

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
100V	13mΩ@10V	50A
	18mΩ@4.5V	

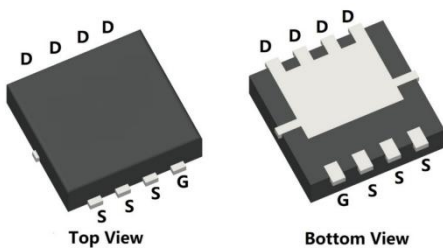
### Feature

- Low  $R_{DS(ON)}$  & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Suffix "-Q1" for AEC-Q101

### Application

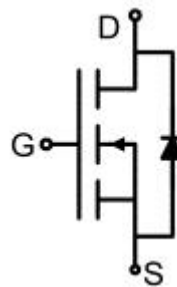
- DC-DC converter

### Package

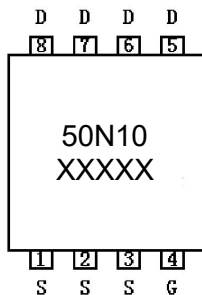


PDFN3\*3-8L

### 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>	100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	50	A
Continuous Drain Current (T <sub>C</sub> =100°C)	I <sub>D</sub> (100 °C)	31	A
Pulsed Drain Current (t <sub>p</sub> =10μs)	I <sub>DM</sub>	200	A
Single Pulse Avalanche Energy <sup>1)</sup>	E <sub>AS</sub>	65	mJ
Power Dissipation	P <sub>D</sub>	62.5	W
Thermal Resistance Junction to Case	R <sub>θJC</sub>	2	°C/W
Operating Junction Temperature	T <sub>J</sub>	-55 ~ +150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

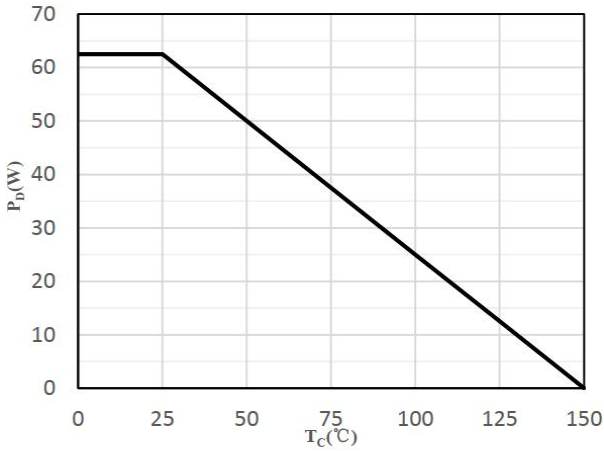
### Electrical characteristics (T<sub>A</sub>=25°C unless otherwise noted)

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	100			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V			1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	2	2.5	V
Drain-source on-resistance <sup>2)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A		10	13	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A		14	18	
<b>Dynamic characteristics<sup>3)</sup></b>						
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V, f = 1MHz		1561		pF
Output Capacitance	C <sub>oss</sub>			469		
Reverse Transfer Capacitance	C <sub>rss</sub>			23		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A		26.5		nC
Gate-Source Charge	Q <sub>gs</sub>			5.3		
Gate-Drain Charge	Q <sub>gd</sub>			6.1		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 15V, I <sub>D</sub> = 20A R <sub>G</sub> = 2Ω		6.2		nS
Turn-on rise time	t <sub>r</sub>			32		
Turn-off delay time	t <sub>d(off)</sub>			25		
Turn-off fall time	t <sub>f</sub>			23		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>S</sub>				50	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>	V <sub>GS</sub> = 0V, I <sub>F</sub> = 20A		48		nS
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = -100A/μs		60		nC

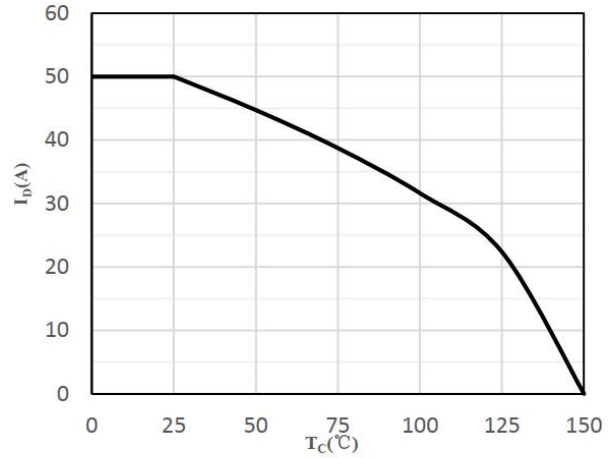
Notes:

- 1) The EAS data shows Max. rating. The test condition is V<sub>DD</sub> = 50V, V<sub>GS</sub> = 10V, L = 0.5mH.
- 2) The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
- 3) Guaranteed by design, not subject to production.

