

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$	$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
30V	18mΩ@10V	28A	-30V	40mΩ@-10V	-20A
	30mΩ@4.5V			60mΩ@-4.5V	

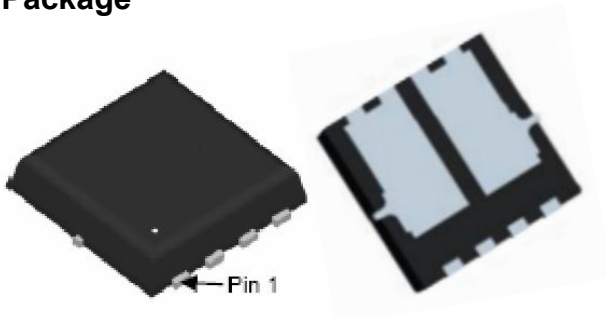
### Feature

- High density cell design for ultra low Rdson
- Trench Power LV MOSFET technology
- High Speed switching
- Suffix "-Q1" for AEC-Q101

### Application

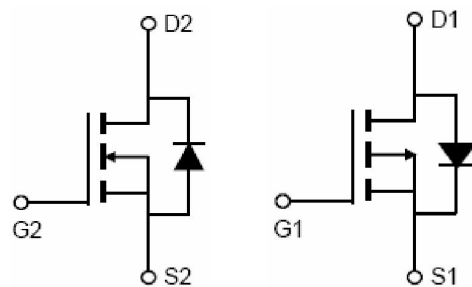
- Wireless charger
- Load switching
- Power management

### Package



DFN3.3X3.3-8L

### Circuit diagram



### Marking



### Absolute maximum ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	$V_{DS}$	30	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current ( $T_C=25^\circ\text{C}$ )	$I_D$	28	-20	A
Continuous Drain Current ( $T_C=100^\circ\text{C}$ )	$I_D (100^\circ\text{C})$	17.5	-12	A
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	60	-40	A
Avalanche energy <sup>2)</sup>	$E_{AS}$	16	16	mJ
Power Dissipation <sup>3)</sup> ( $T_C=25^\circ\text{C}$ )	$P_D$	27	27	W
Thermal Resistance from Junction to Case <sup>4)</sup>	$R_{\theta JC}$	4.5	4.5	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	-55 ~ +150	$^\circ\text{C}$

### N-CH Electrical characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	30			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$			1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.0	1.5	2.2	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 14A$		14	18	m $\Omega$
		$V_{GS} = 4.5V, I_D = 5A$		23	30	
<b>Dynamic characteristics<sup>5)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1\text{MHz}$		380		pF
Output Capacitance	$C_{oss}$			75		
Reverse Transfer Capacitance	$C_{rss}$			60		
Total Gate Charge	$Q_g$	$V_{DS} = 15V, V_{GS} = 10V, I_D = 10A$		12.5		nC
Gate-Source Charge	$Q_{gs}$			2.8		
Gate-Drain Charge	$Q_{gd}$			2.5		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15V, V_{GS} = 10V, I_D = 10A, R_{GEN} = 3\Omega$		5		nS
Turn-on rise time	$t_r$			31		
Turn-off delay time	$t_{d(off)}$			15		
Turn-off fall time	$t_f$			23		
<b>Source-Drain Diode characteristics</b>						
Diode Continuous Current	$I_S$				28	A
Diode Forward voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 14A$			1.2	V
Reverse Recovery Charge	$Q_{rr}$	$I_F = 10A, di/dt = 100A/\mu\text{s}$		1.7		nC
Reverse Recovery Time	$t_{rr}$				18	

### P-CH Electrical characteristics (T<sub>J</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	-30			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V			-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, 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	-1.0	-1.5	-2.4	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A		31	40	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5A		45	60	
<b>Dynamic characteristics<sup>5)</sup></b>						
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz		490		pF
Output Capacitance	C <sub>oSS</sub>			75		
Reverse Transfer Capacitance	C <sub>rSS</sub>			60		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A		9		nC
Gate-Source Charge	Q <sub>gs</sub>			2.5		
Gate-Drain Charge	Q <sub>gd</sub>			2.3		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A, R <sub>GEN</sub> = 2.5Ω		9		nS
Turn-on rise time	t <sub>r</sub>			3.5		
Turn-off delay time	t <sub>d(off)</sub>			30		
Turn-off fall time	t <sub>f</sub>			18		
<b>Source-Drain Diode characteristics</b>						
Diode Continuous Current	I <sub>S</sub>				-20	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = -10A			-1.2	V
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = -10A, di/dt = 100A/us		15		nC
Reverse Recovery Time	t <sub>rr</sub>				35	

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2) NMOS: T<sub>J</sub>=25°C, V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=8A. PMOS: T<sub>J</sub>=25°C, V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=-8A.
- 3) Pd is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of R<sub>JA</sub> is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in the still air environment with T<sub>A</sub> = 25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
- 5) Guaranteed by design, not subject to production.

