

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
-20V	3mΩ@-4.5V	-70A
	4mΩ@-2.5V	
	8mΩ@-1.8V	

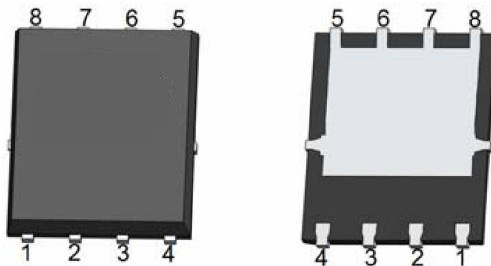
### Feature

- 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

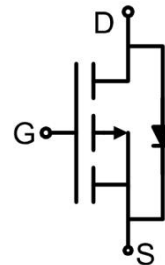
- Battery and loading switching

### Package

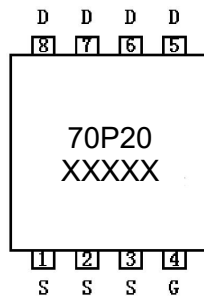


DFN5X6-8L

### Circuit diagram



### Marking



### Absolute maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	-20	V
Gate-Source Voltage	V <sub>GS</sub>	±10	V
Continuous Drain Current	I <sub>D</sub>	-70	A
Pulsed Drain Current	I <sub>DM</sub>	-280	A
Power Dissipation	P <sub>D</sub>	130	W
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	1.6	°C/W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

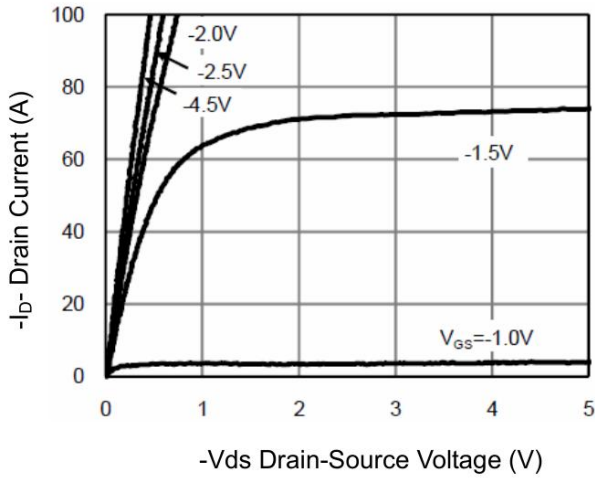
### Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)

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	-20			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V			-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-0.4		-1.0	V
Drain-source on-resistance <sup>1)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -20A		2.3	3	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -20A		2.8	4	
		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -20A		3.8	8	
Forward transconductance <sup>1)</sup>	g <sub>FS</sub>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -20A	100			S
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V, f = 1MHz		4950		pF
Output Capacitance	C <sub>oss</sub>			380		
Reverse Transfer Capacitance	C <sub>rss</sub>			290		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -20A		100		nC
Gate-Source Charge	Q <sub>gs</sub>			21		
Gate-Drain Charge	Q <sub>gd</sub>			32		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = -10V, V <sub>GS</sub> = -4.5V, R <sub>L</sub> = 0.5Ω, R <sub>GEN</sub> = 3Ω		20		nS
Turn-on rise time	t <sub>r</sub>			50		
Turn-off delay time	t <sub>d(off)</sub>			100		
Turn-off fall time	t <sub>f</sub>			40		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current <sup>1)</sup>	I <sub>S</sub>				-70	A
Diode Forward voltage	V <sub>DS</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> = -10A		48		nS
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100A/μs <sup>1)</sup>		55		nC

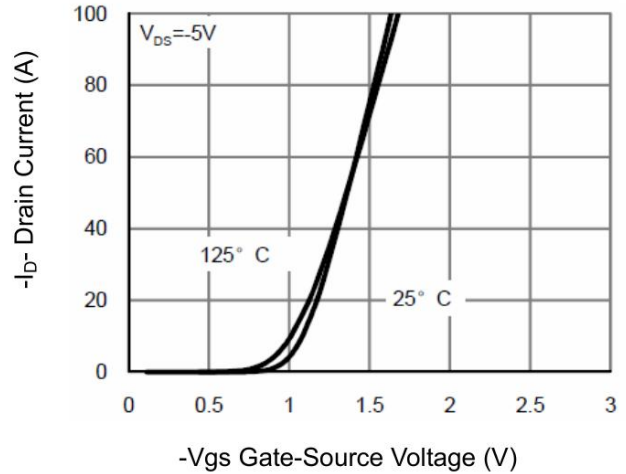
Notes:

- 1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.
- 2) Guaranteed by design, not subject to production testing.

