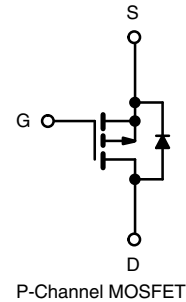
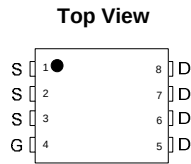
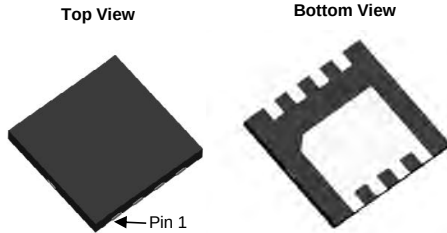


NCE30P20Q-VB Datasheet

P-Channel 30-V (D-S) MOSFET

V _{DS}		-30	V
R _{DS(on)} , typ	V _{GS} =10V	9	mΩ
R _{DS(on)} , typ	V _{GS} =4.5V	17	mΩ
I _D		-30	A

DFN 3x3 EP

**FEATURES**

- Trench power MOSFET
- 100 % R_g and UIS tested

APPLICATIONS

- Notebook battery charging
- Notebook adapter switch



RoHS
COMPLIANT
HALOGEN
FREE

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V _{DS}	-30	V
Gate-Source Voltage		V _{GS}	± 25	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	-30 ^d	A
	T _C = 70 °C		-25 ^d	
	T _A = 25 °C		-13.9 ^{a, b}	
	T _A = 70 °C		-11.1 ^{a, b}	
Pulsed Drain Current		I _{DM}	-120	
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	-35 ^d	
	T _A = 25 °C		-3 ^{a, b}	
Avalanche Current		I _{AS}	-29	mJ
Single-Pulse Avalanche Energy		E _{AS}	42	
Maximum Power Dissipation	T _C = 25 °C	P _D	52	W
	T _C = 70 °C		33	
	T _A = 25 °C		3.7 ^{a, b}	
	T _A = 70 °C		2.4 ^{a, b}	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +150	°C
Soldering Recommendations (Peak Temperature) ^{e, f}			260	

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum Junction-to-Ambient ^{a, c}	t ≤ 10 s	R _{thJA}	26	33	°C/W
Maximum Junction-to-Case	Steady State	R _{thJC}	1.9	2.4	

Notes

- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 81 °C/W.
- Package limited.
- The DFN 3 x 3 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- Based on T_C = 25 °C.

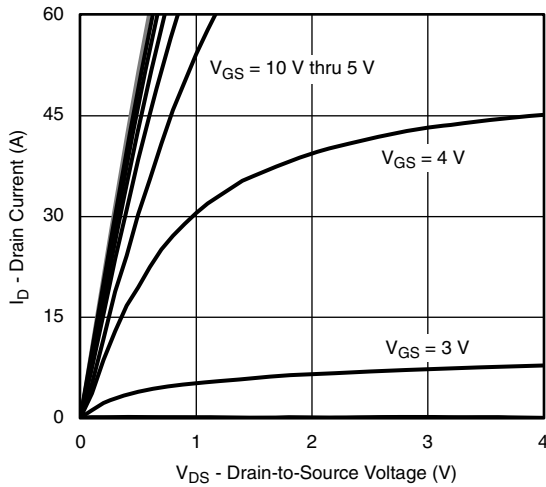
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = -250 μA	-30	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = -250 μA	-	-25	-	mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J		-	4.7	-	
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-1.2	-	-2.5	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 25 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V	-	-	-1	μA
		V _{DS} = -30 V, V _{GS} = 0 V, T _J = 55 °C	-	-	-5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ -10 V, V _{GS} = -10 V	-30	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = -10 V, I _D = -13.9 A	-	9	-	mΩ
		V _{GS} = -4.5 V, I _D = -10.3 A	-	17	-	
Forward Transconductance ^a	g _{fs}	V _{DS} = -15 V, I _D = -13.9 A	-	35	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = -15 V, V _{GS} = 0 V, f = 1 MHz	-	1800	-	pF
Output Capacitance	C _{oss}		-	370	-	
Reverse Transfer Capacitance	C _{rss}		-	312	-	
Total Gate Charge	Q _g	V _{DS} = -15 V, V _{GS} = -10 V, I _D = -13.9 A	-	-	15	nC
		V _{DS} = -15 V, V _{GS} = -4.5 V, I _D = -13.9 A	-	-	13	
Q _{gs}	-		-	6		
Q _{gd}	-		-	11		
Gate Resistance	R _g	f = 1 MHz	0.4	2	4	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = -15 V, R _L = 1.35 Ω I _D ≅ -11.1 A, V _{GEN} = -10 V, R _g = 1 Ω	-	11	22	ns
Rise Time	t _r		-	9	18	
Turn-Off DelayTime	t _{d(off)}		-	32	50	
Fall Time	t _f		-	9	18	
Turn-On Delay Time	t _{d(on)}	V _{DD} = -15 V, R _L = 1.35 Ω I _D ≅ -11.1 A, V _{GEN} = -4.5 V, R _g = 1 Ω	-	40	60	
Rise Time	t _r		-	43	65	
Turn-Off DelayTime	t _{d(off)}		-	30	45	
Fall Time	t _f		-	11	22	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	-	-	-35	A
Pulse Diode Forward Current	I _{SM}		-	-	-60	
Body Diode Voltage	V _{SD}	I _S = -11.1 A, V _{GS} = 0 V	-	-0.8	-1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = -11.1 A, dI/dt = 100 A/μs, T _J = 25 °C	-	33	50	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	30	45	nC
Reverse Recovery Fall Time	t _a		-	18	-	ns
Reverse Recovery Rise Time	t _b		-	16	-	