### N- Channel Typical Characteristics

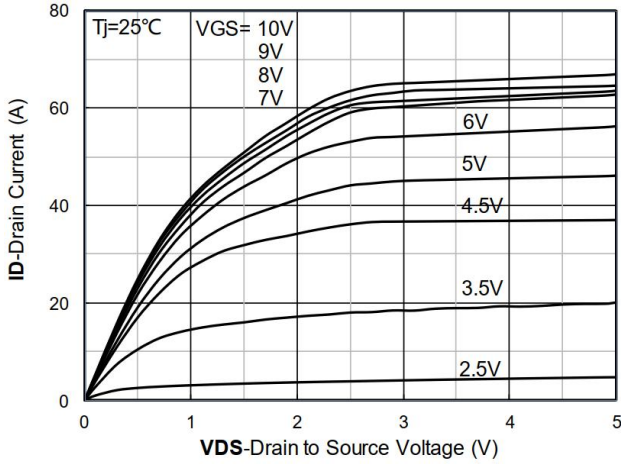


Figure 1. Output Characteristics

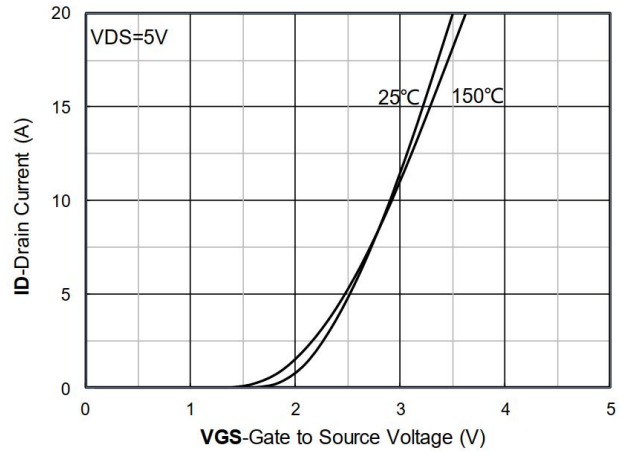


Figure 2. Transfer Characteristics

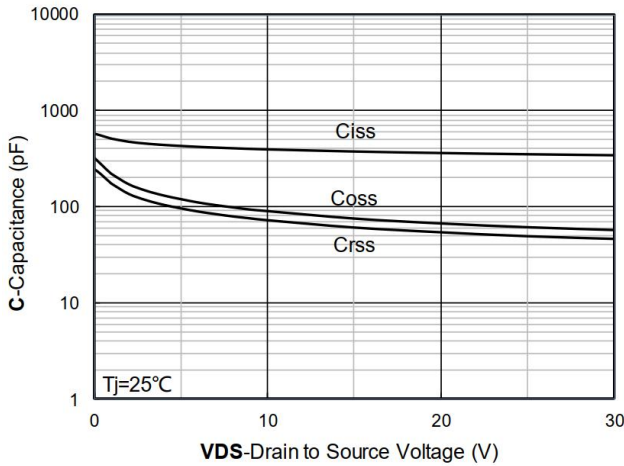


Figure 3. Capacitance Characteristics

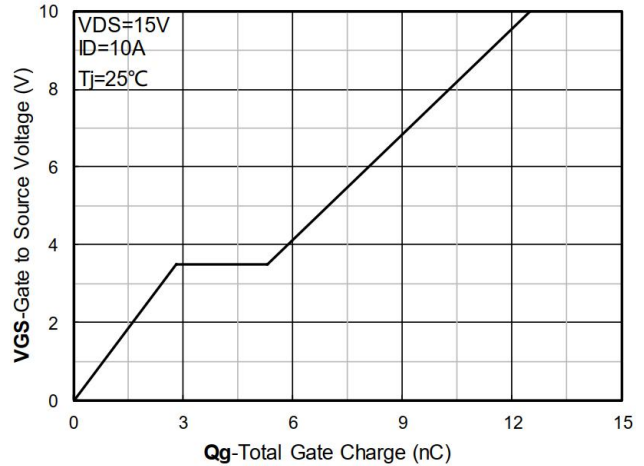


Figure 4. Gate Charge

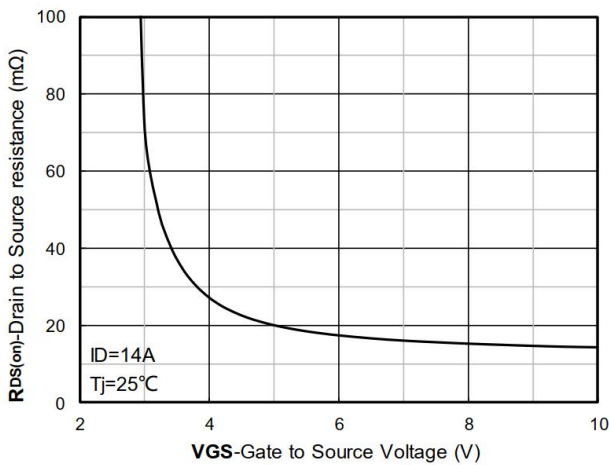


