

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_b$
-30V	7mΩ@-10V	-50A

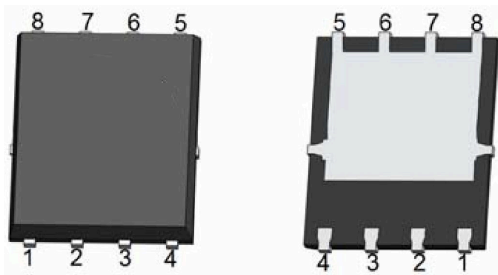
### Feature

- 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

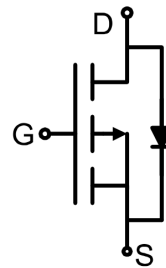
- Battery and loading switching

### Package

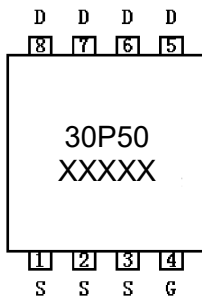


DFN5X6-8L

### Circuit diagram



### Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	-50	A
Pulsed Drain Current	$I_{DM}$	-200	A
Power Dissipation	$P_D$	35	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.6	°C/W
Single pulse avalanche energy	$E_{AS}$	300	mJ
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55 ~ +150	°C

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

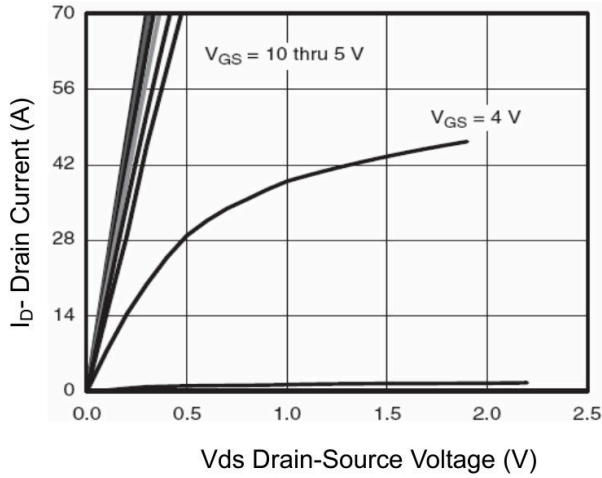
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V$			-1	μA
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			±100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0		-2.2	V
Drain-source on-resistance <sup>1)</sup>	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -10A$		4.4	7	mΩ
Forward transconductance <sup>1)</sup>	$g_{FS}$	$V_{DS} = -10V, I_D = -15A$		20		S
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$		3590		pF
Output Capacitance	$C_{oss}$			695		
Reverse Transfer Capacitance	$C_{rss}$			665		
Total Gate Charge	$Q_g$	$V_{DS} = -15V, V_{GS} = -10V, I_D = -10A$		84		nC
Gate-Source Charge	$Q_{gs}$			11.7		
Gate-Drain Charge	$Q_{gd}$			25		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15V, V_{GS} = -10V, I_D = -10A, R_{GEN} = 6\Omega$		13		nS
Turn-on rise time	$t_r$			12		
Turn-off delay time	$t_{d(off)}$			50		
Turn-off fall time	$t_f$			14		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current <sup>1)</sup>	$I_S$				-50	A
Diode Forward voltage	$V_{DS}$	$V_{GS} = 0V, I_S = -10A$			-1.2	V
Reverse Recovery Time	$t_{rr}$	$T_J = 25^\circ C, I_F = -10A, di/dt = 100A/\mu s$ <sup>1)</sup>			45	nS
Reverse Recovery Charge	$Q_{rr}$				43	nC

Notes:

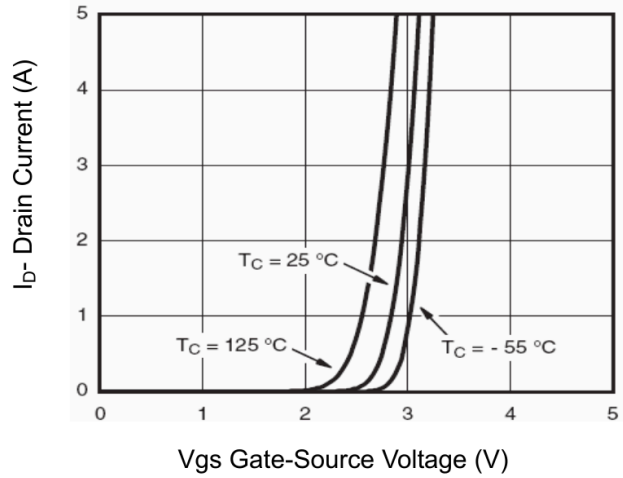
1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.

