

Dual N-channel Enhancement Mode Power MOSFET

Features

- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired
- 100% UIS TESTED!
- 100% ΔV_{ds} TESTED!

Product Summary

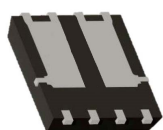
Parameters	Value	Unit
V_{DSS}	30	V
$V_{GS(th)_{Typ}}$	1.65	V
$I_D(@V_{GS}=10V)$	40	A
$R_{DS(ON)_{Typ}}(@V_{GS}=10V)$	7.6	m Ω

Applications

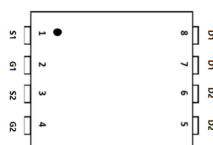
- Load Switch
- PWM Application
- Power Management

Top View

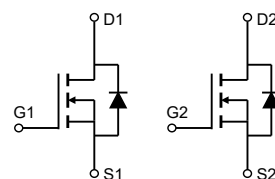
Bottom View



PDFN3x3-8L



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK30N40DQ	30N40D	DFN3x3	Reel	N/A	N/A	5000

MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	40	A
	$T_C = 100^{\circ}\text{C}$		25	
Pulsed Drain Current		I_{DM}	Refer to Fig.4	A
Single Pulsed Avalanche Energy		E_{AS}	43	mJ
Power Dissipation		P_D	21	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	58	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^{\circ}\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS

$T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	V _{(BR) DSS}	V _{GS} = 0V, I _D = 250μA	30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 30V, V _{GS} =0V			1.0	μA
Gate-body leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} =±20V			±100	nA
On characteristics						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0	1.65	2.5	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		7.6	10	mΩ
		V _{GS} =4.5V, I _D =15A		11.5	17	mΩ
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =15V,V _{GS} =0V f =1MHz		1232		pF
Output capacitance	C _{oss}			157		
Reverse transfer capacitance	C _{rss}			127		
Switching characteristics						
Total gate charge	Q _g	V _{GS} =0 to 10V V _{DS} =15V, I _D =20A		25		nC
Gate-source charge	Q _{gs}			4		
Gate-drain charge	Q _{gd}			5		
Turn-on delay time	t _{d(on)}	V _{DD} =15V,I _D =20A V _{GS} =10V,R _{GEN} =3Ω		6		ns
Turn-on rise time	t _r			11		
Turn-off delay time	t _{d(off)}			26		
Turn-off fall time	t _f			7		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Continuous drain-source diode forward current	I _S				40	A
Pulsed Source Current	I _{SM}				162	A
Reverse recovery time	t _{rr}	di/dt = 100A/μs, I _F = 20A		9		ns
Reverse recovery charge	Q _{rr}			2.3		nC

Notes:

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
- 2.EAS condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 15V$, $V_{GS} = 10V$, $R_G = 25\Omega$, $L = 0.5mH$, $I_{AS} = 13.3A$, $V_{DD} = 0V$ during time in avalanche.
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB.
- 4.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