Figure 5. On-Resistance vs Gate to Source Voltage

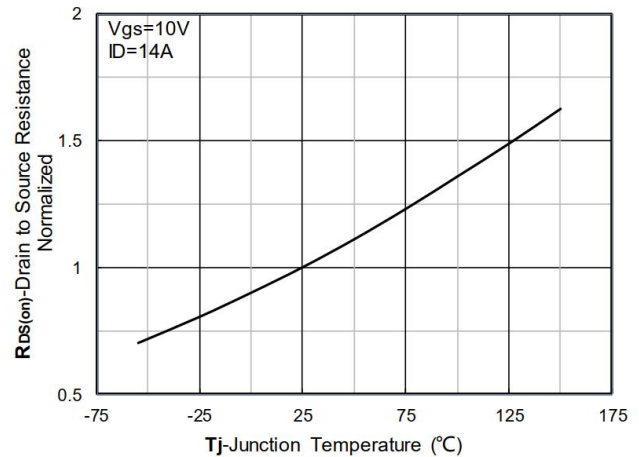


Figure 6. Normalized On- Resistance

### N- Channel Typical Characteristics

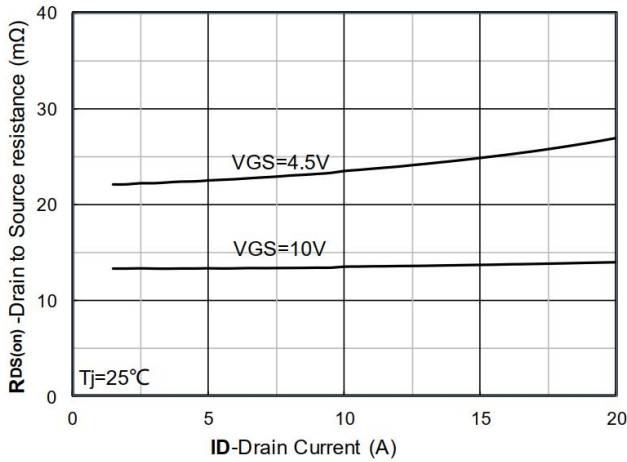


Figure 7. RDS(on) VS Drain Current

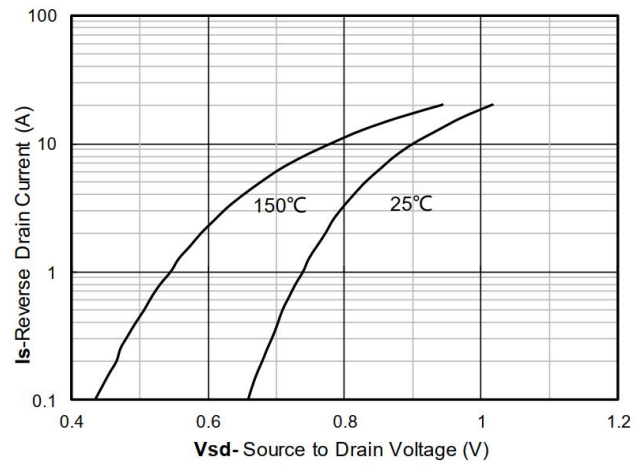


Figure 8. Forward characteristics of reverse diode

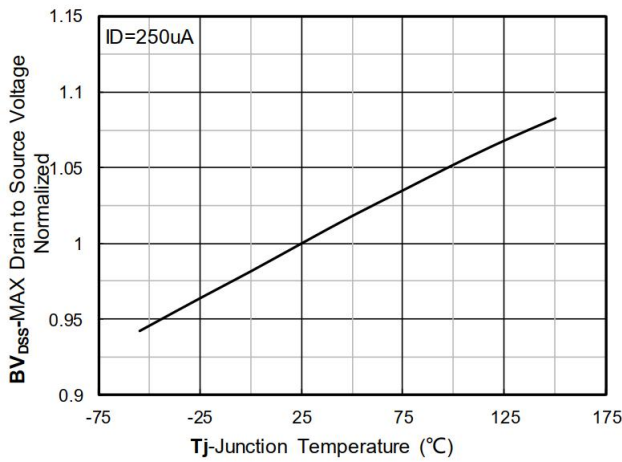


Figure 9. Normalized breakdown voltage

