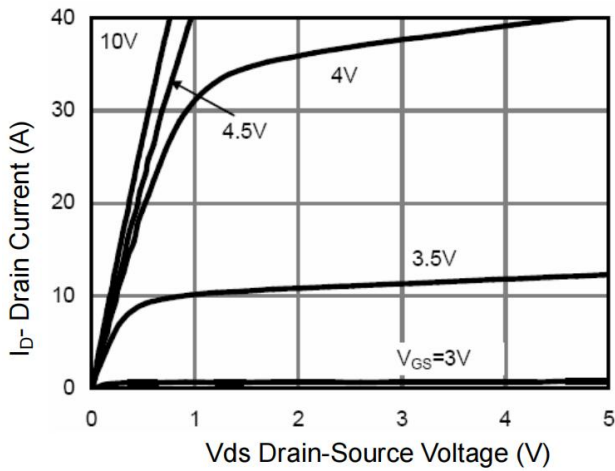
### Electrical characteristics (T<sub>c</sub>=25°C unless otherwise noted)

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	60			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, 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	1.2	1.6	2.5	V
Drain-source on-resistance <sup>2)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A		24	35	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A		30	40	
<b>Dynamic characteristics<sup>3)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f =1MHz		973		pF
Output Capacitance	C <sub>oss</sub>			61		
Reverse Transfer Capacitance	C <sub>rss</sub>			59		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A		25		nC
Gate-Source Charge	Q <sub>gs</sub>			4.5		
Gate-Drain Charge	Q <sub>gd</sub>			6.5		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>L</sub> =6.7Ω, R <sub>G</sub> =3Ω		5		nS
Turn-on rise time	t <sub>r</sub>			2.6		
Turn-off delay time	t <sub>d(off)</sub>			16.1		
Turn-off fall time	t <sub>f</sub>			2.3		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current <sup>1)</sup>	I <sub>S</sub>				18	A
Diode Forward voltage <sup>2)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =10A			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 10A		29		nS
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100A/μs		49		nC

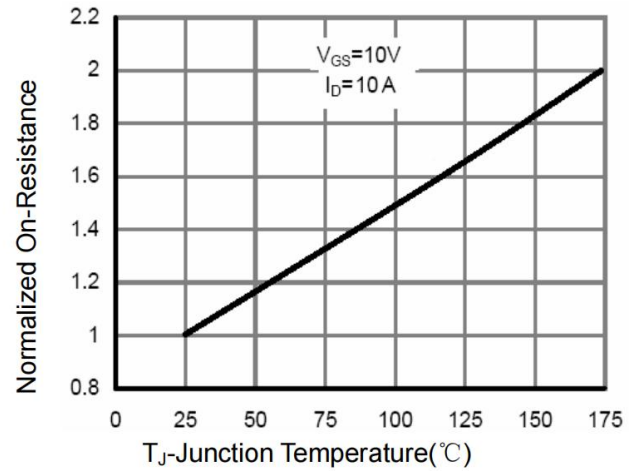
Notes:

- 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 ,V °C DD=20V,V<sub>G</sub>=10V,L=0.5mH,R<sub>G</sub>=25Ω.

