

SI7403BDN-T1-GE3-VB Datasheet

P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^d	Q_g (Typ.)
- 20	0.016 at $V_{GS} = - 4.5$ V	- 15	16 nC
	0.020 at $V_{GS} = - 2.5$ V	- 10	

FEATURES

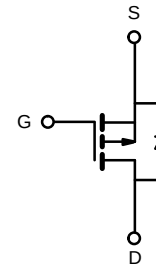
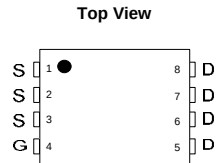
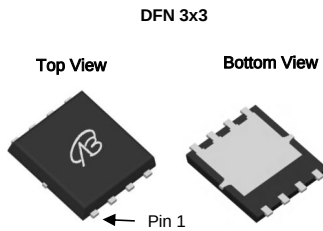
- Halogen-free According to IEC 61249-2-21 Definition
- Trench Power MOSFET
- 100 % R_g Tested

APPLICATIONS

- Load Switch
- Battery Switch



RoHS
COMPLIANT
HALOGEN
FREE
Available



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 20	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current ($T_J = 150$ °C)	$T_C = 25$ °C	- 15	A
	$T_C = 70$ °C	- 12	
	$T_A = 25$ °C	- 10 ^{a, b}	
	$T_A = 70$ °C	- 8 ^{a, b}	
Pulsed Drain Current	I_{DM}	- 150	A
Continuous Source-Drain Diode Current	$T_C = 25$ °C	- 45	
	$T_A = 25$ °C	- 2.1 ^{a, b}	
Maximum Power Dissipation	$T_C = 25$ °C	40	W
	$T_C = 70$ °C	27	
	$T_A = 25$ °C	2.5 ^{a, b}	
	$T_A = 70$ °C	1.6 ^{a, b}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, c}	R_{thJA}	40	50	°C/W
Maximum Junction-to-Foot	R_{thJF}	24	30	

Notes:

- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- Maximum under Steady State conditions is 95 °C/W.
- 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	- 20			V	
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = - 250 μA		- 31		mV/°C	
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			4.5			
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA		-0.6		V	
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 8 V			± 100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 20 V, V _{GS} = 0 V			- 1	μA	
		V _{DS} = -20 V, V _{GS} = 0 V, T _J = 55 °C			- 5		
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ - 5 V, V _{GS} = - 10 V	- 40			A	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 4.5 V I _D = - 7.0 A		0.016		Ω	
		V _{GS} = - 2.5 V, I _D = - 5.6 A		0.020			
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 7.0 A		18		S	
Dynamic ^b							
Input Capacitance	C _{iss}	V _{DS} = - 10 V, V _{GS} = 0 V, f = 1 MHz		1500		pF	
Output Capacitance	C _{oss}			180			
Reverse Transfer Capacitance	C _{rss}			145			
Total Gate Charge	Q _g	V _{DS} = - 10 V, V _{GS} = - 10 V, I _D = - 7.0 A		25	38	nC	
		V _{DS} = - 10 V, V _{GS} = - 4.5 V, I _D = - 7.0 A		13	20		
					3.5		
					5.5		
Gate-Source Charge	Q _{gs}						
Gate-Drain Charge	Q _{gd}						
Gate Resistance	R _g	f = 1 MHz	0.4	2.0	4.0	Ω	
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 10 V, R _L = 2.7 Ω I _D ≅ - 5.6 A, V _{GEN} = - 10 V, R _g = 1 Ω		10	20	ns	
Rise Time	t _r			13	20		
Turn-Off DelayTime	t _{d(off)}			23	35		
Fall Time	t _f			9	18		
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 10 V, R _L = 2.7 Ω I _D ≅ - 5.6 A, V _{GEN} = - 4.5 V, R _g = 1 Ω		38	57		
Rise Time	t _r			89	134		
Turn-Off DelayTime	t _{d(off)}			22	33		
Fall Time	t _f			11	17		
Drain-Source Body Diode Characteristics							
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			- 15	A	
Pulse Diode Forward Current	I _{SM}				- 45		
Body Diode Voltage	V _{SD}	I _S = - 5.6 A, V _{GS} = 0 V		- 0.71	- 1.2	V	
Body Diode Reverse Recovery Time	t _{rr}	I _F = - 5.6 A, dI/dt = 100 A/μs, T _J = 25 °C		22	33	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			17	26	nC	
Reverse Recovery Fall Time	t _a			13		ns	
Reverse Recovery Rise Time	t _b			9			