Typical Characteristics

Figure 1: Power De-rating

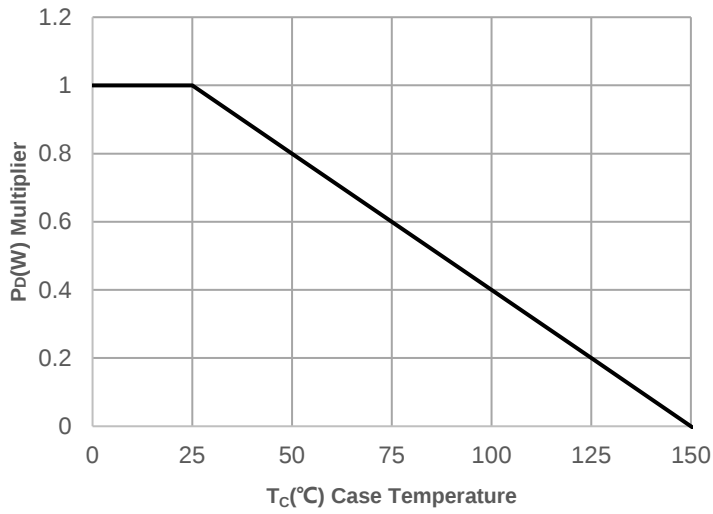


Figure 2: Current De-rating

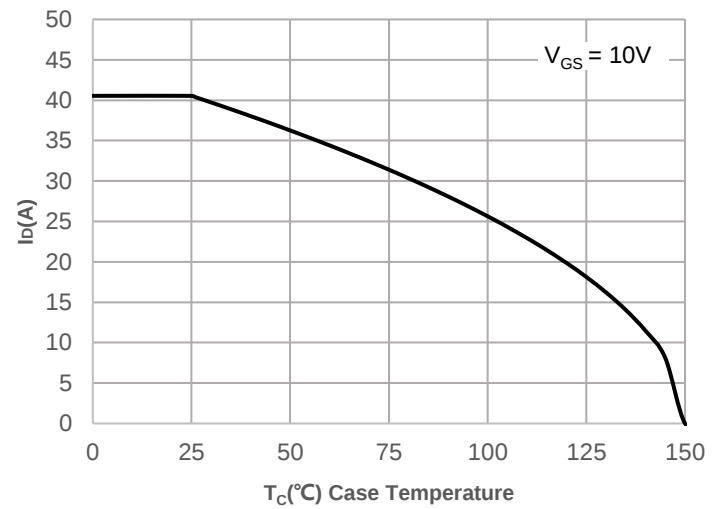