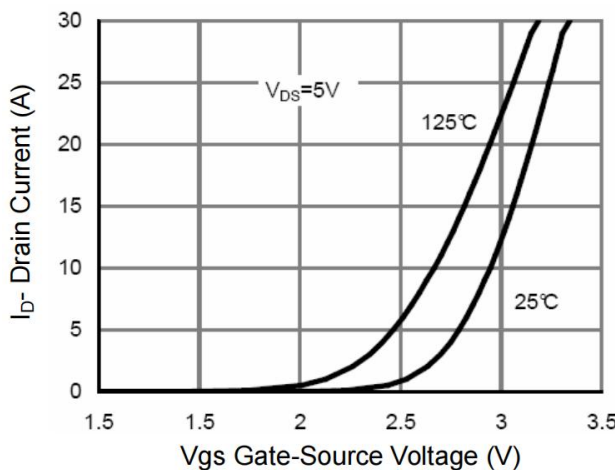
## Typical Characteristics



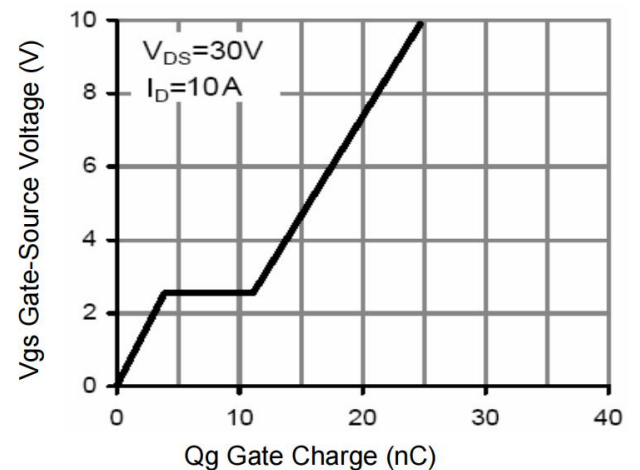
**Figure 1 Output Characteristics**



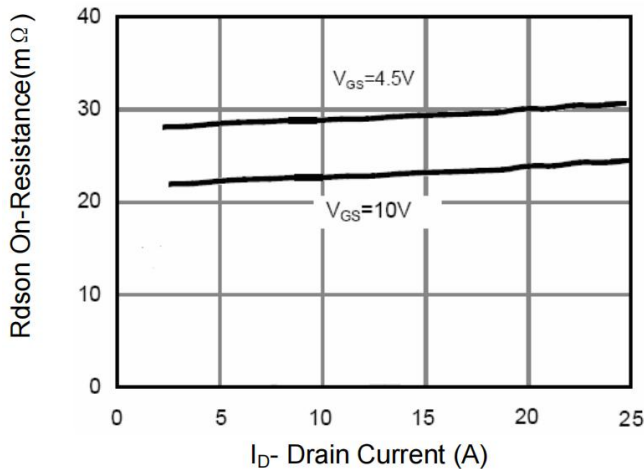
**Figure 2 Rdson-Junction Temperature**



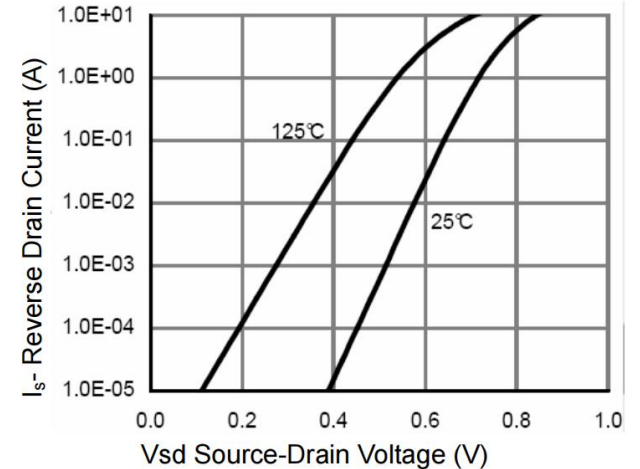
**Figure 3 Transfer Characteristics**



**Figure 4 Gate Charge**

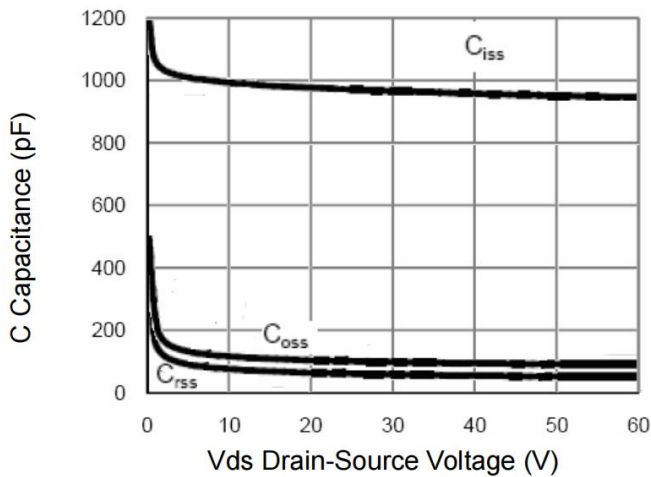


**Figure 53 RdsonDrain Current**

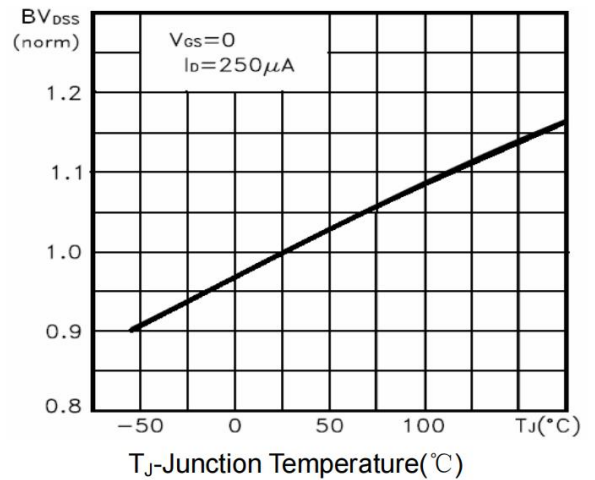