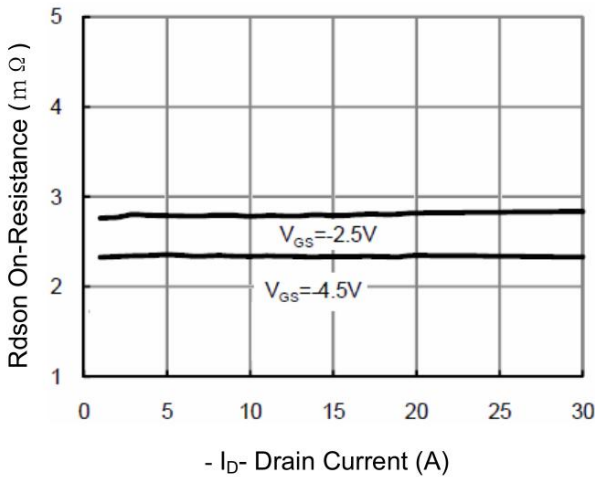
## Typical Characteristics



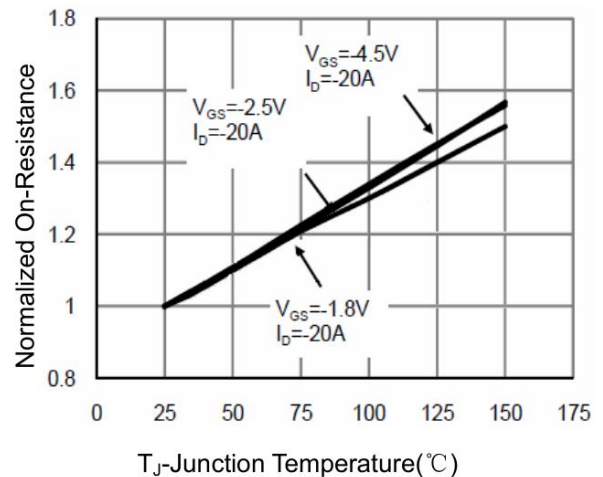
**Figure 1 Output Characteristics**



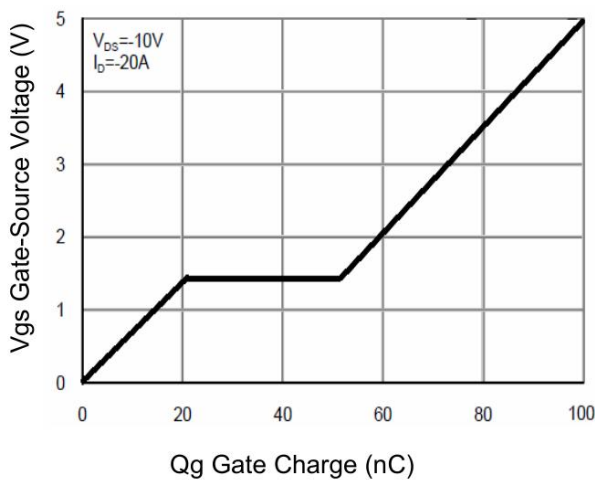
**Figure 2 Transfer Characteristics**



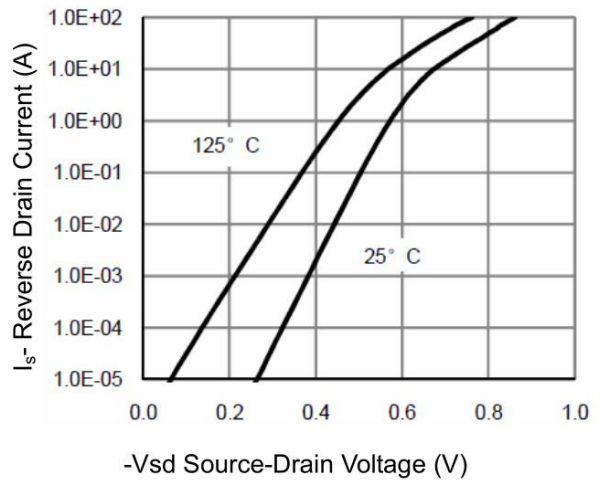
**Figure 3 Rdson- Drain Current**



**Figure 4 Rdson-Junction