

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	2.75m Ω @10V	90A
	4.0m Ω @4.5V	

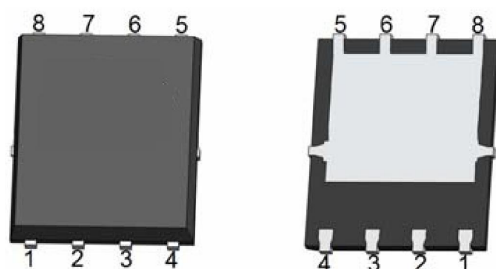
Feature

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

Application

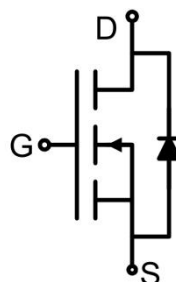
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

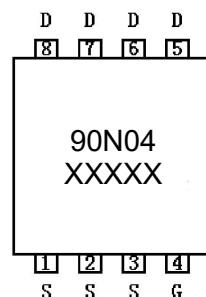


DFN5X6-8L

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	90	A
Continuous Drain Current($T_C = 100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	63.6	A
Pulsed Drain Current	I_{DM}	360	A
Power Dissipation	P_D	85	W
Power Dissipation($T_C = 100^\circ\text{C}$)	$P_D(100^\circ\text{C})$	34	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.47	$^\circ\text{C/W}$
Single pulse avalanche energy ¹⁾	E_{AS}	500	mJ
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical characteristics (Tc=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V,V _{GS} = 0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} = 0V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.2	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		2.2	2.75	mΩ
		V _{GS} =4.5V, I _D =20A		3.3	4.0	
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A		60		S
Dynamic characteristics ²⁾						
Input Capacitance	C _{iss}	V _{DS} =20V,V _{GS} =0V,f =1MHz		2300		pF
Output Capacitance	C _{oss}			740		
Reverse Transfer Capacitance	C _{rss}			38		
Total Gate Charge	Q _g	V _{DS} =20V,V _{GS} =10V,I _D =20A		40		nC
Gate-Source Charge	Q _{gs}			5.8		
Gate-Drain Charge	Q _{gd}			7.2		
Turn-on delay time	t _{d(on)}	V _{DD} =20V,V _{GS} =10V, I _D =20A,R _{GEN} =1.6Ω		7.5		nS
Turn-on rise time	t _r			4		
Turn-off delay time	t _{d(off)}			37		
Turn-off fall time	t _f			7.5		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				90	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = I _S		14		nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs		21		nC

Notes:

1) EAS condition : $T_J = 25^\circ\text{C}, V_{DD} = 20V, V_G = 10V, L = 0.5mH, R_g = 25\Omega$