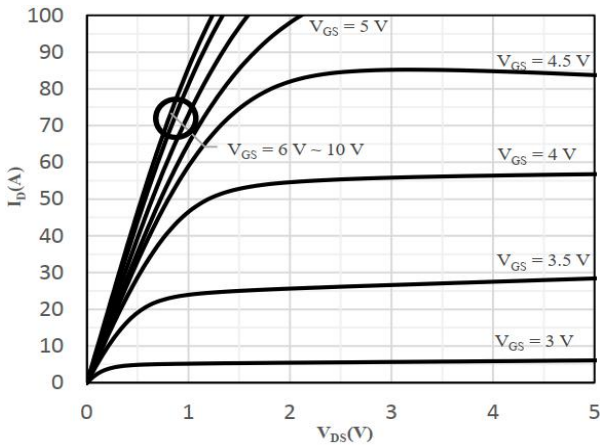
## Typical Characteristics



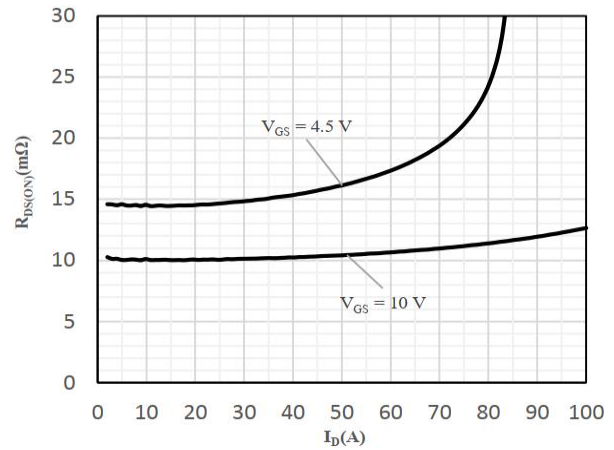
**Fig 1 Power Dissipation**



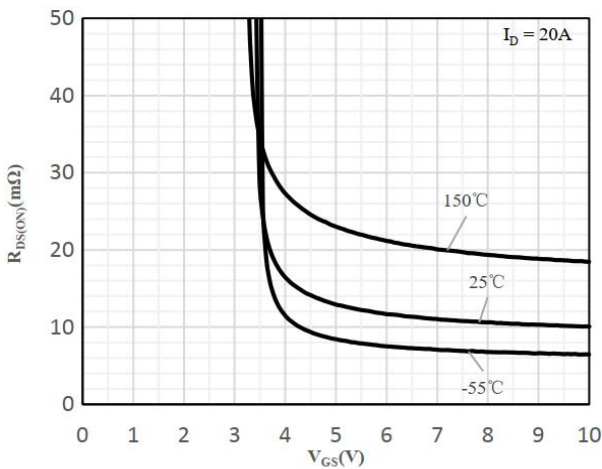
**Fig 2 Drain Current**



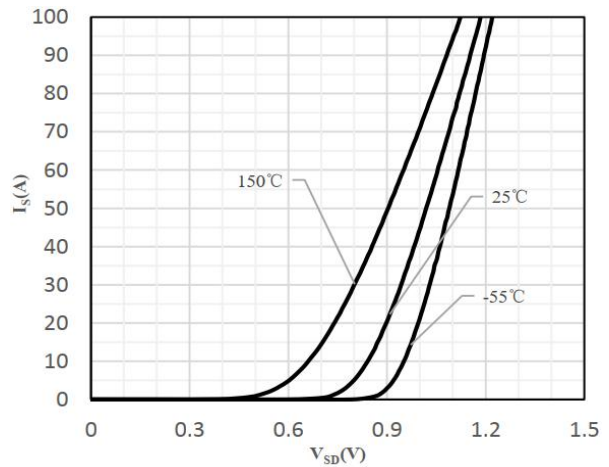
**Fig 3 Typical Output Characteristics**