Temperature**

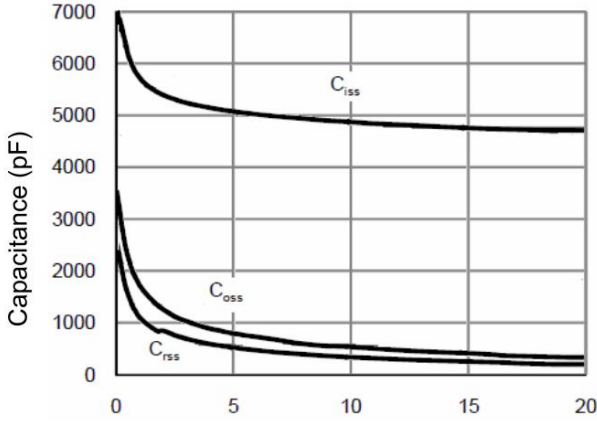


**Figure 5 Gate Charge**

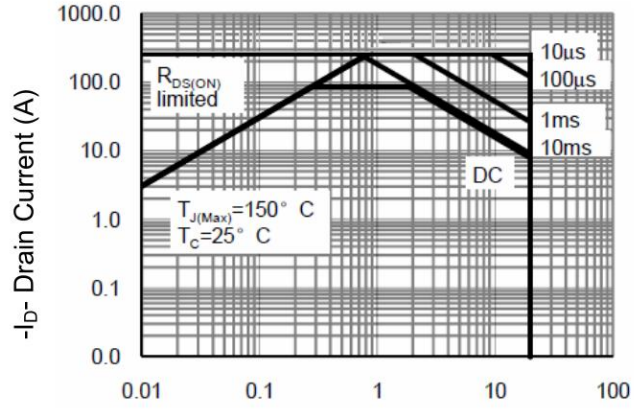


**Figure 6 Source- Drain Diode Forward**

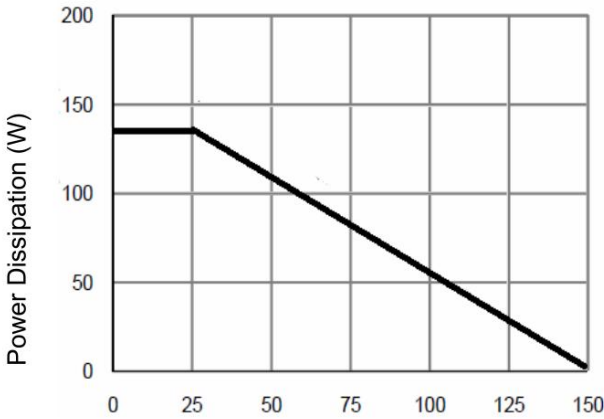
## Typical Characteristics



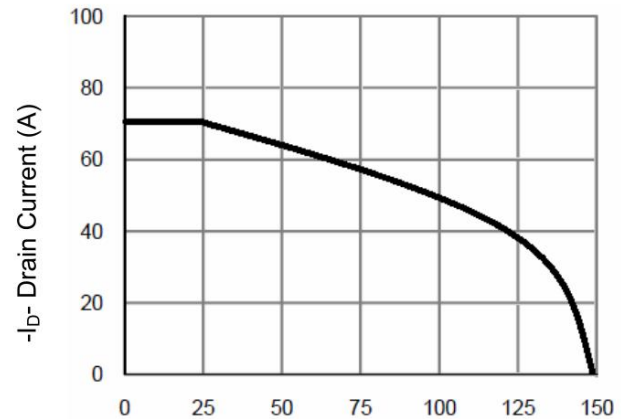
-Vds Drain-Source Voltage (V)  
**Figure 7 Capacitance vs Vds**



