

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
60V	6.5mΩ@10V	66A
	9mΩ@4.5V	

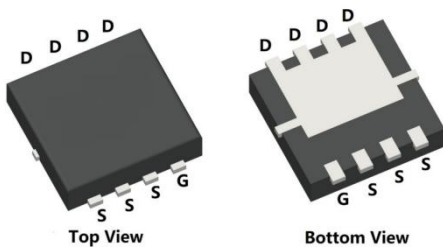
### Feature

- Advanced Shielded-Gate Trench technology
- Low on-resistance
- Fast switching speed
- Low thermal resistance
- Suffix "-Q1" for AEC-Q101

### Application

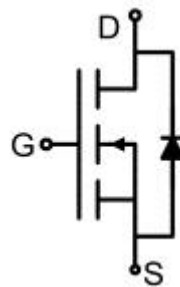
- DC-DC converter
- Power switching application

### Package

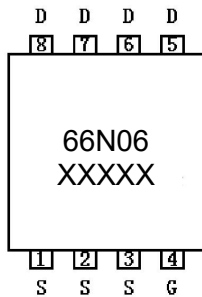


PDFN3\*3-8L

### 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>	60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	66	A
Continuous Drain Current (T <sub>C</sub> =100°C)	I <sub>D</sub> (100°C)	42	A
Pulsed Drain Current (t <sub>p</sub> =10μs)	I <sub>DM</sub>	264	A
Single Pulse Avalanche Energy <sup>1)</sup>	E <sub>AS</sub>	80	mJ
Power Dissipation	P <sub>D</sub>	52	W
Thermal Resistance Junction to Case	R <sub>θJC</sub>	2.4	°C/W
Operating Junction Temperature	T <sub>J</sub>	-55 ~ +150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

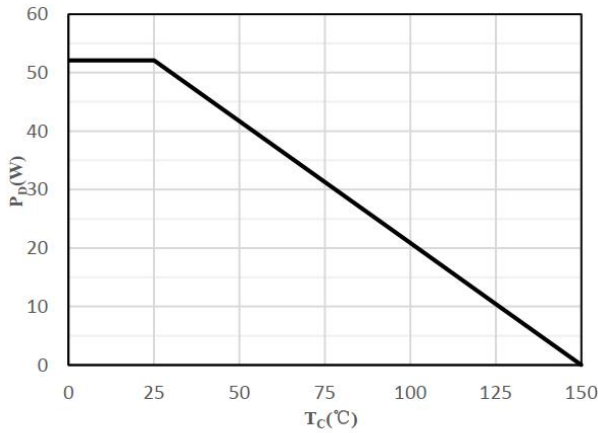
### Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)

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	60			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =48V, 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	1.8	2.5	V
Drain-source on-resistance <sup>2)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A		4.5	6.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A		7.5	9	
<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		1527		pF
Output Capacitance	C <sub>oss</sub>			638		
Reverse Transfer Capacitance	C <sub>rss</sub>			16		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =48V, V <sub>GS</sub> =10V, I <sub>D</sub> =15A		30.7		nC
Gate-Source Charge	Q <sub>gs</sub>			4.2		
Gate-Drain Charge	Q <sub>gd</sub>			9.3		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =15V, I <sub>D</sub> =15A R <sub>G</sub> =3.3Ω		17		nS
Turn-on rise time	t <sub>r</sub>			19		
Turn-off delay time	t <sub>d(off)</sub>			45		
Turn-off fall time	t <sub>f</sub>			10		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>S</sub>				66	A
Diode Forward voltage <sup>2)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =5A			1.2	V
Reverse Recovery Time	T <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>F</sub> =30A di/dt =-100A/μs		41		nS
Reverse Recovery Charge	Q <sub>rr</sub>			37		nC

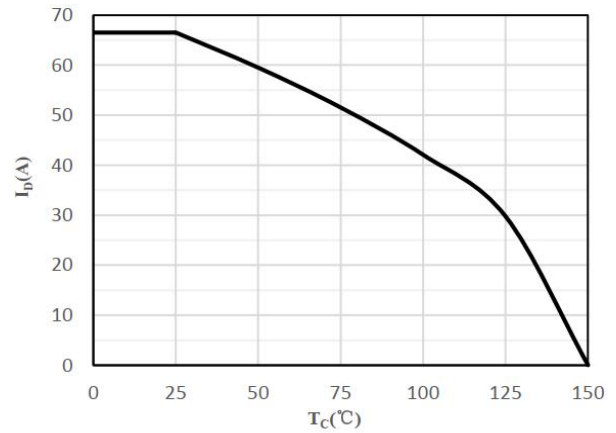
Notes:

- 1) The E<sub>AS</sub> data shows Max. rating. The test condition is V<sub>DD</sub> = 25V, 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 testing.