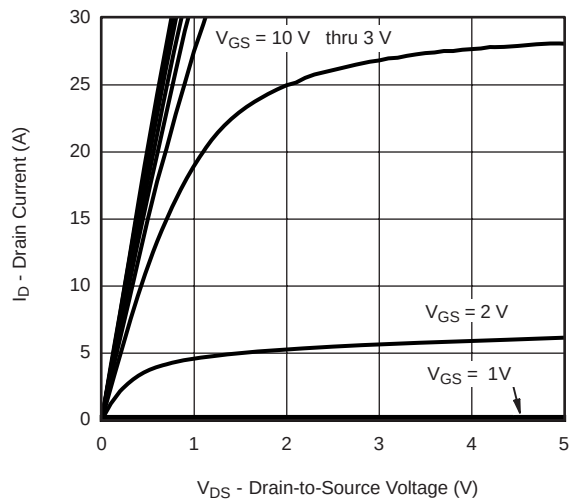
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

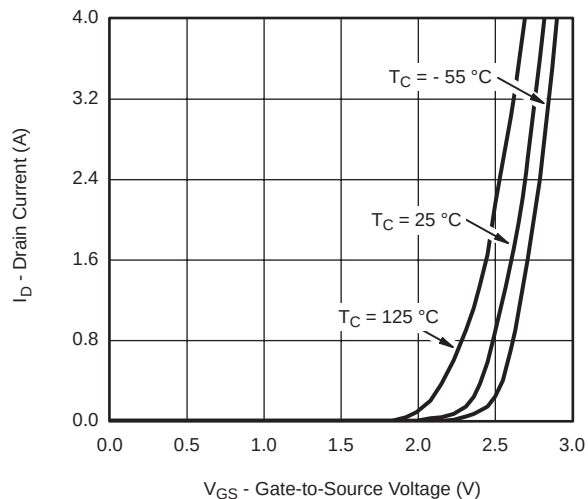
b. Guaranteed by design, not subject to production testing.

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.

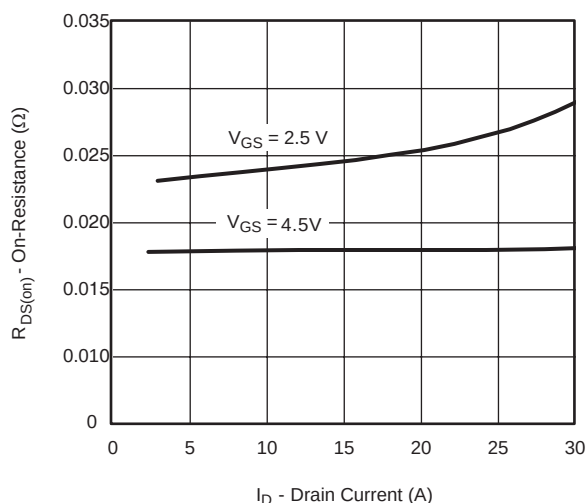
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