Notes

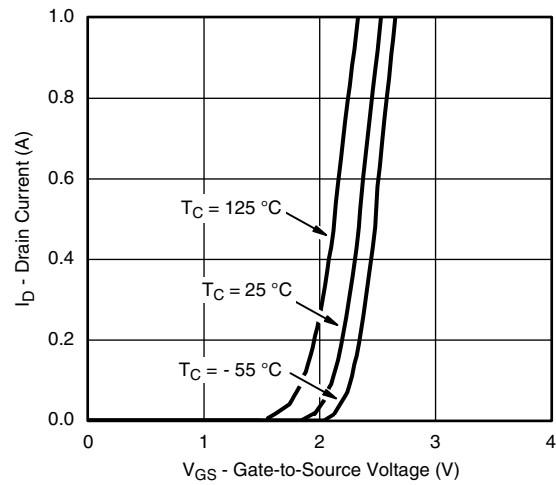
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

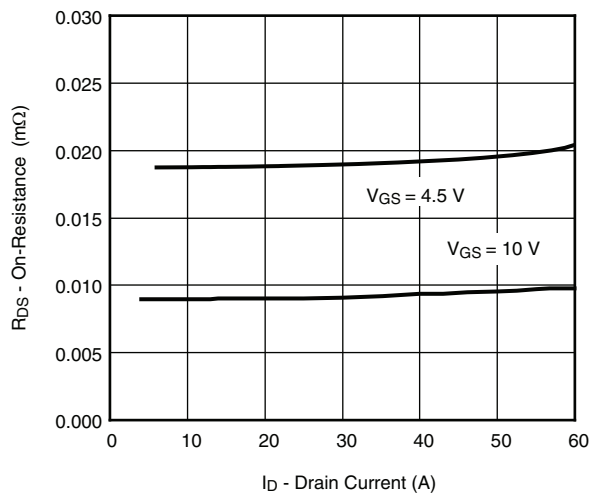
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