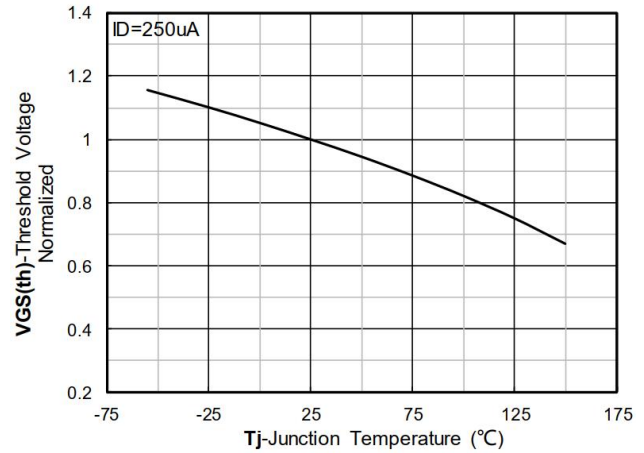


Figure 10. Normalized Threshold voltage

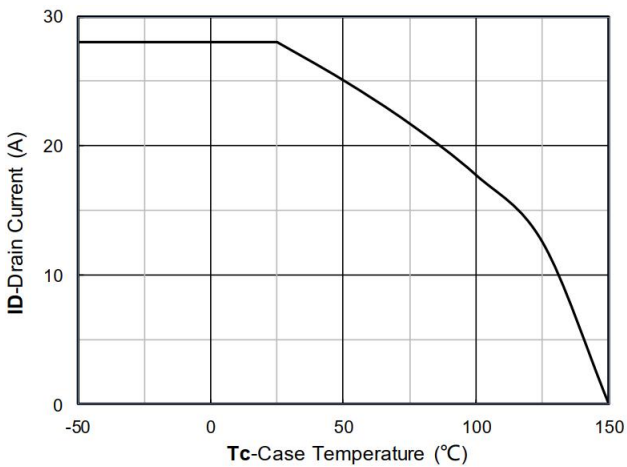


Figure 11. Current dissipation

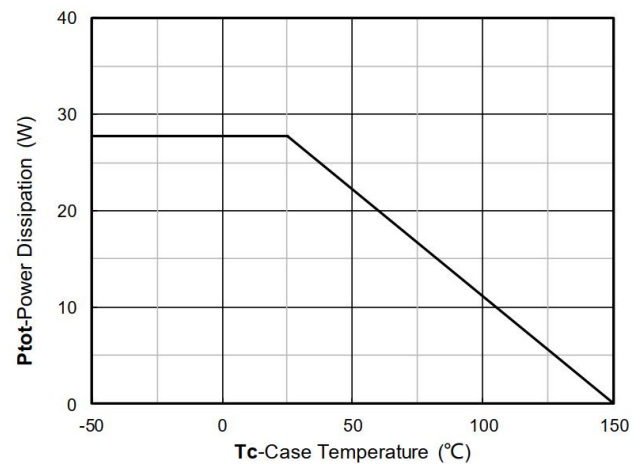


Figure 12. Power dissipation

### N- Channel Typical Characteristics

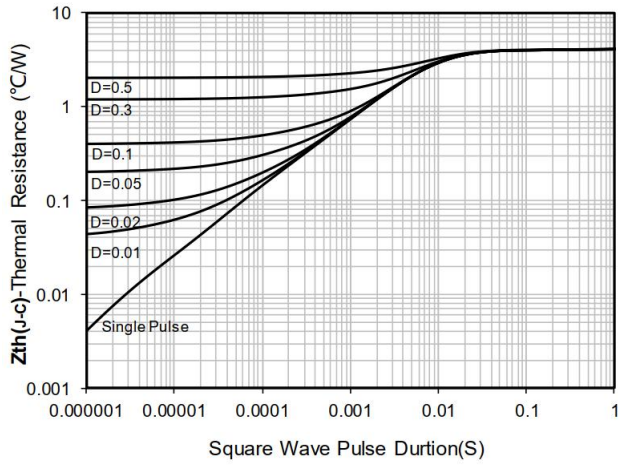


Figure 13. Maximum Transient Thermal Impedance

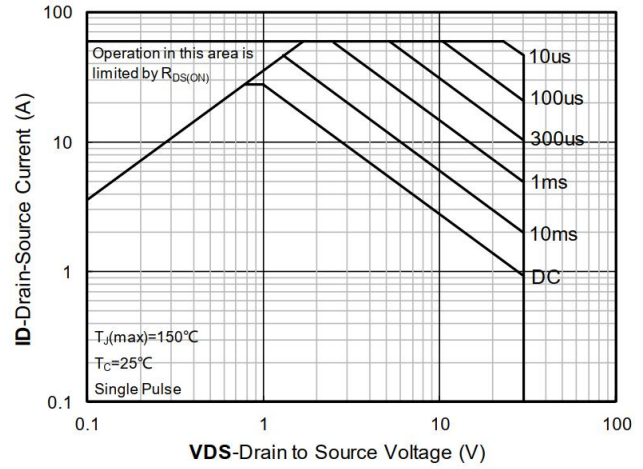