Figure 3: Normalized Maximum Transient Thermal Impedance

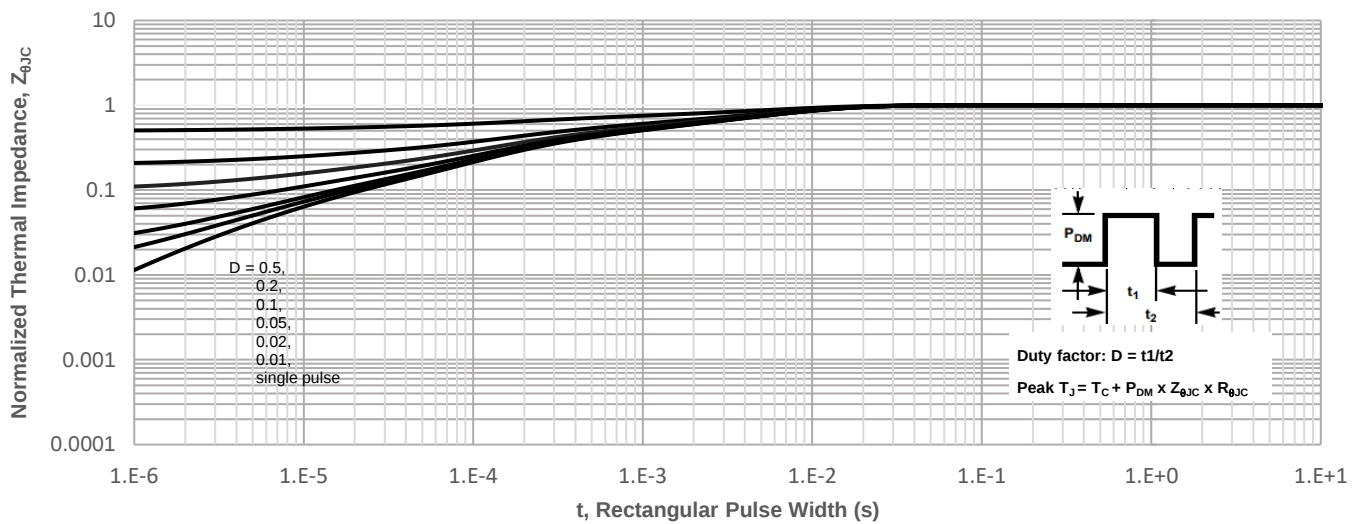
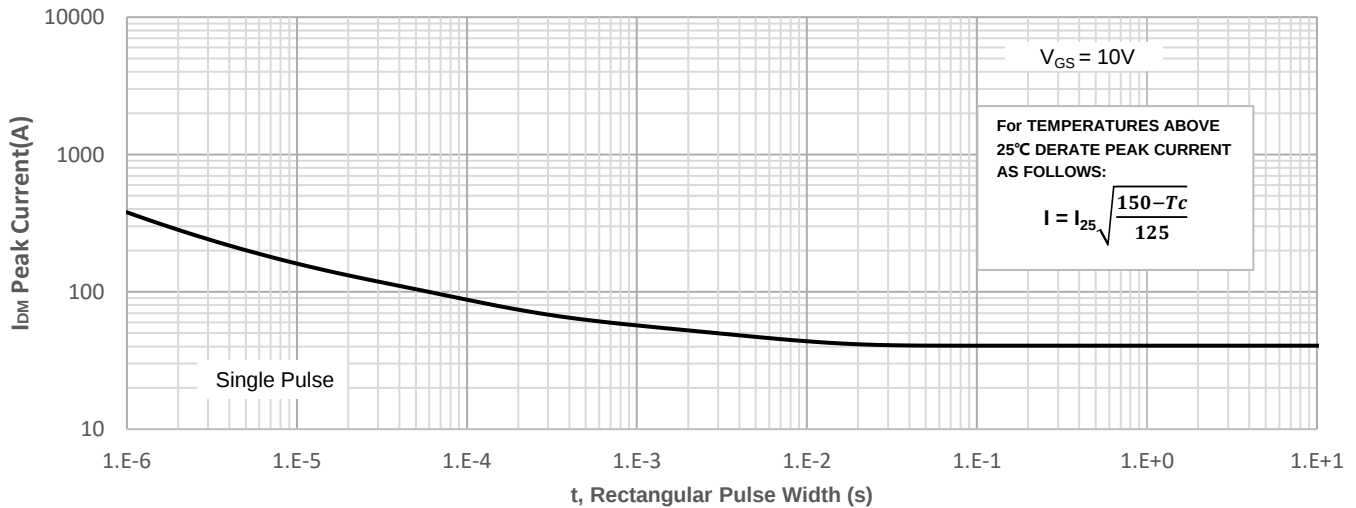