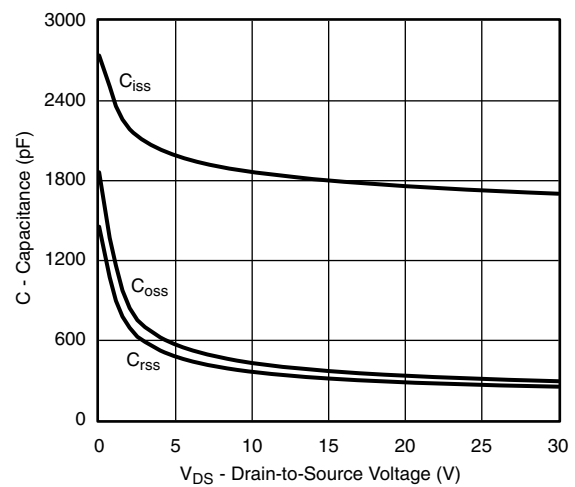
Output Characteristics



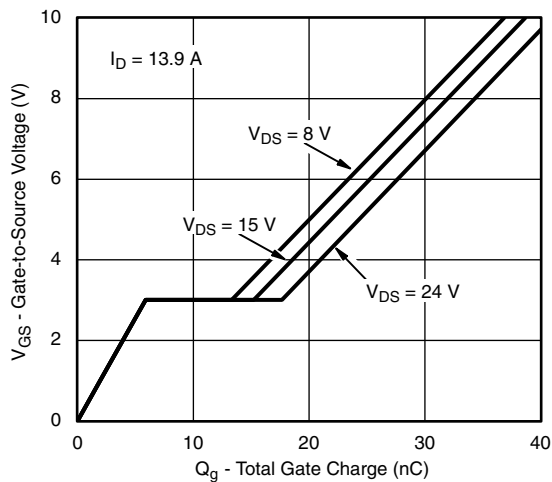
Transfer Characteristics



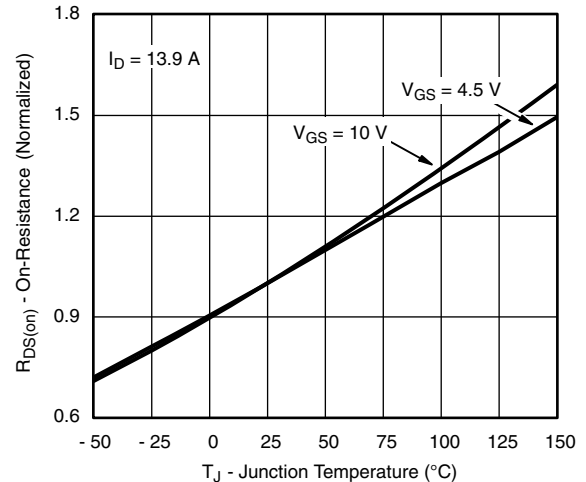
On-Resistance vs. Drain Current



Capacitance

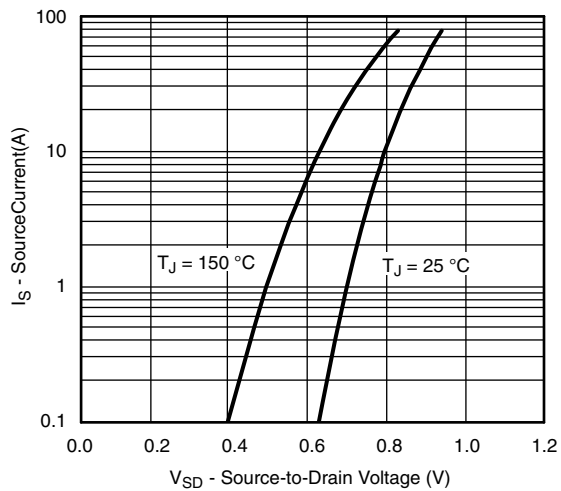


Gate Charge

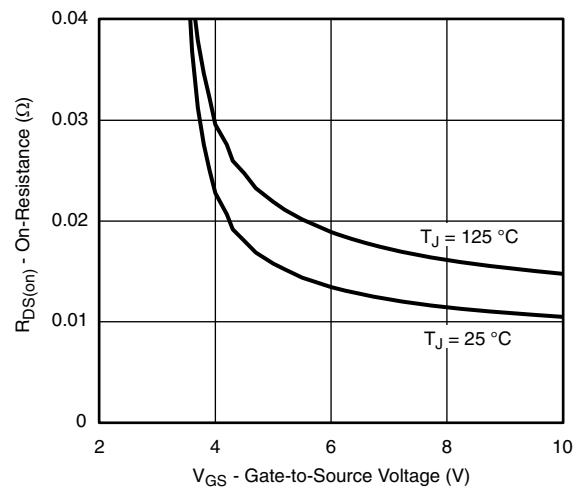


On-Resistance vs. Junction Temperature

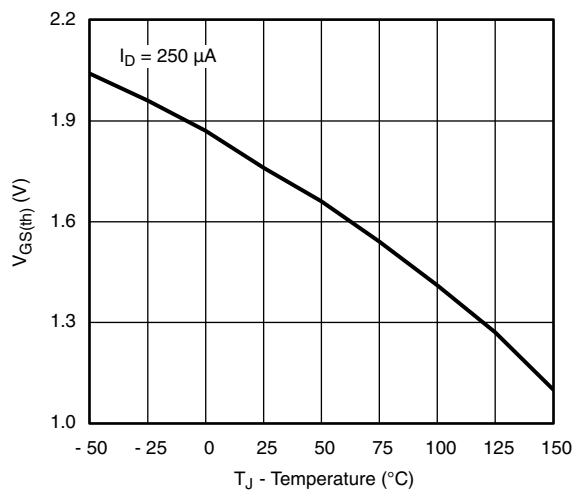
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