Figure 14. Safe Operation Area

### P- Channel Typical Characteristics

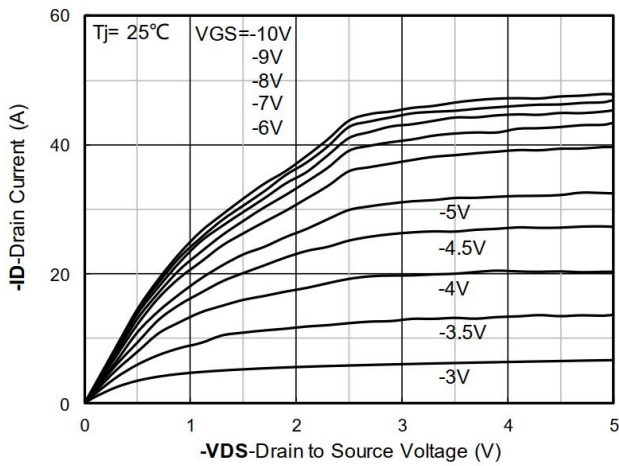


Figure 1. Output Characteristics

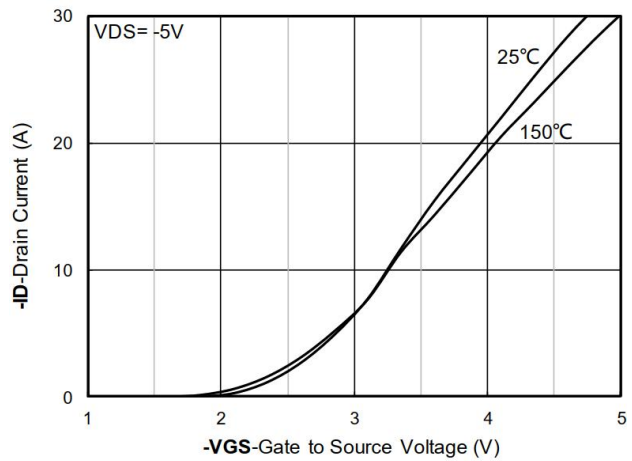


Figure 2. Transfer Characteristics

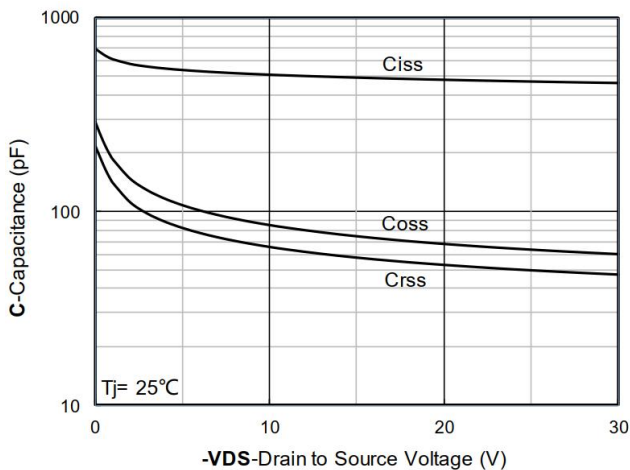


Figure 3. Capacitance Characteristics

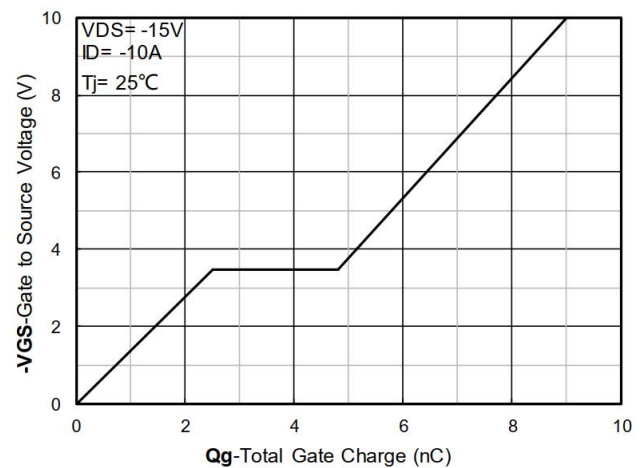


Figure 4. Gate Charge