Figure 4: Peak Current Capacity



Typical Characteristics

Figure 5: Output Characteristics

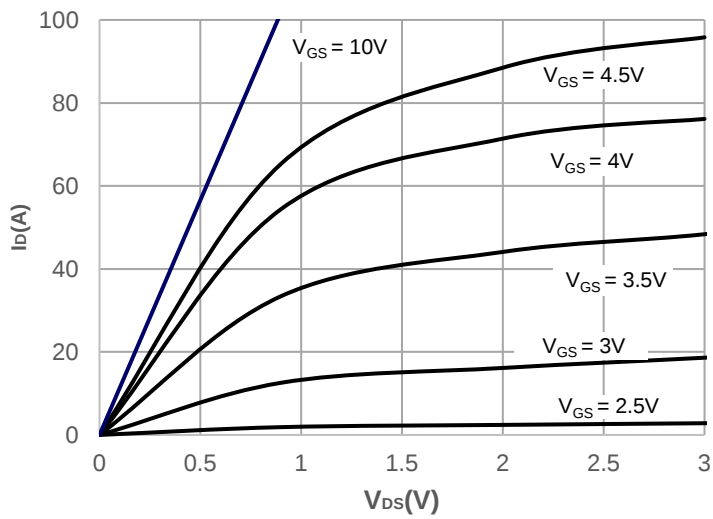


Figure 6: Typical Transfer Characteristics

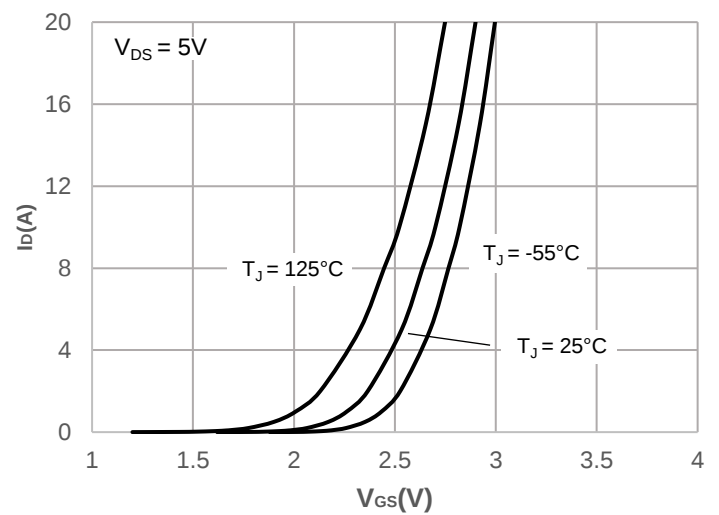


Figure 7: On-resistance vs. Drain Current