**Fig 4 On-Resistance vs. Drain Current and Gate Voltage**

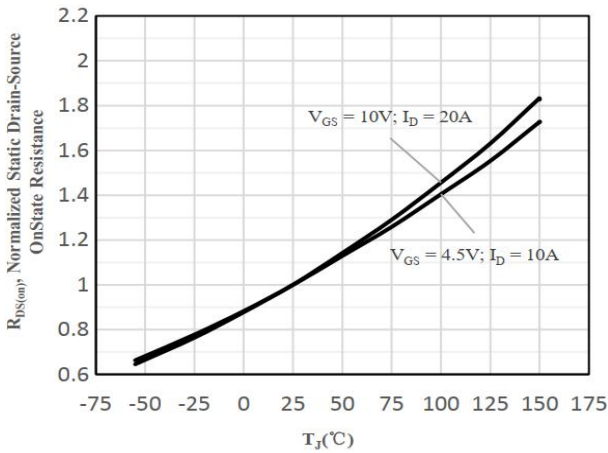


**Fig 5 On-Resistance vs. Gate-Source Voltage**

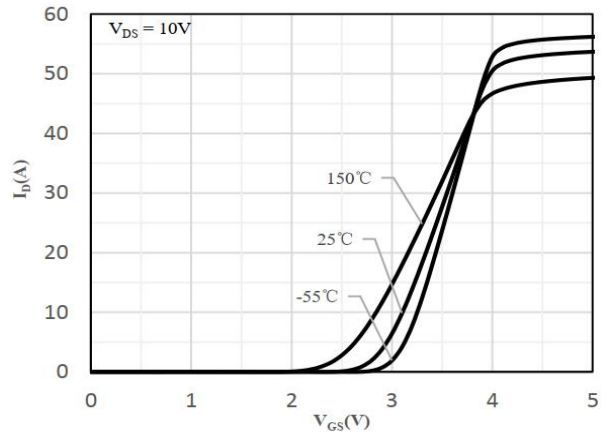


**Fig 6 Body-Diode Characteristics**

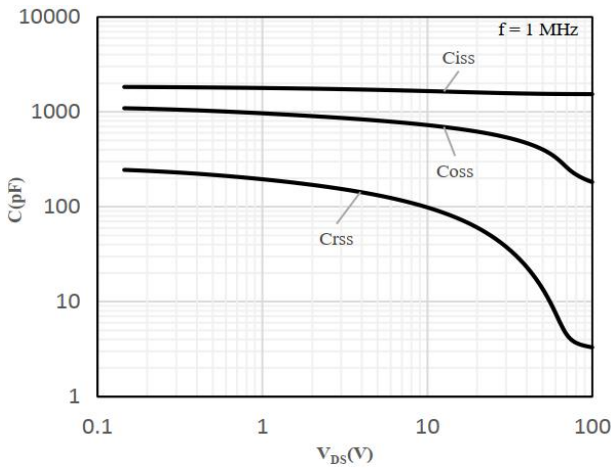
## Typical Characteristics



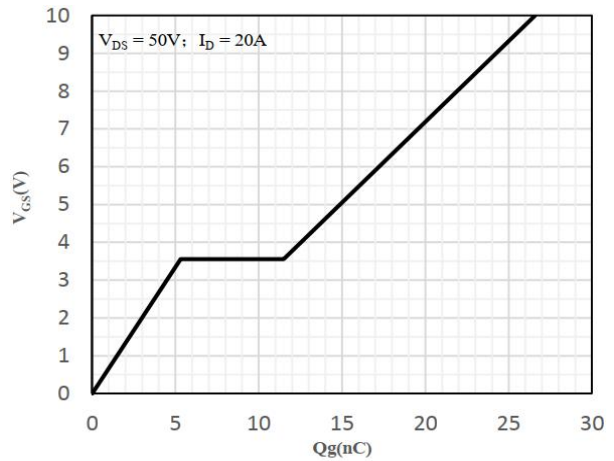
**Fig 7 Normalized On-Resistance vs. Junction Temperature**