### P- Channel Typical Characteristics

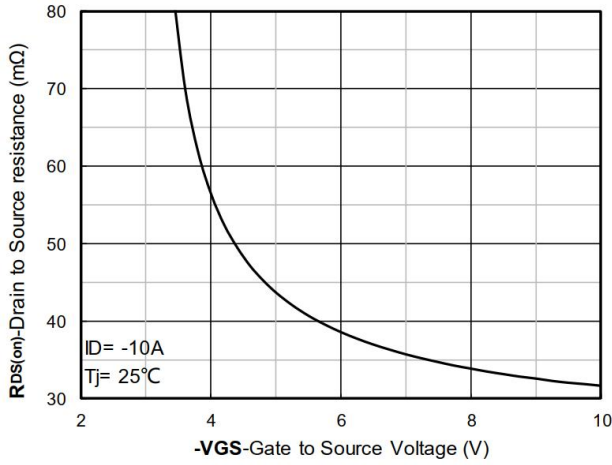


Figure 5. On-Resistance vs Gate to Source Voltage

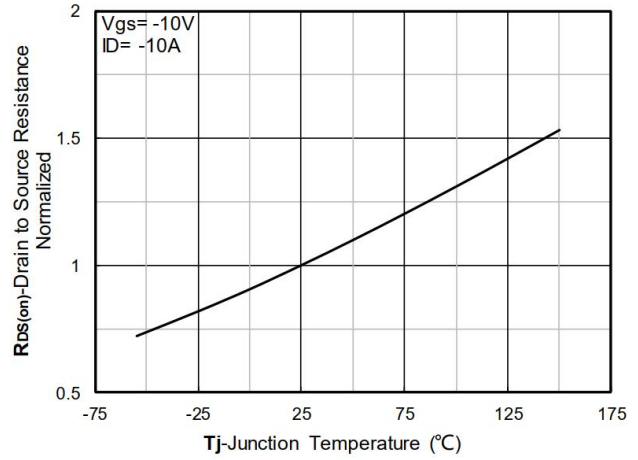


Figure 6. Normalized On-Resistance

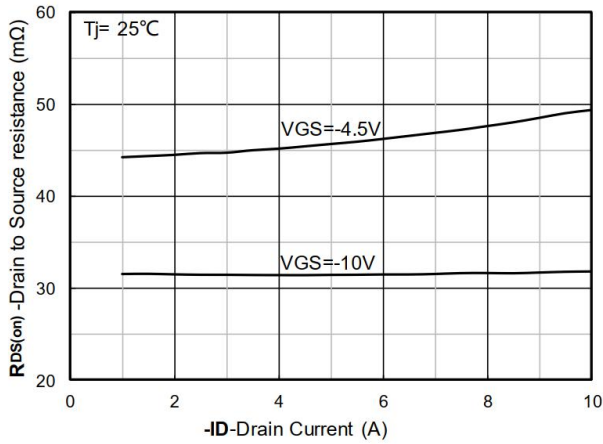


Figure 7. RDS(on) VS Drain Current

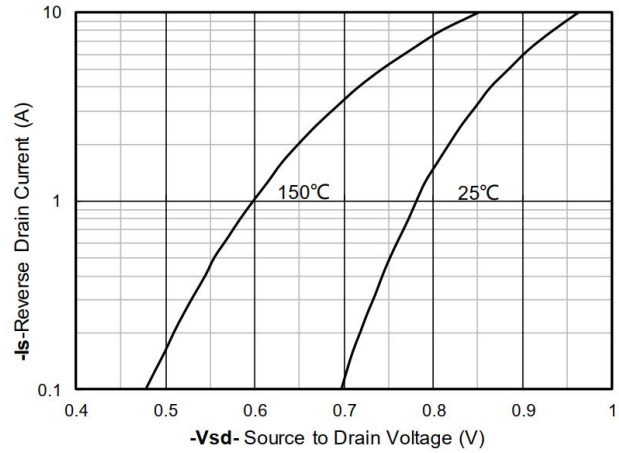


Figure 8. Forward characteristics of reverse diode

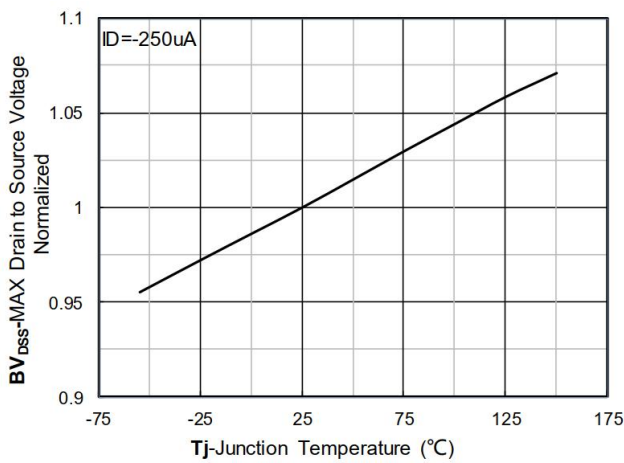