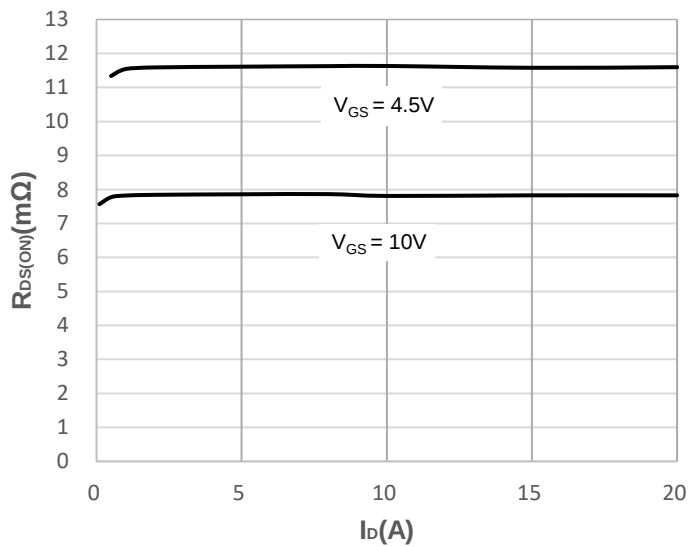


Figure 8: Body Diode Characteristics

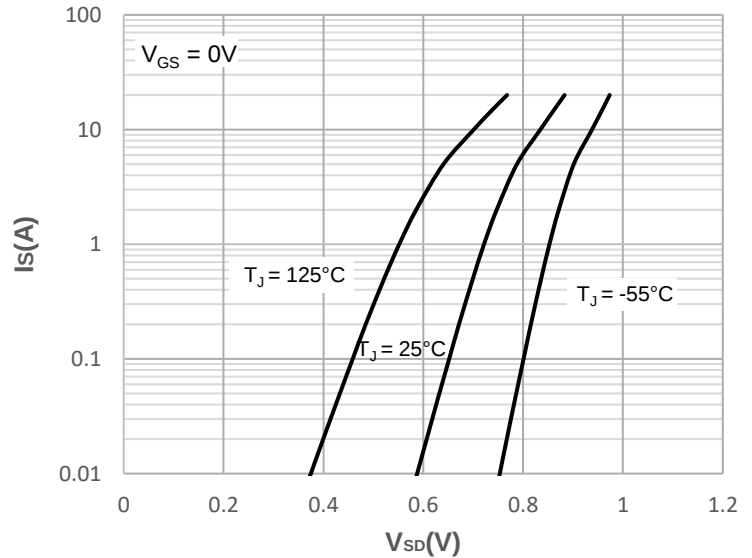


Figure 9: Gate Charge Characteristics

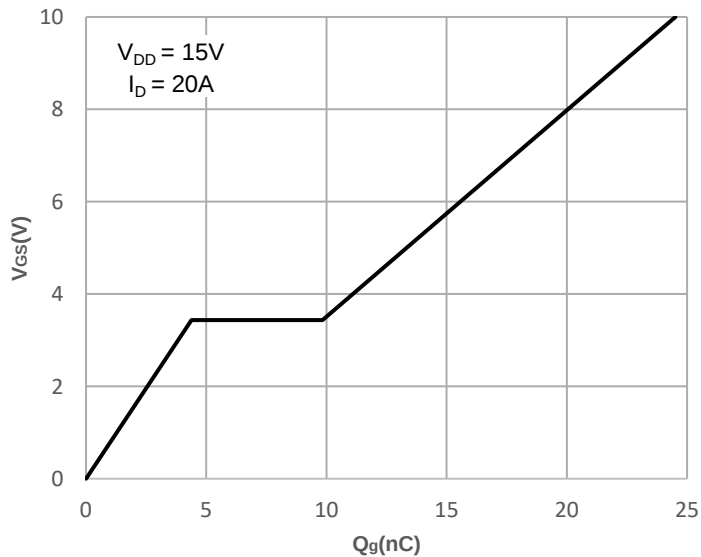
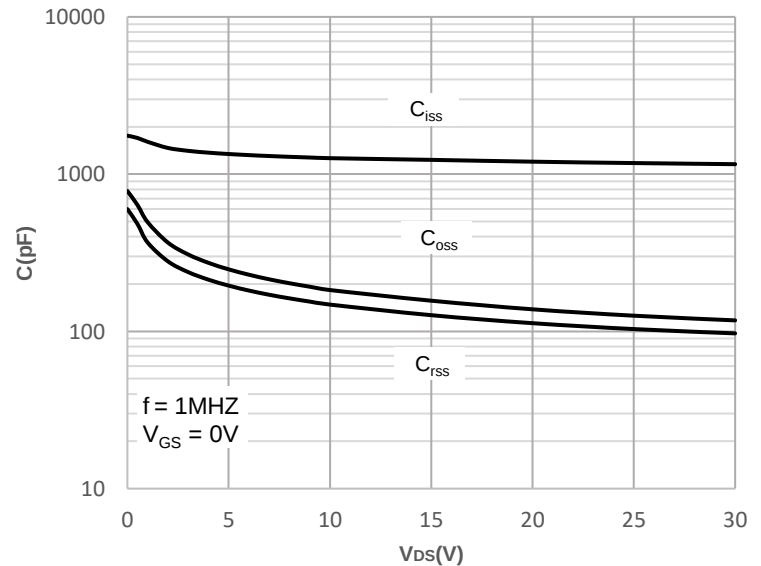