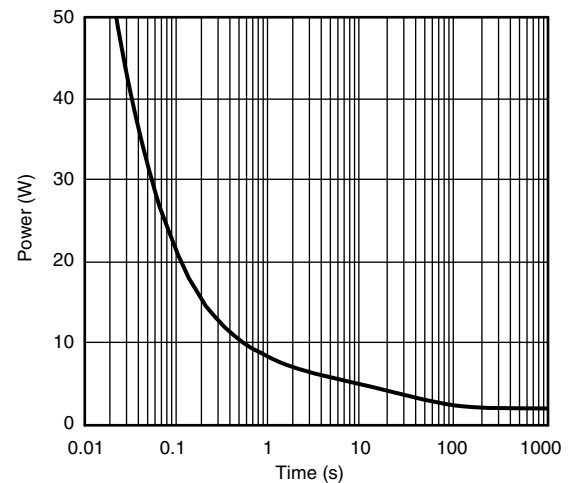
Source-Drain Diode Forward Voltage



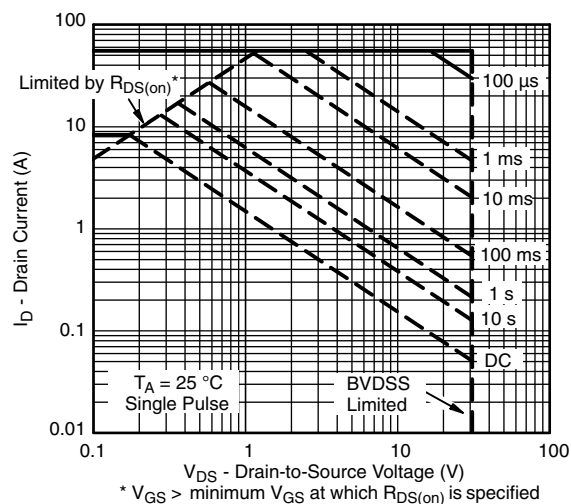
On-Resistance vs. Gate-to-Source Voltage



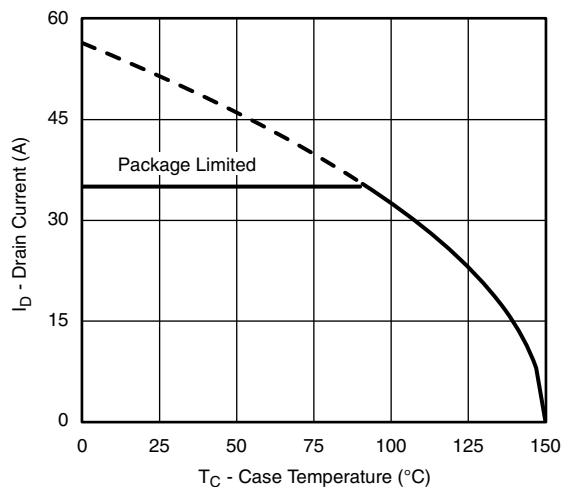
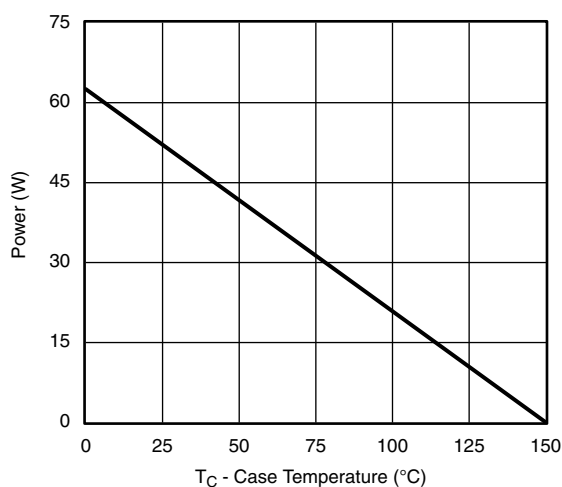
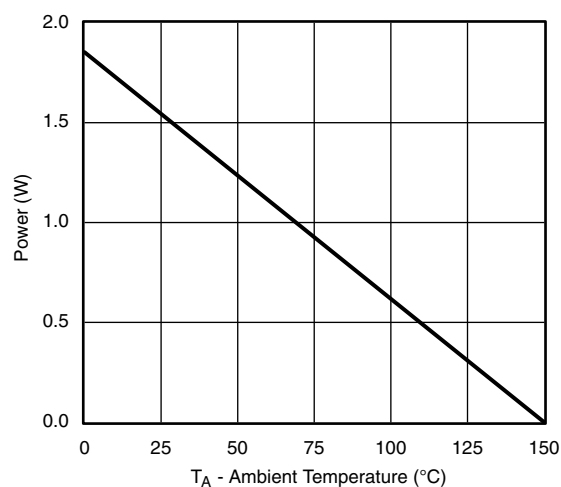
Threshold Voltage