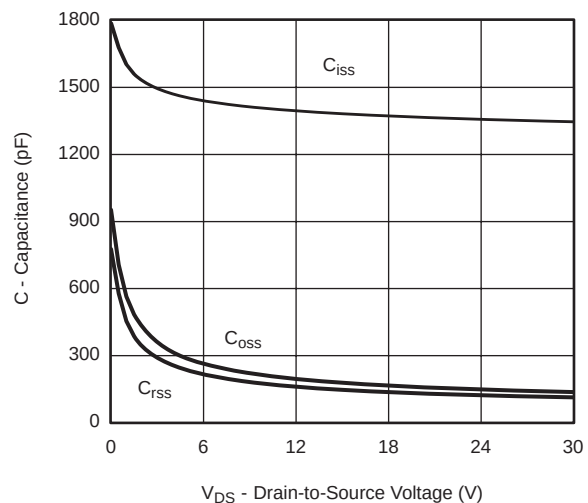
Output Characteristics



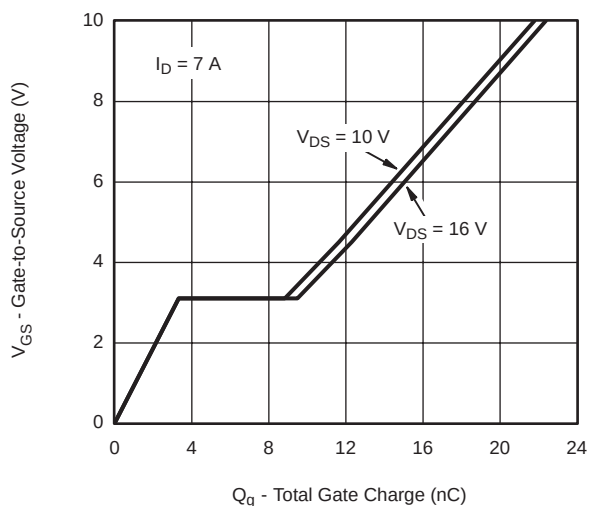
Transfer Characteristics



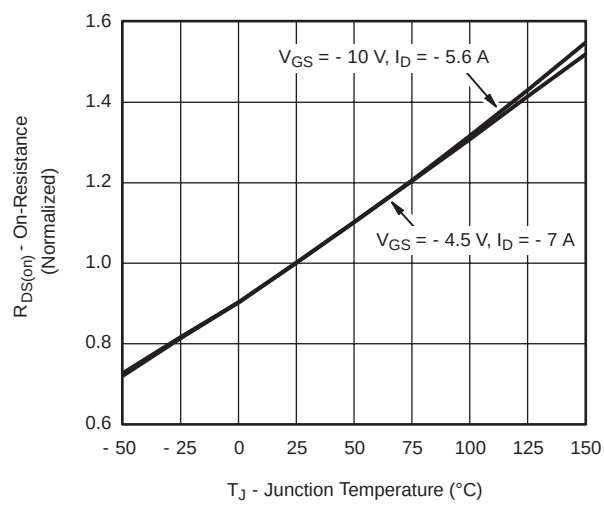
On-Resistance vs. Drain Current