Figure 10: Capacitance Characteristics



Typical Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

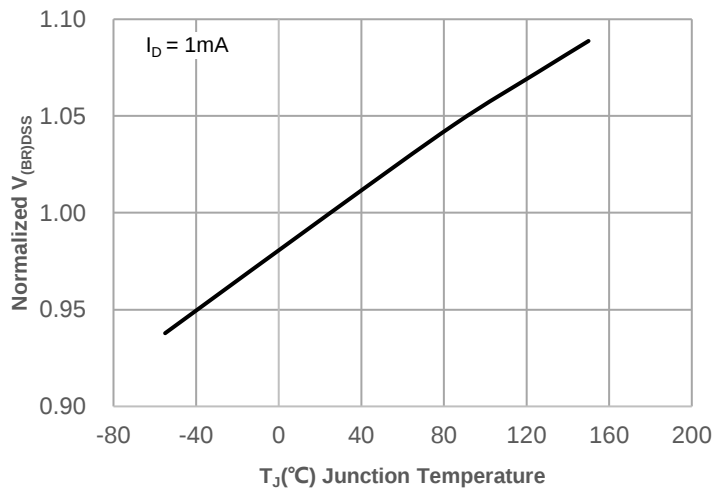


Figure 12: Normalized on Resistance vs. Junction Temperature

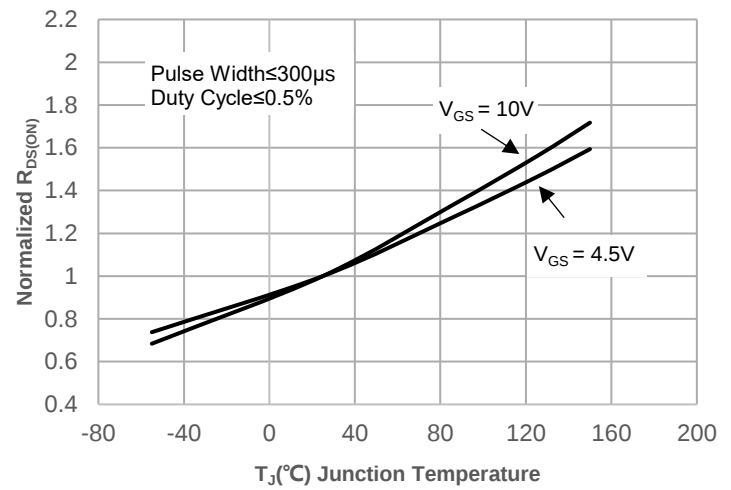


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

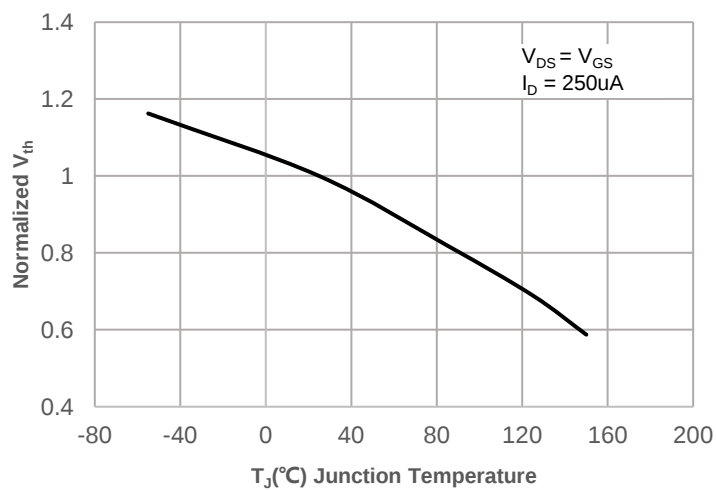


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

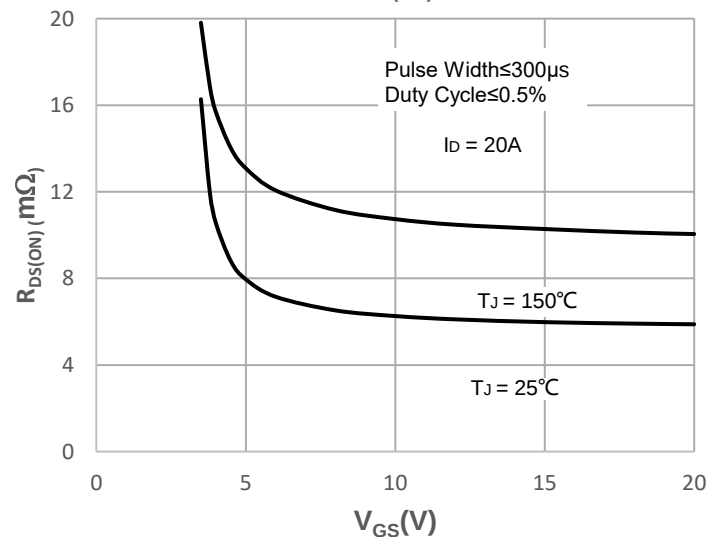
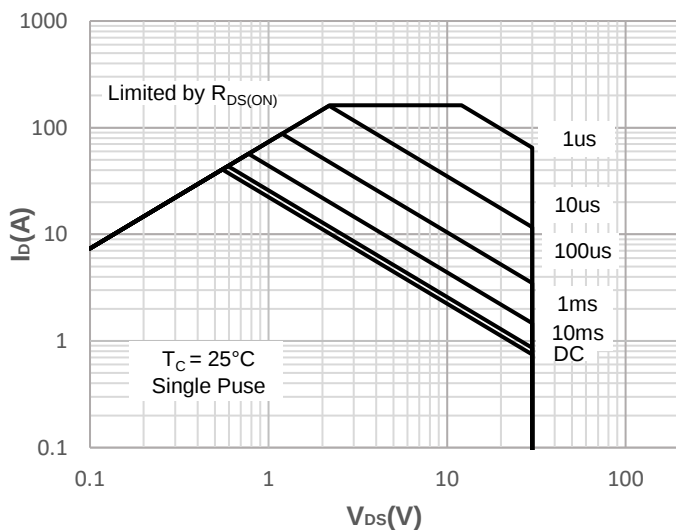
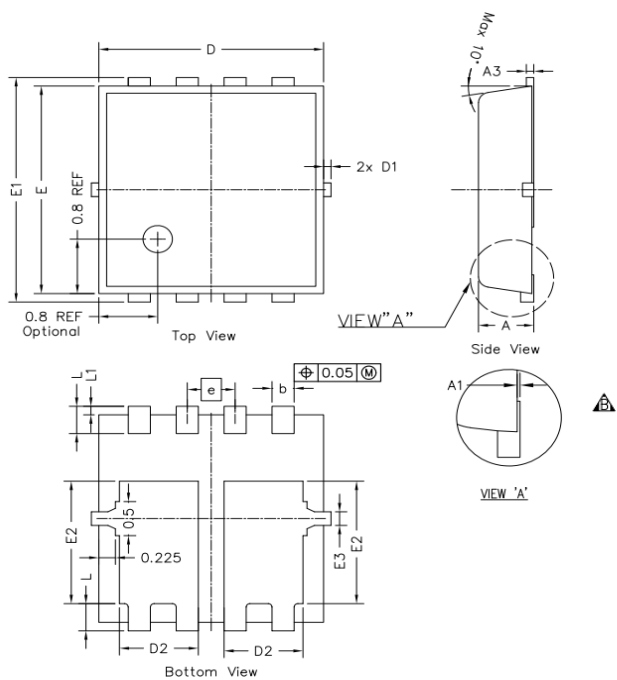


Figure 15: Maximum Safe Operating Area



Package Mechanical Data(PDFN3x3-8L)



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1	---	---	0.050	----	----	0.002
A3	0.144	0.152	0.202	0.006	0.006	0.008
b	0.250	0.300	0.350	0.010	0.012	0.014
e	0.65 BSC			0.026 BSC		
D	2.950	3.050	3.150	0.116	0.120	0.124
E	2.950	3.050	3.150	0.116	0.120	0.124
D1	---	---	0.125	----	----	0.005
E1	3.200	3.300	3.400	0.126	0.130	0.134
D2	0.970	1.070	1.170	0.038	0.042	0.046
E2	1.700	1.800	1.900	0.067	0.071	0.075
E3	0.150	0.200	0.250	0.006	0.008	0.010
L	0.300	0.400	0.500	0.012	0.016	0.020
L1	0.075	0.125	0.175	0.003	0.005	0.007