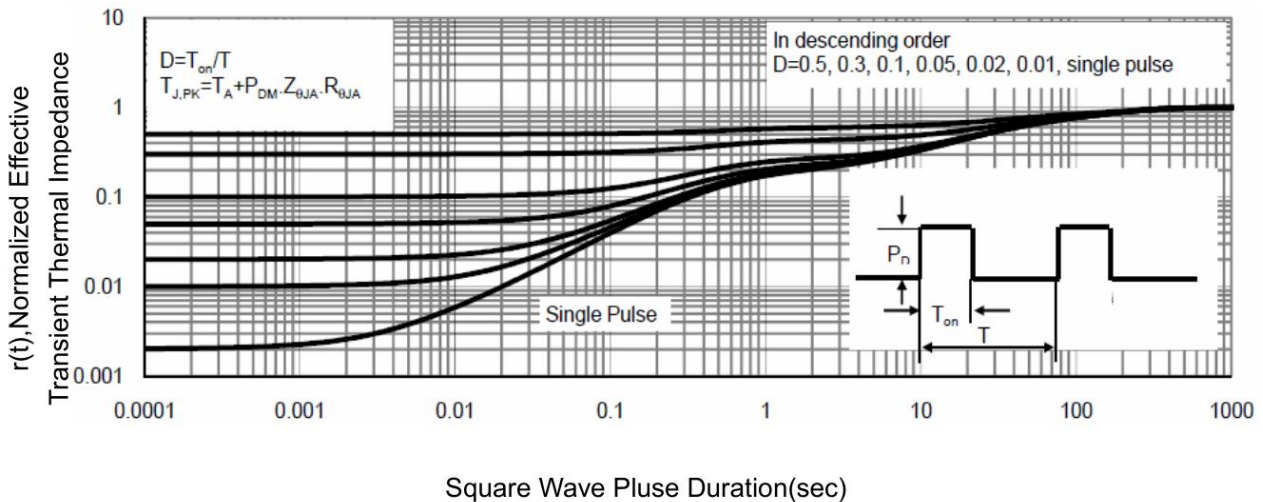
-Vds Drain-Source Voltage (V)  
**Figure 8 Safe Operation Area**



T<sub>J</sub>-Junction Temperature(°C)  
**Figure 9 Power De-rating**

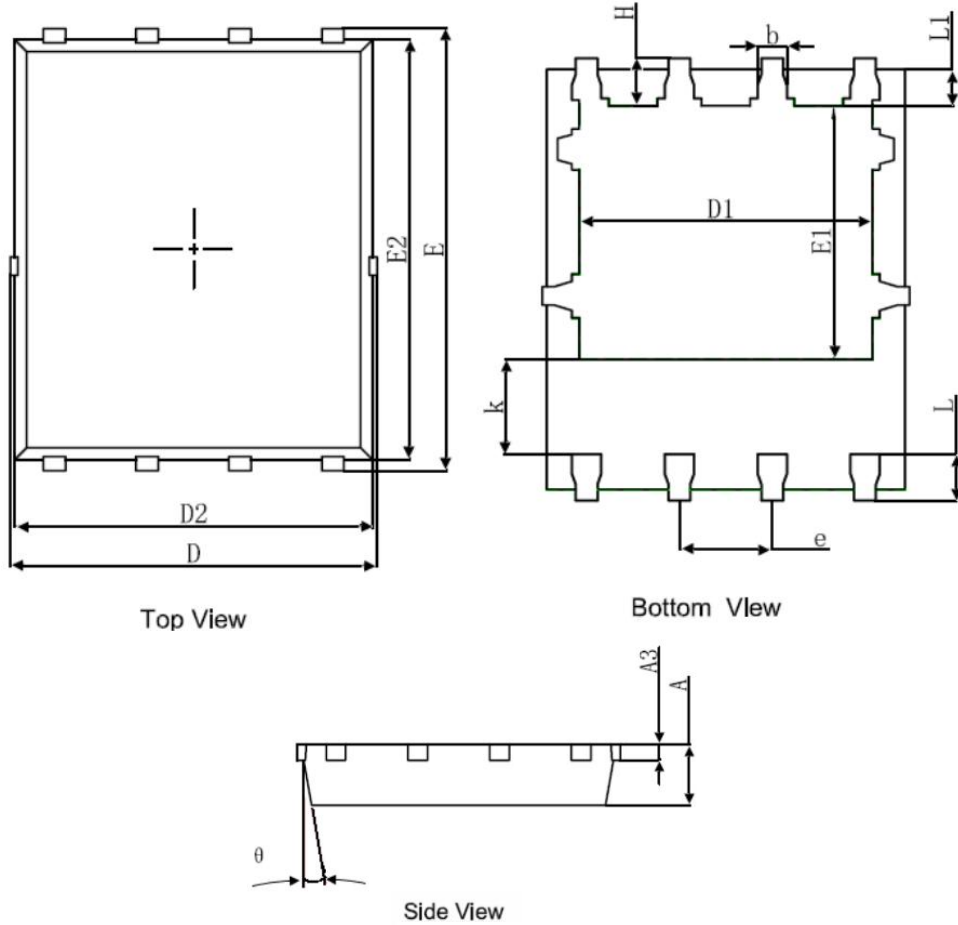


T<sub>J</sub>-Junction Temperature(°C)  
**Figure 10 -Current De-rating**



Square Wave Pulse Duration(sec)  
**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	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
$\theta$	8°	12°	8°	12°