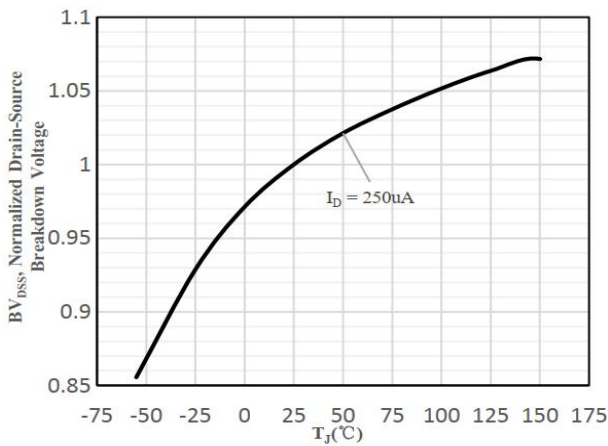
**Fig 8 Transfer Characteristics**



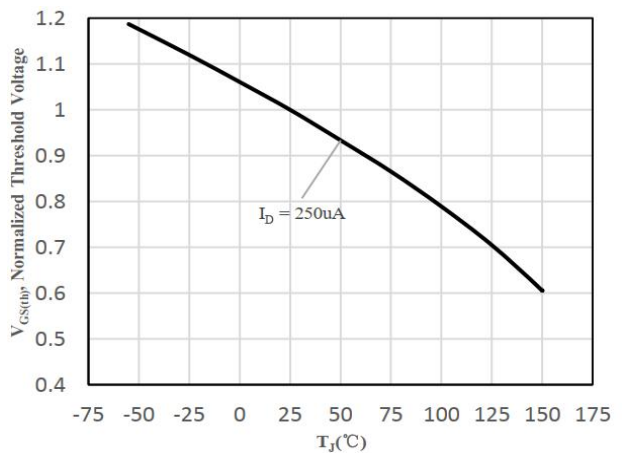
**Fig 9 Capacitance Characteristics**



**Fig 10 Gate-Charge Characteristics**

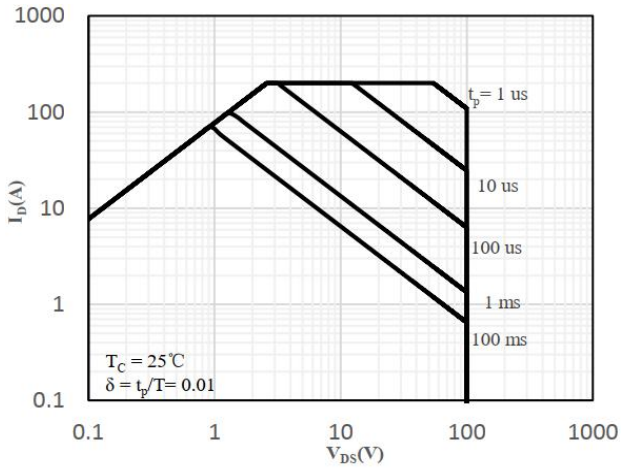


**Fig 11 Normalized Breakdown Voltage vs. Junction Temperature**

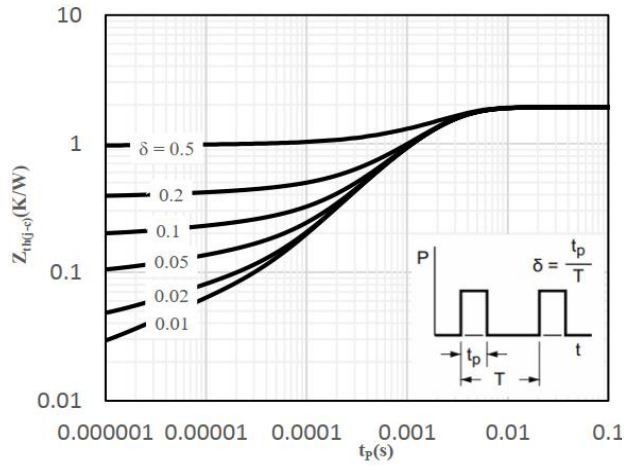


**Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature**

## Typical Characteristics

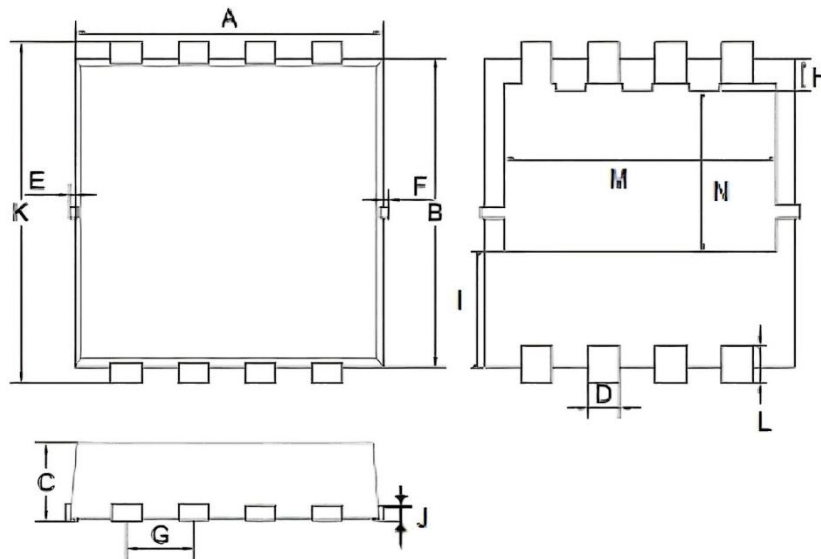


**Fig 13 Safe Operation Area**



**Fig 14 Maximum transient thermal impedance**

### PDFN3\*3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.900	3.100	0.114	0.122
B	2.900	3.100	0.114	0.122
C	0.650	0.850	0.026	0.033
D	0.200	0.400	0.008	0.016
E	0.000	0.100	0.000	0.004
F	0.000	0.100	0.000	0.004
G	0.550	0.750	0.022	0.030
H	0.200	0.400	0.008	0.016
I	0.700	1.100	0.028	0.043
J	0.100	0.200	0.004	0.008
K	3.150	3.450	0.124	0.136
L	0.200	0.400	0.008	0.016
M	2.350	2.550	0.093	0.100
N	1.500	1.900	0.059	0.075