2) Guaranteed by design, not subject to production testing.

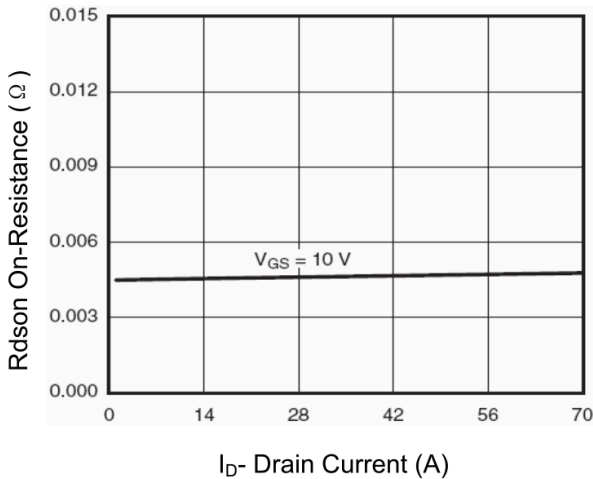
## Typical Characteristics



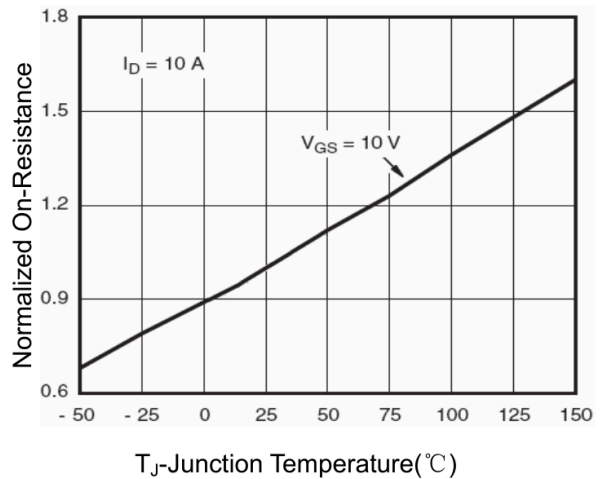
**Figure 1 Output Characteristics**



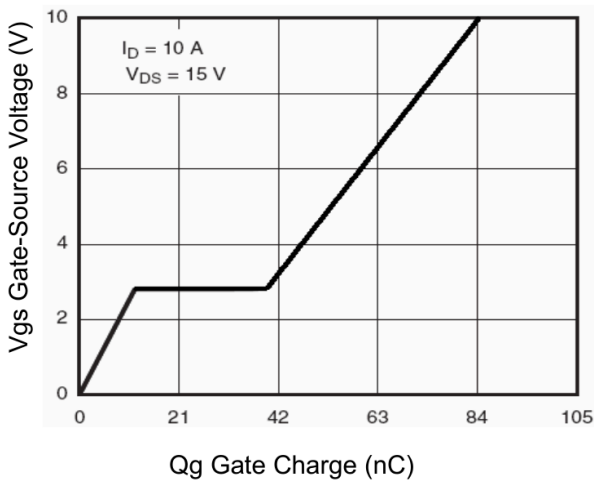
**Figure 2 Transfer Characteristics**



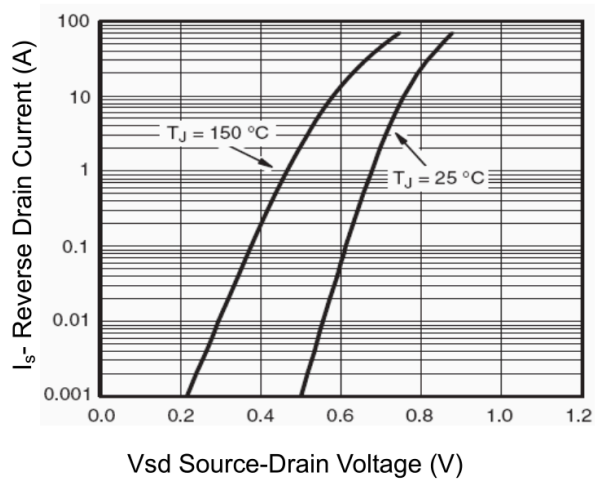