Figure 9. Normalized breakdown voltage

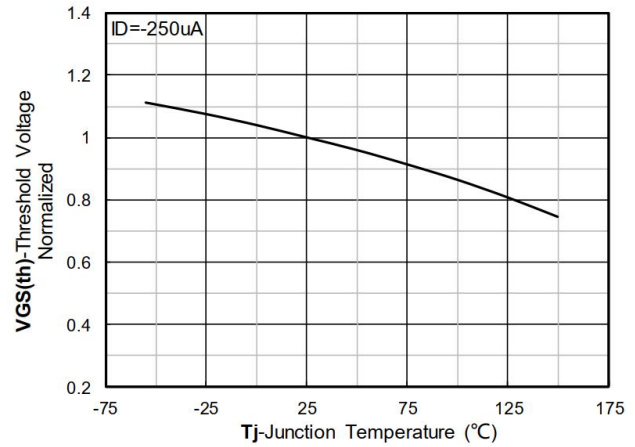


Figure 10. Normalized Threshold voltage

### P- Channel Typical Characteristics

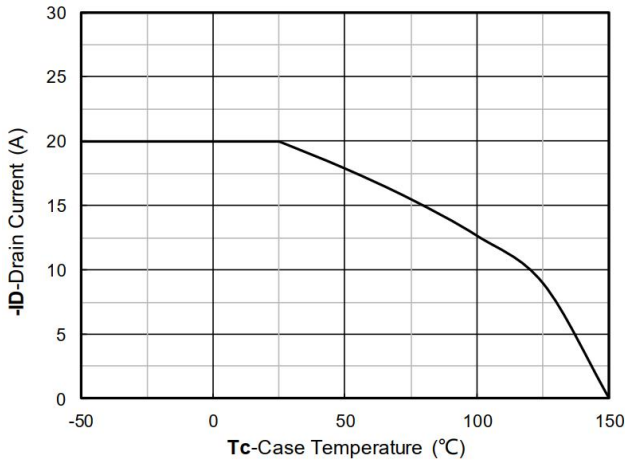


Figure 11. Current dissipation

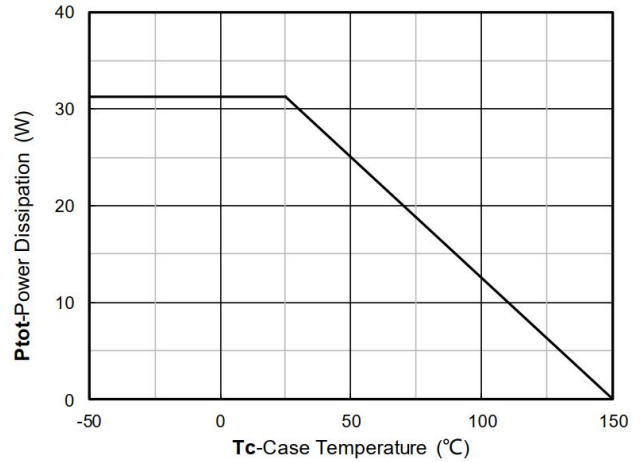


Figure 12. Power dissipation

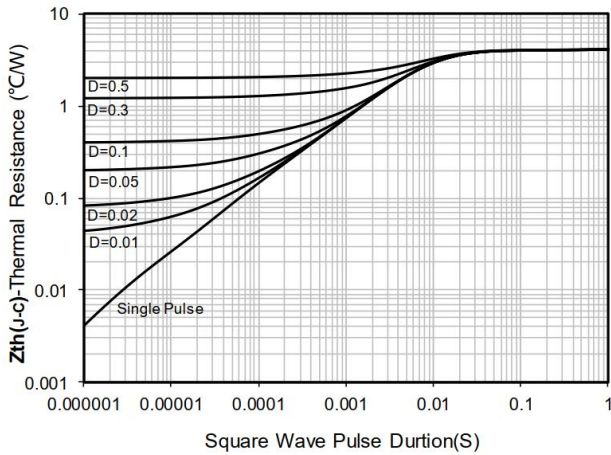


Figure 13. Maximum Transient Thermal Impedance

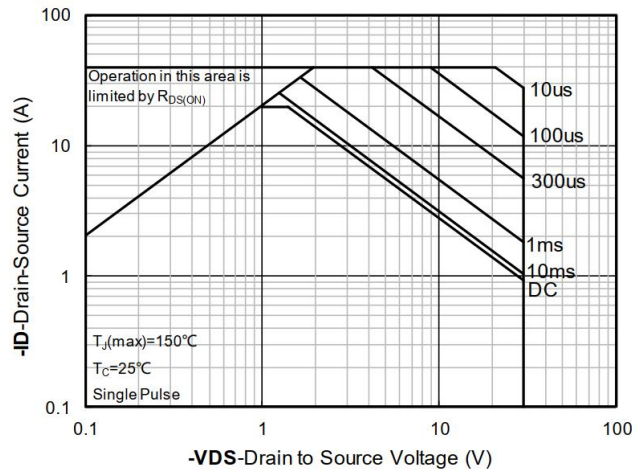