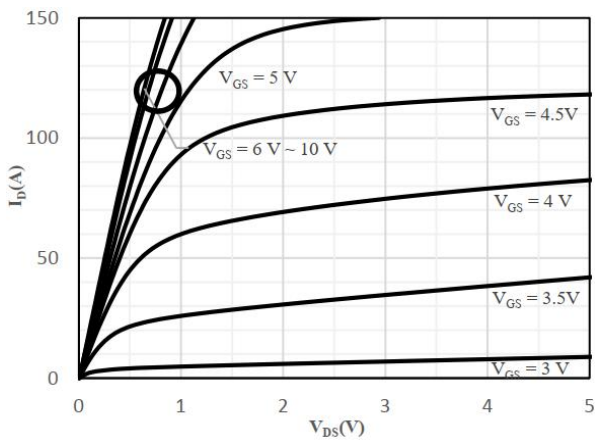
## Typical Characteristics



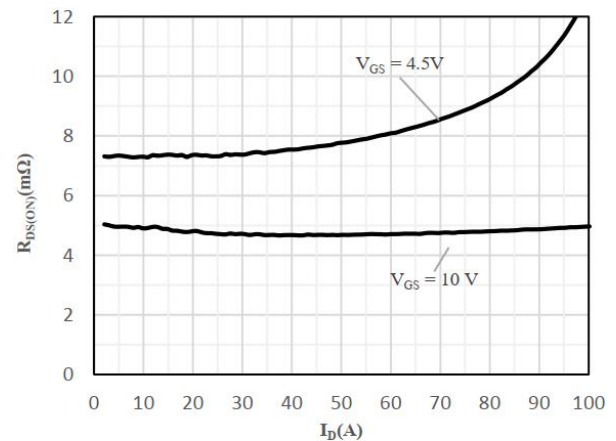
**Fig 1 Power Dissipation**



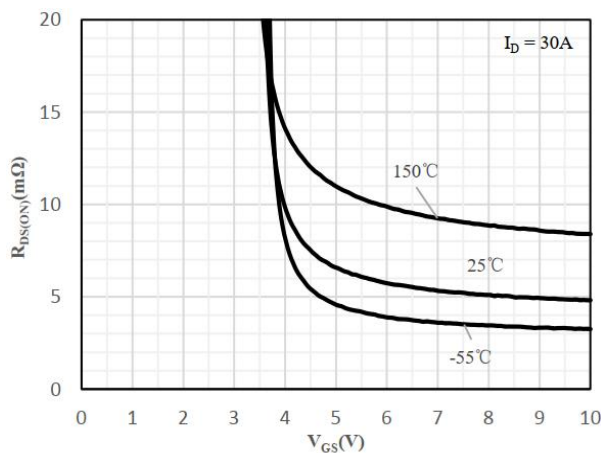
**Fig 2 Drain Current**



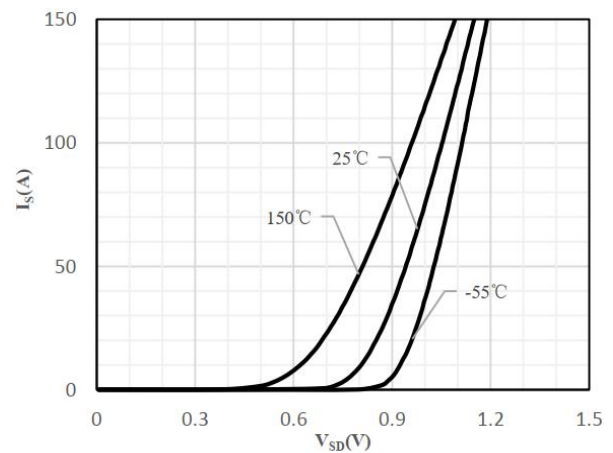
**Fig 3 Typical Output Characteristics**