**Figure 3 Rdson- Drain Current**



**Figure 4 Rdson-Junction Temperature**

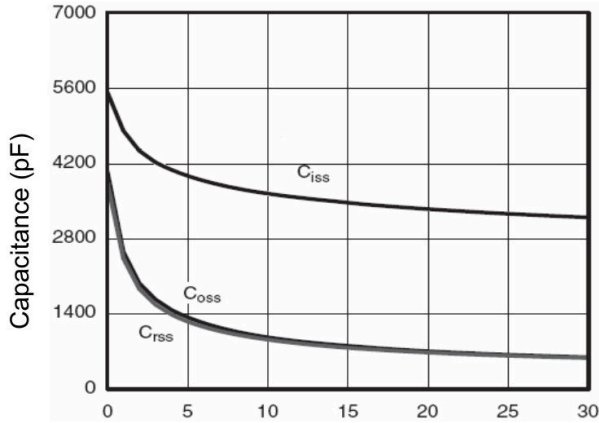


**Figure 5 Gate Charge**

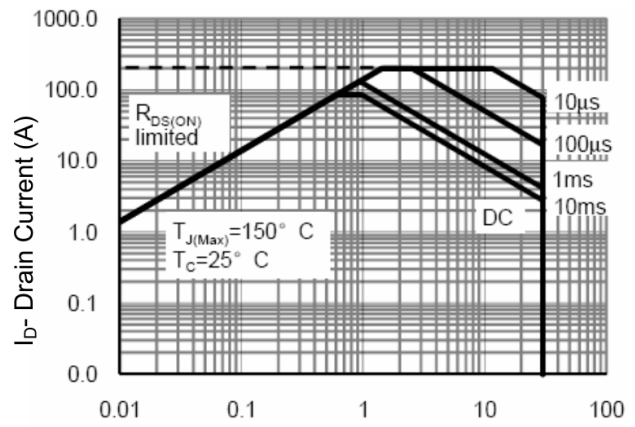


**Figure 6 Source- Drain Diode Forward**

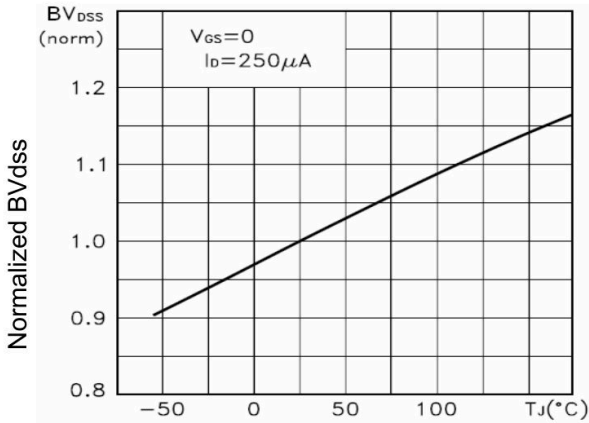
## Typical Characteristics



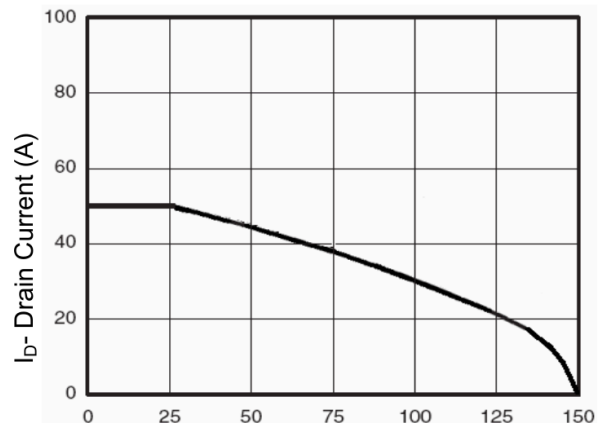
Vds Drain-Source Voltage (V)  
**Figure 7 Capacitance vs Vds**