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

Typical Characteristics

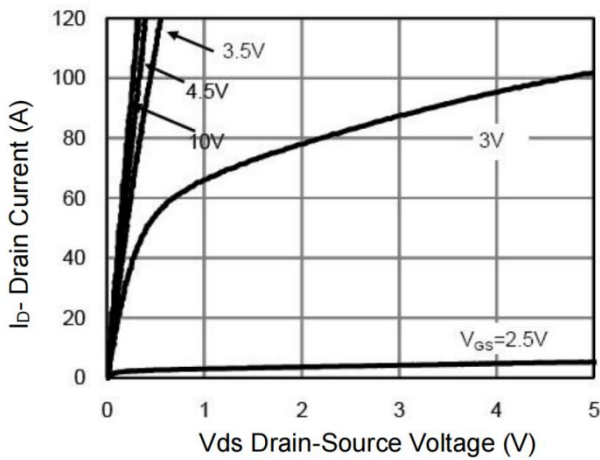


Figure 1 Output Characteristics

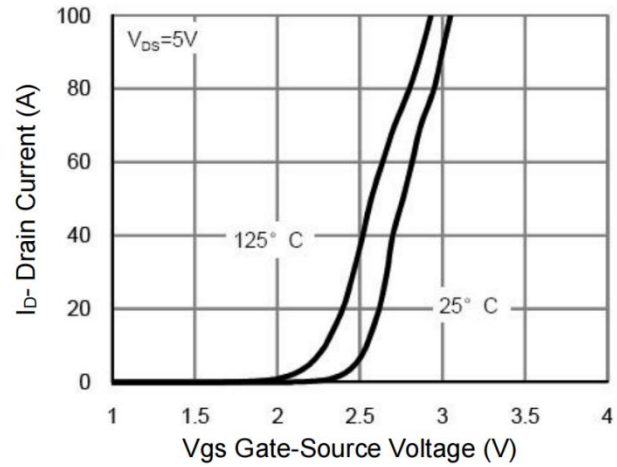


Figure 2 Transfer Characteristics

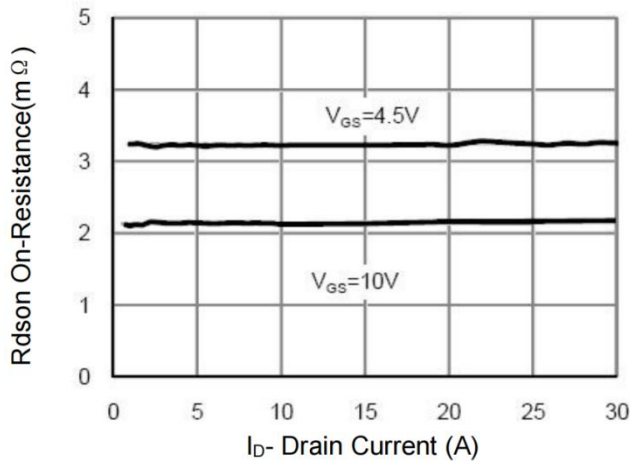


Figure 3 Rdson- Drain Current

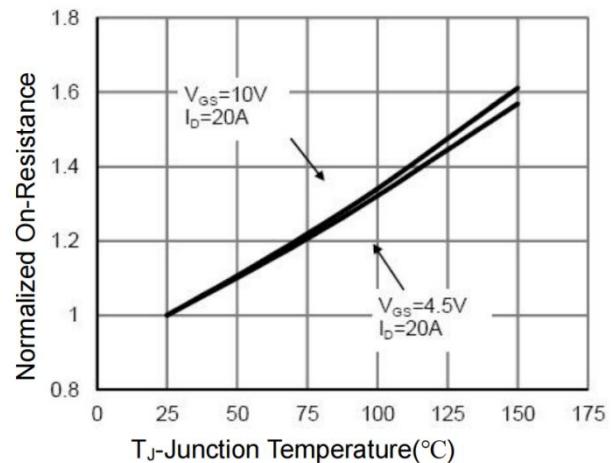


Figure 4 Rdson-Junction Temperature

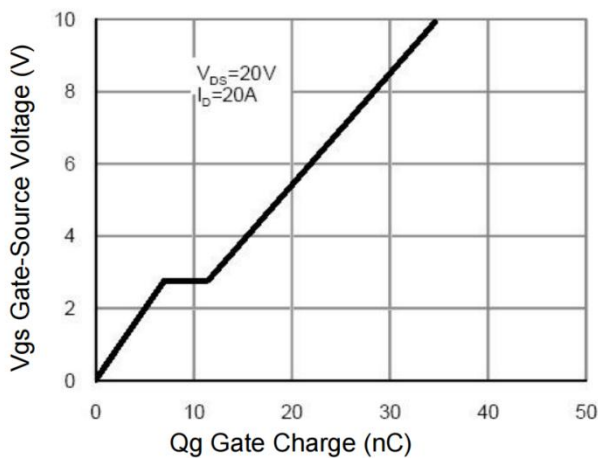


Figure 5 Gate Charge