Capacitance

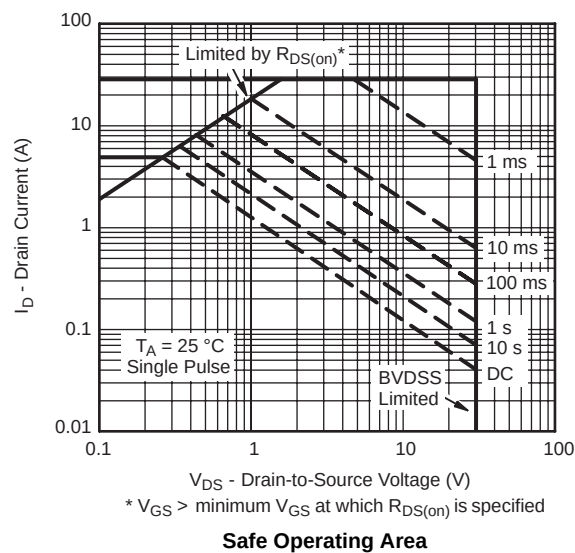
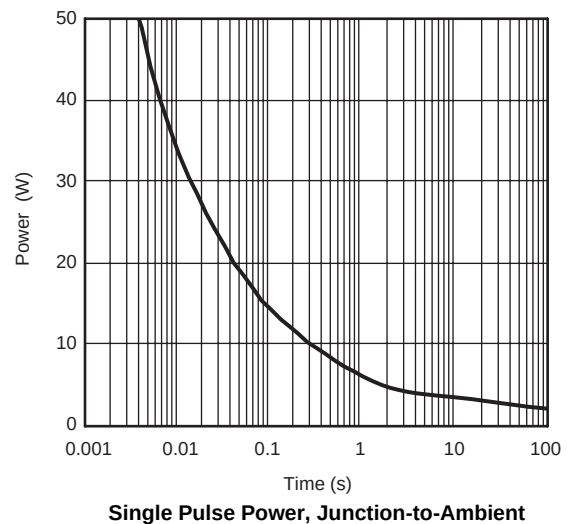
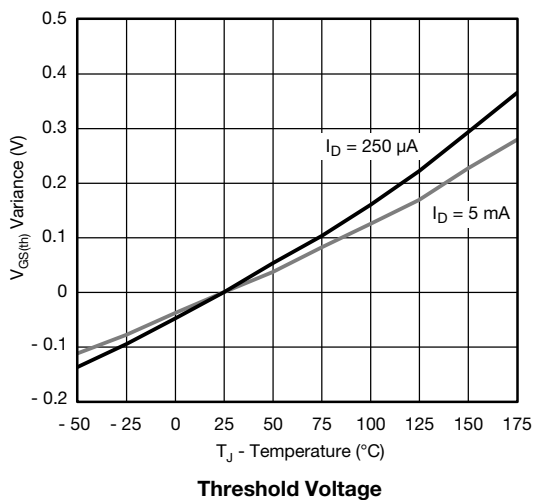
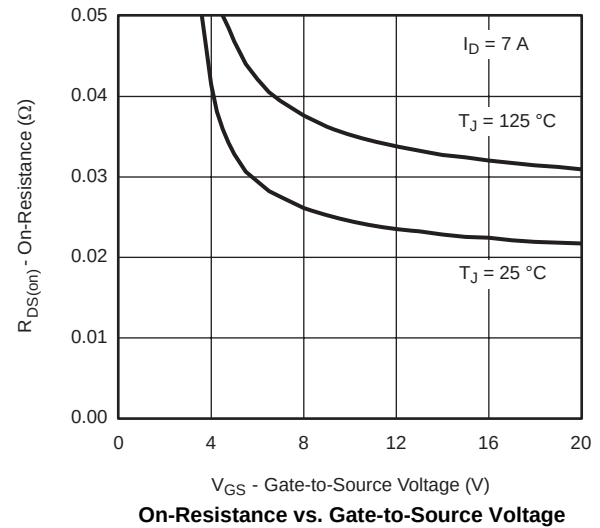
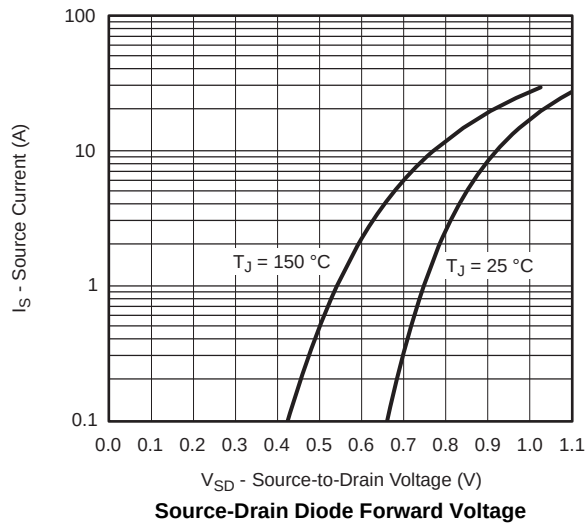