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

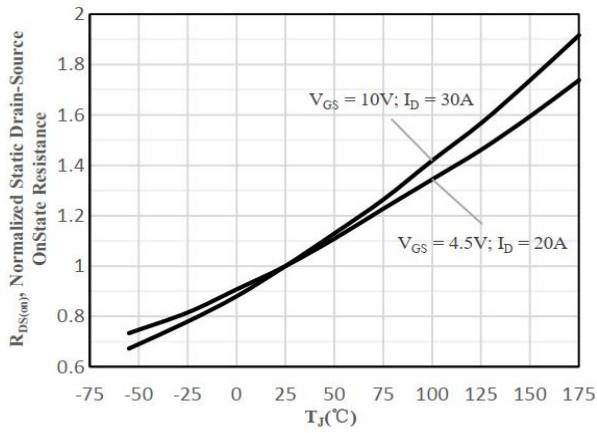


**Fig 5 On-Resistance vs. Gate-Source Voltage**

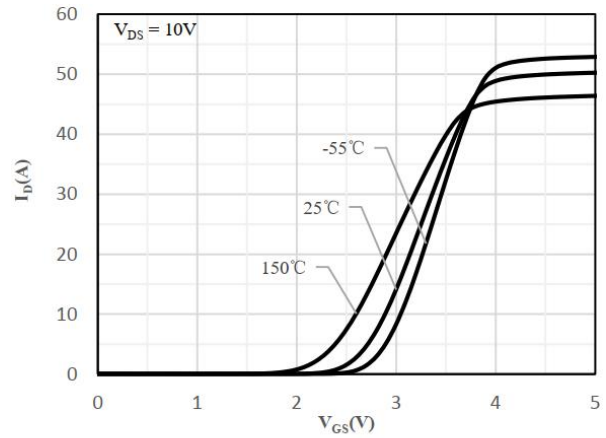


**Fig 6 Body-Diode Characteristics**

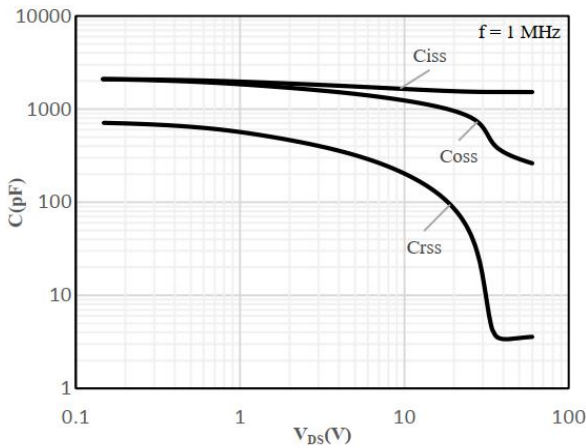
## Typical Characteristics



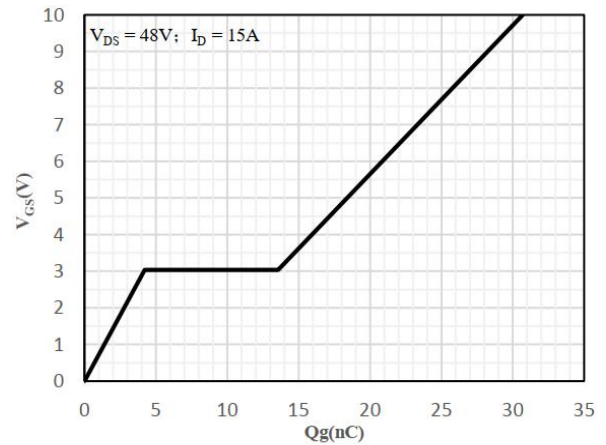
**Fig 7 Normalized On-Resistance vs. Junction Temperature**