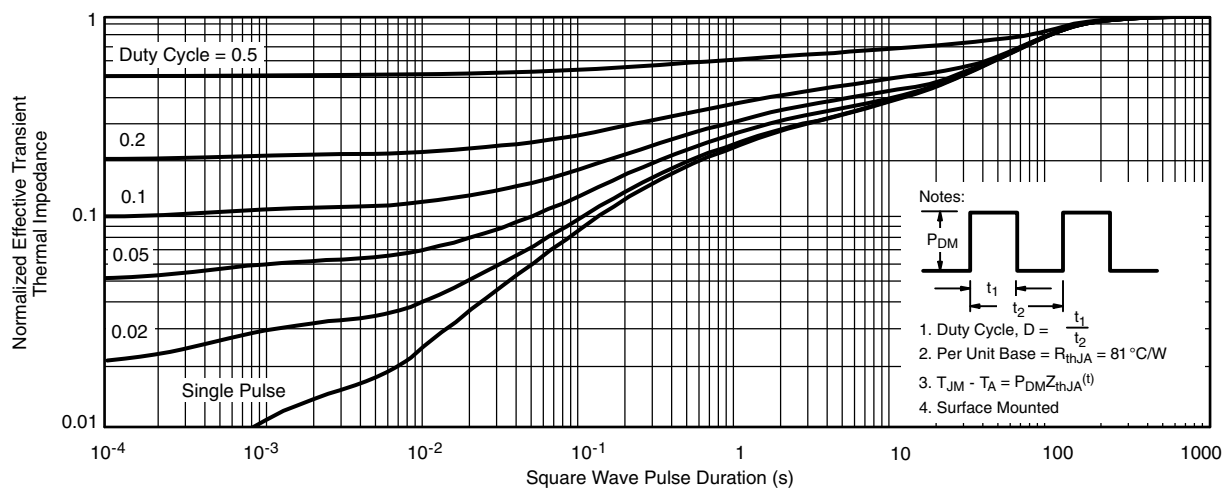
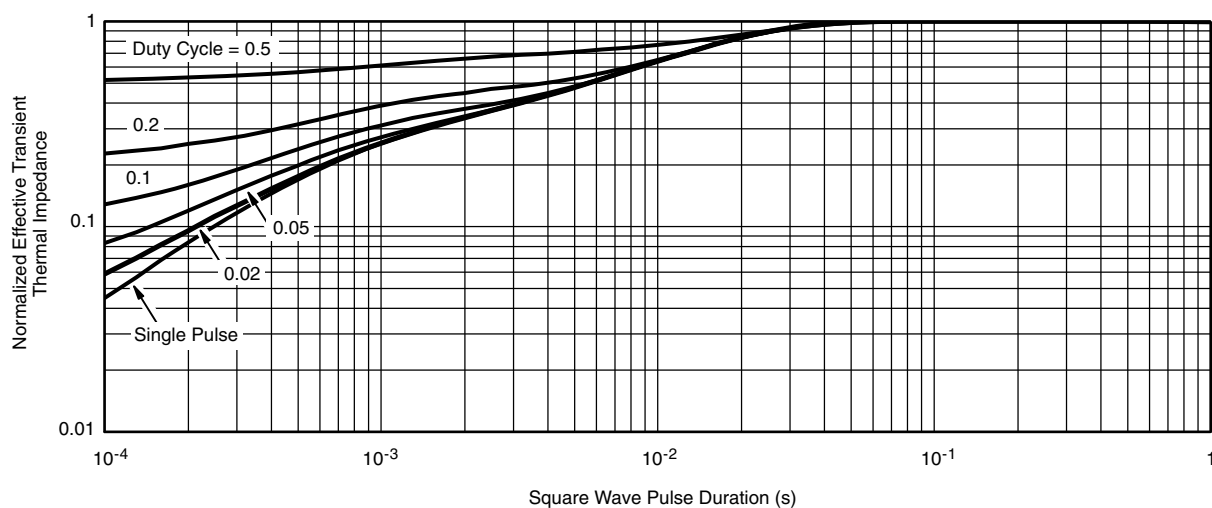
Single Pulse Power, Junction-to-Ambient