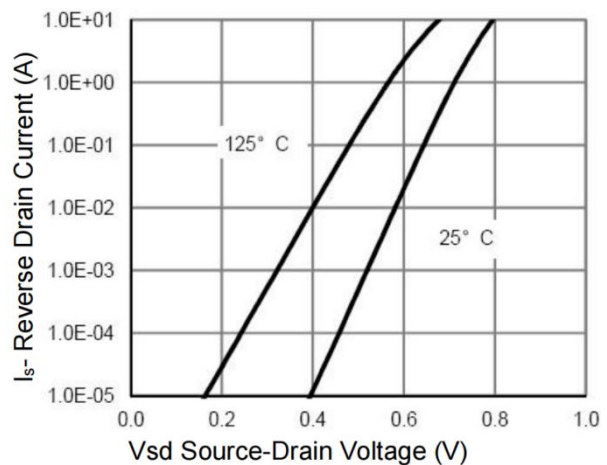


Figure 6 Source- Drain Diode Forward

Typical Characteristics

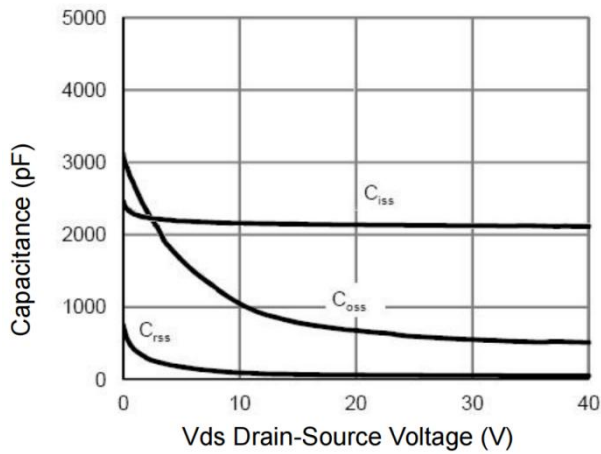


Figure 7 Capacitance vs Vds

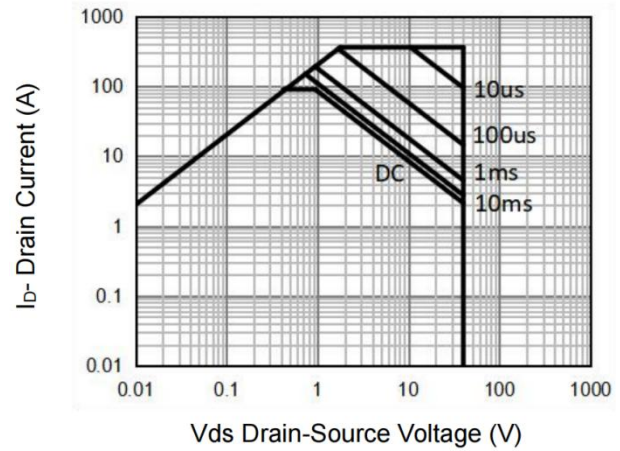


Figure 8 Safe Operation Area

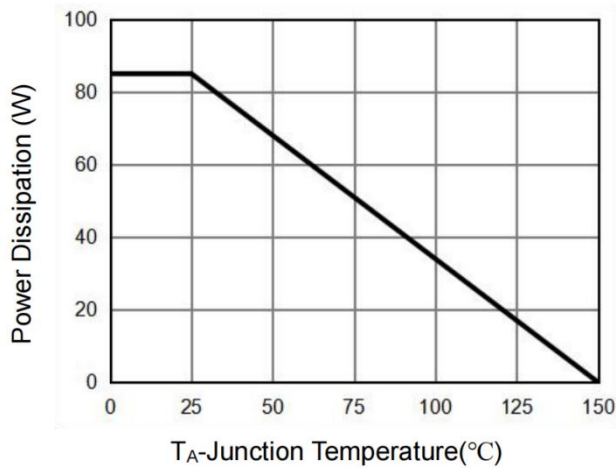


Figure 9 Power De-rating

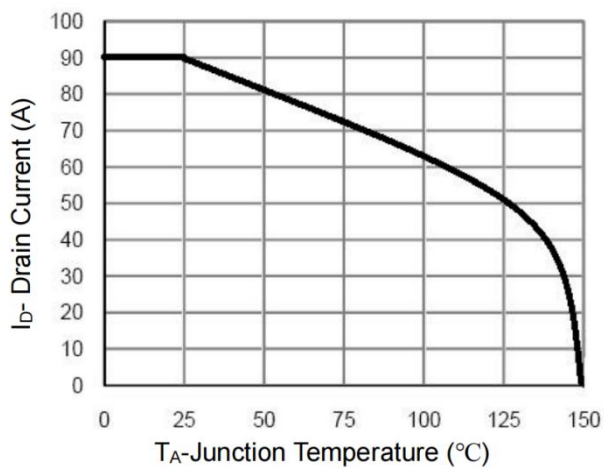


Figure 10 Current De-rating

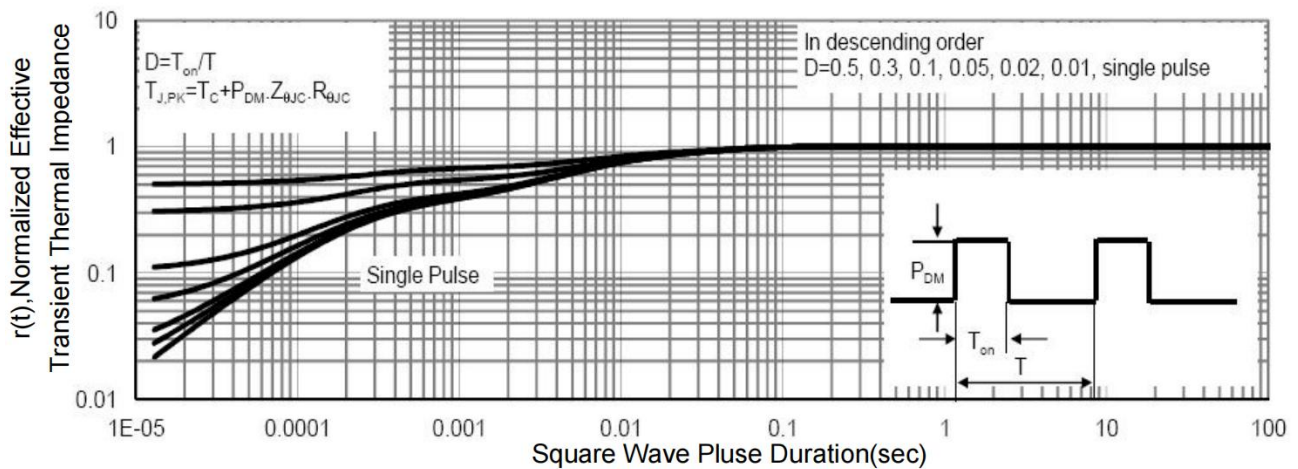