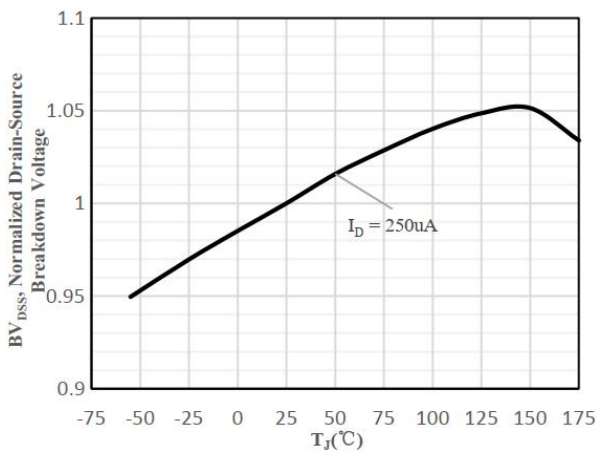
**Fig 8 Transfer Characteristics**



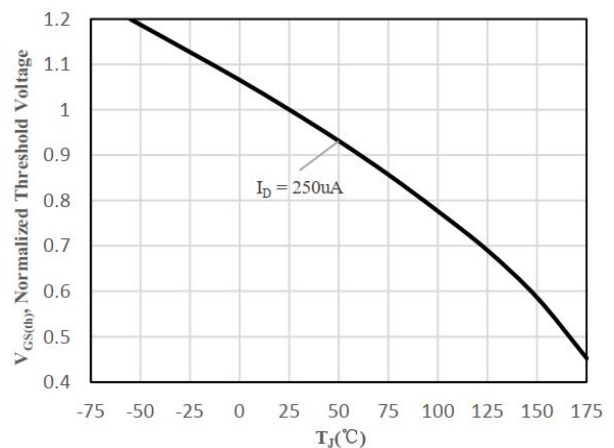
**Fig 9 Capacitance Characteristics**



**Fig 10 Gate-Charge Characteristics**

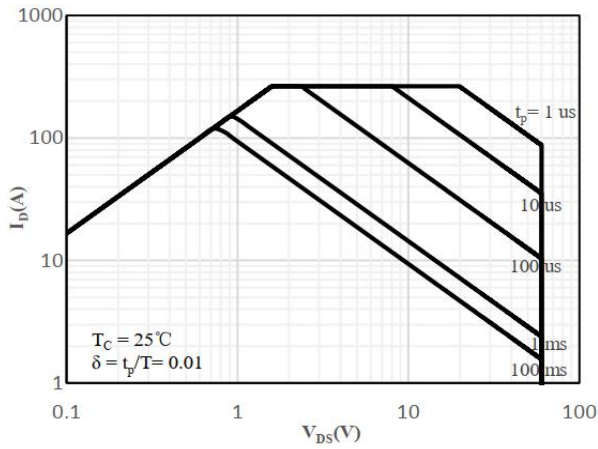


**Fig 11 Normalized Breakdown Voltage vs. Junction Temperature**

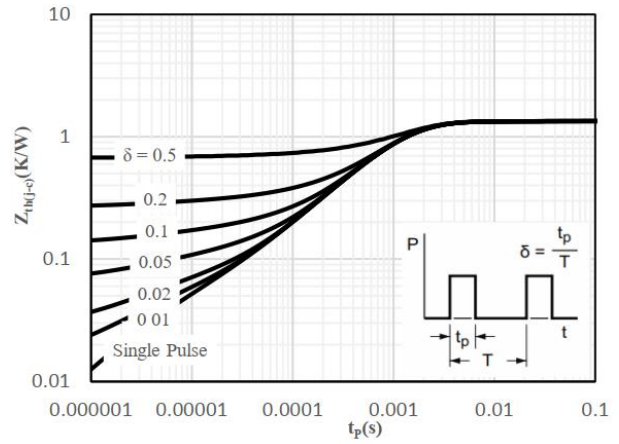


**Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature**

## Typical Characteristics

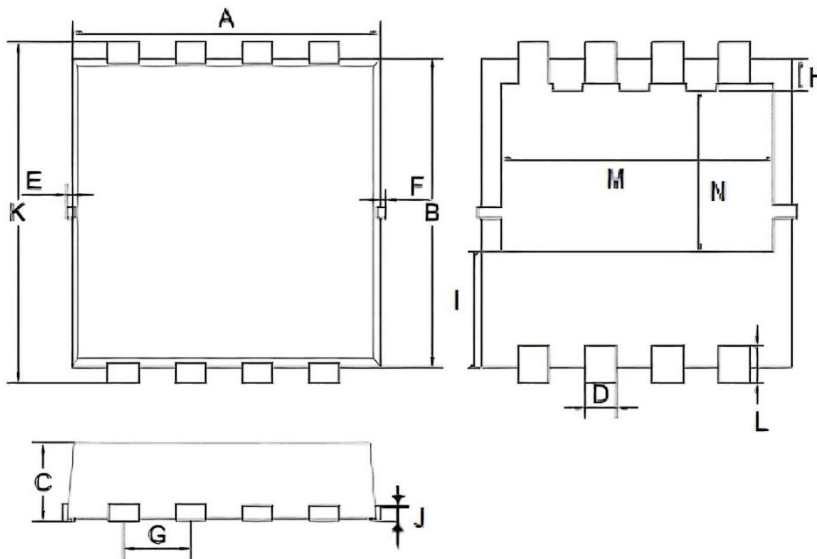


**Fig 13 Safe Operating Area**



**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