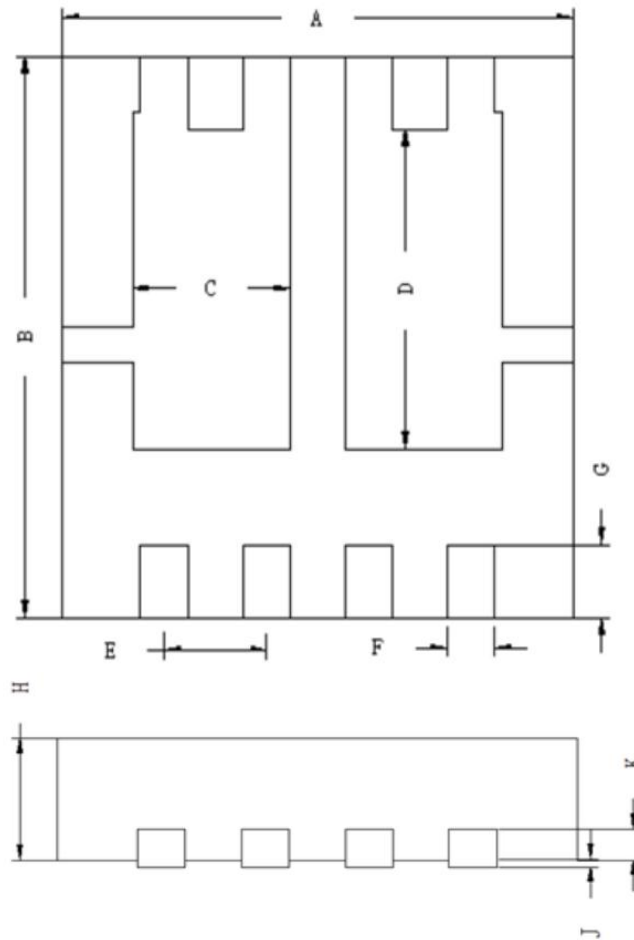


Figure 14. Safe Operation Area



### DFN3.3X3.3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.150	3.350	0.124	0.132
B	3.150	3.350	0.124	0.132
C	0.900	1.100	0.035	0.044
D	1.750	1.950	0.068	0.077
E	0.650 BSC		0.026 BSC	
F	0.200	0.400	0.007	0.016
G	0.325	0.525	0.012	0.021
H	0.700	0.900	0.027	0.036
J	0.100 Max		0.004 Max	
K	0.200 BSC		0.008 BSC	