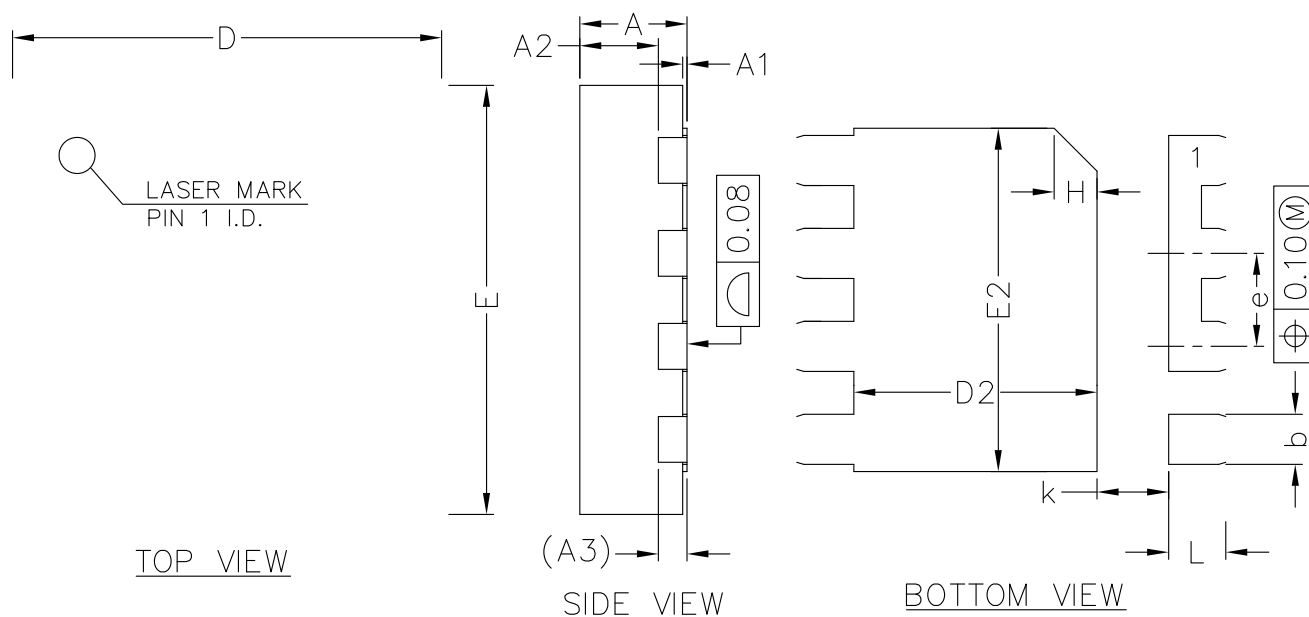
Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Current Derating*

Power Derating, Junction-to-Case

Power Derating, Junction-to-Ambient

* The power dissipation P_D is based on T_J (max.) = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Normalized Thermal Transient Impedance, Junction-to-Ambient

Normalized Thermal Transient Impedance, Junction-to-Case

DFN3x3 PACKAGE OUTLINE



SIDE VIEW

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	0.50	0.55	0.60
A3	0.20REF		
b	0.30	0.35	0.40
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D2	1.60	1.70	1.80
E2	2.30	2.40	2.50
e	0.55	0.65	0.75
K	0.40	0.50	0.60
L	0.35	0.40	0.45

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