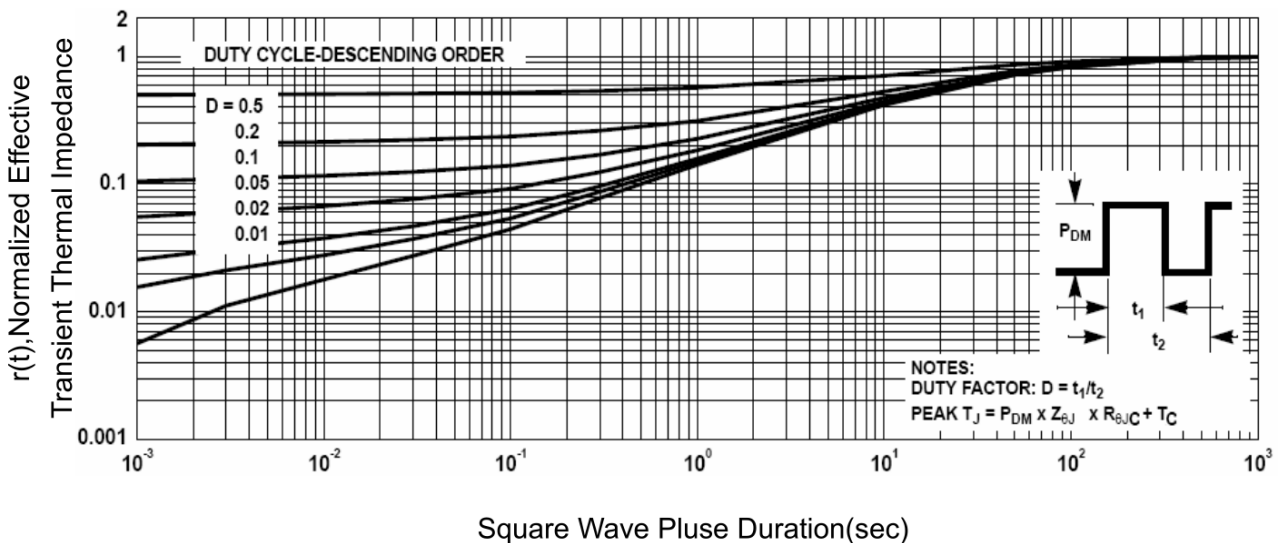
Vds Drain-Source Voltage (V)  
**Figure 8 Safe Operation Area**



T<sub>J</sub>-Junction Temperature(°C)  
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**

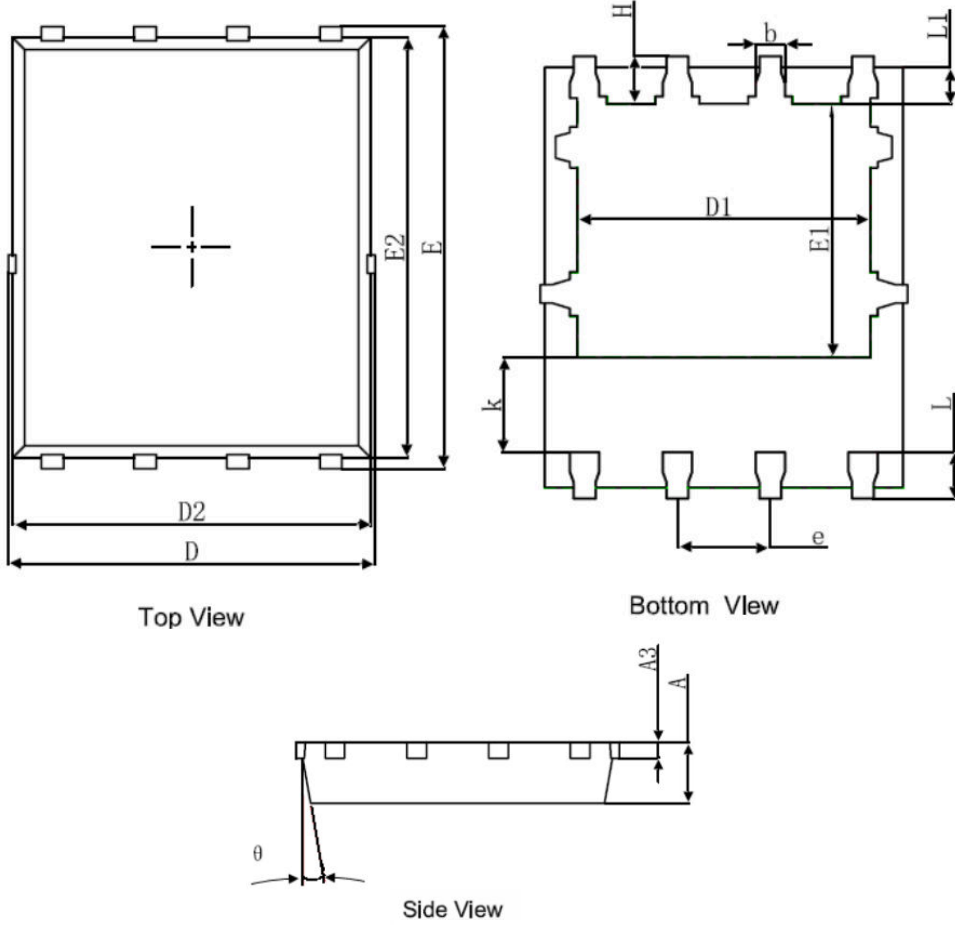


T<sub>J</sub>-Junction Temperature(°C)  
**Figure 10 ID Current Derating vs Junction**



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°