**Figure 6 Source-Drain Diode Forward**

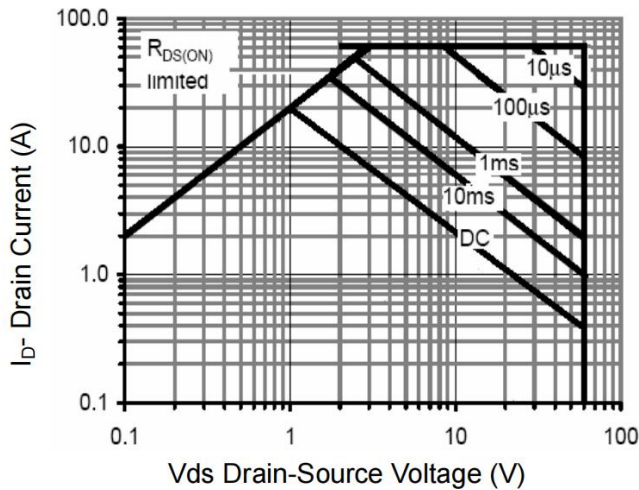
## Typical Characteristics



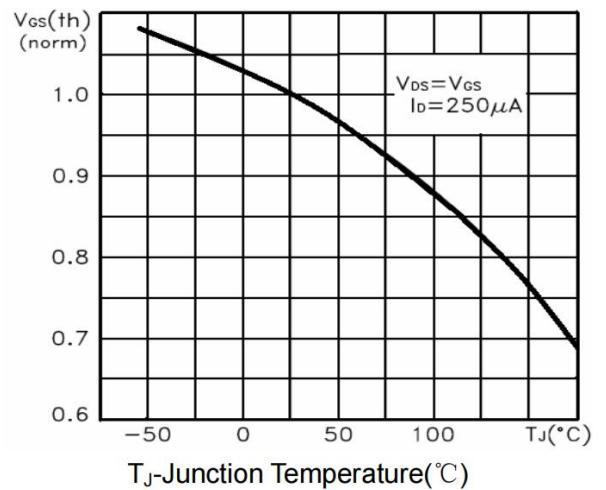
**Figure 7 Capacitance vs Vds**



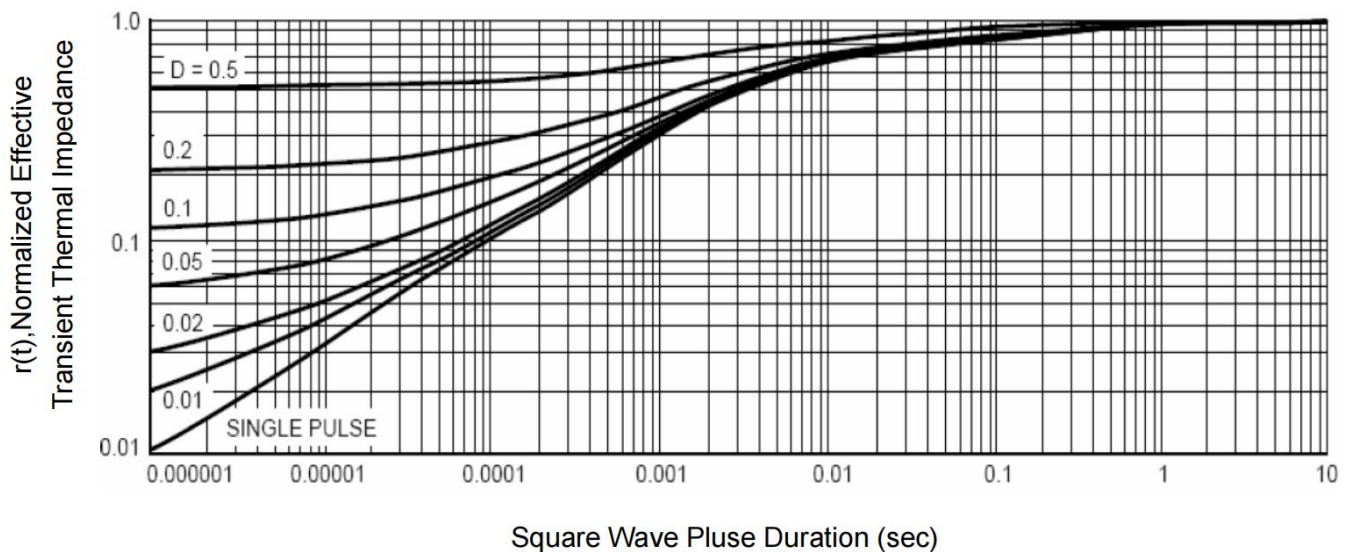
**Figure 8  $BV_{DSS}$  vs Junction Temperature**



**Figure 9 Safe Operation Area**

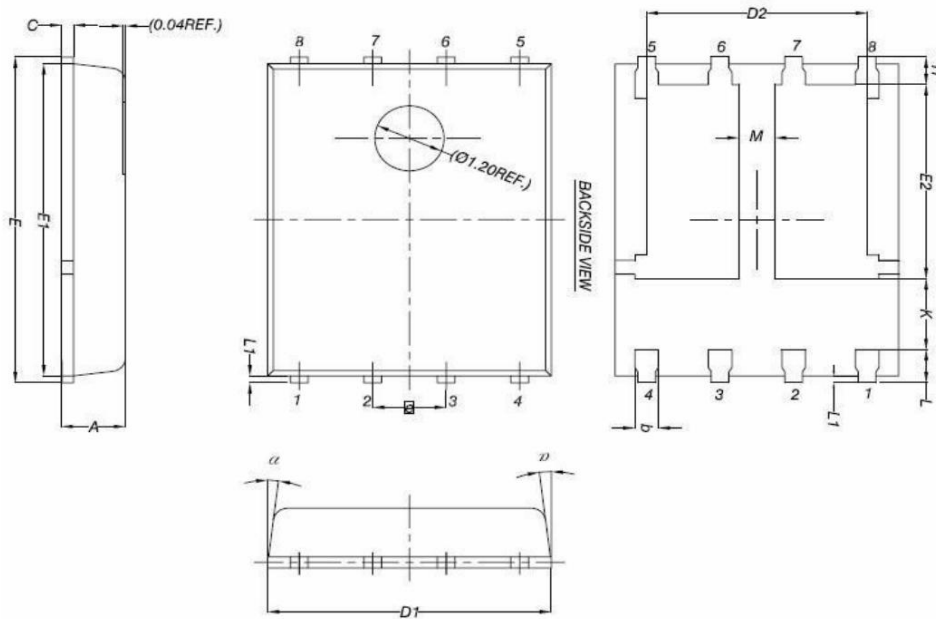


**Figure 10  $V_{GS(th)}$  vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

### DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.10	0.035	0.043
b	0.33	0.51	0.013	0.020
C	0.20	0.30	0.008	0.012
D1	4.80	5.00	0.189	0.197
D2	3.61	3.96	0.142	0.156
E	5.90	6.10	0.232	0.240
E1	5.70	5.90	0.224	0.232
E2	3.37	3.78	0.133	0.149
e	1.27BSC.		1.27BSC.	
H	0.41	0.61	0.016	0.024
K	1.10	-	0.043	-
L	0.51	0.71	0.020	0.028
L1	0.06	0.20	0.002	0.008
M	0.50	-	0.020	-
a	0°	12°	0°	12°