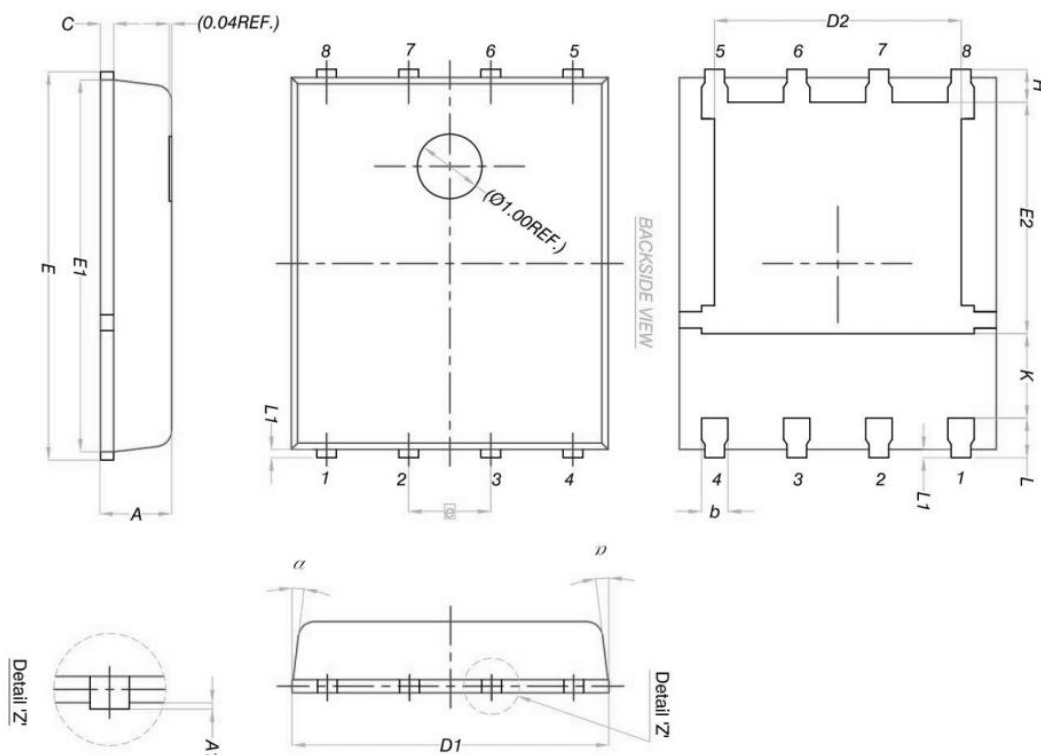


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A1	0.000	0.050	0.000	0.002
b	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.012
D1	4.800	5.000	0.189	0.197
D2	3.610	3.960	0.142	0.156
E	5.900	6.100	0.232	0.240
E1	5.700	5.800	0.224	0.228
E2	3.380	3.780	0.133	0.149
e	1.270 BSC		0.050 BSC	
H	0.410	0.610	0.016	0.024
K	1.100	-	0.043	-
L	0.510	0.710	0.020	0.028
L1	0.060	0.200	0.002	0.008
θ	0°	12°	0°	12°