Gate Charge

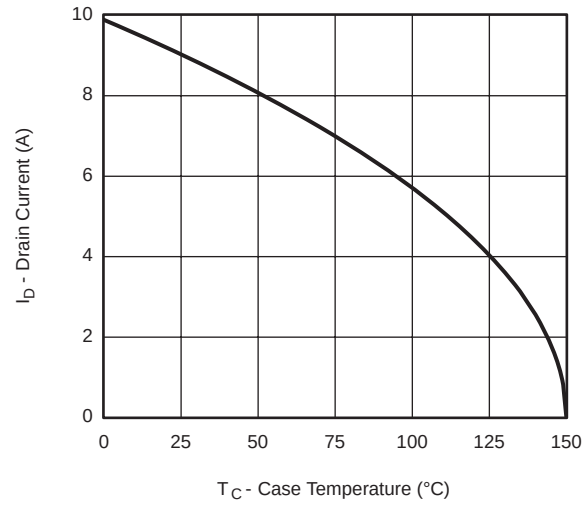


On-Resistance vs. Junction Temperature

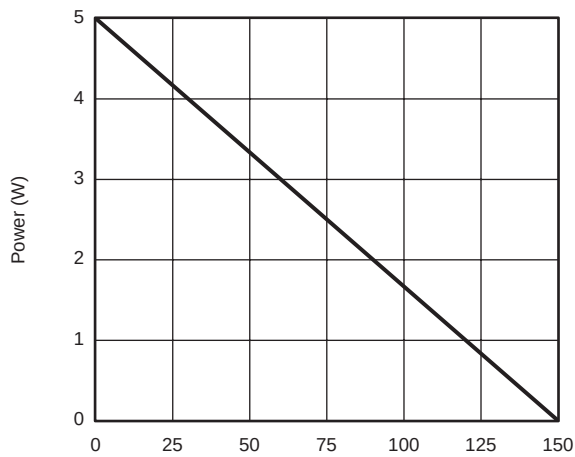
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



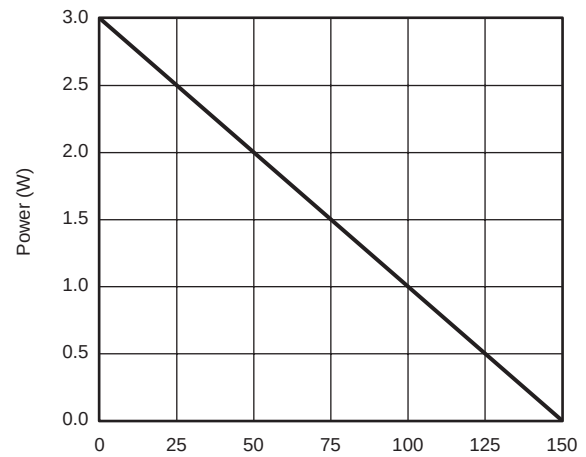
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*



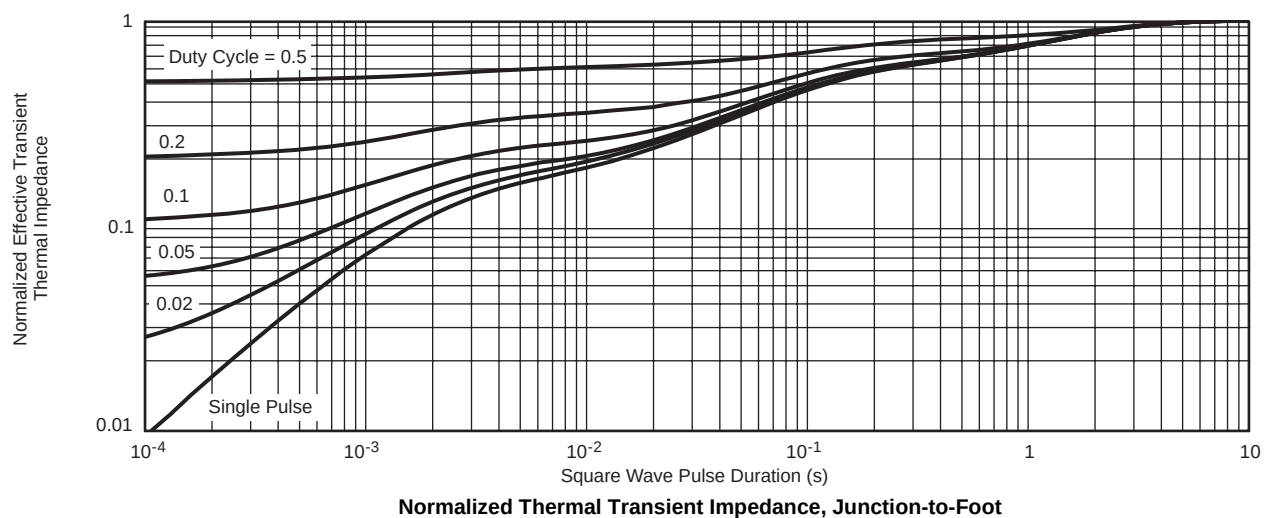
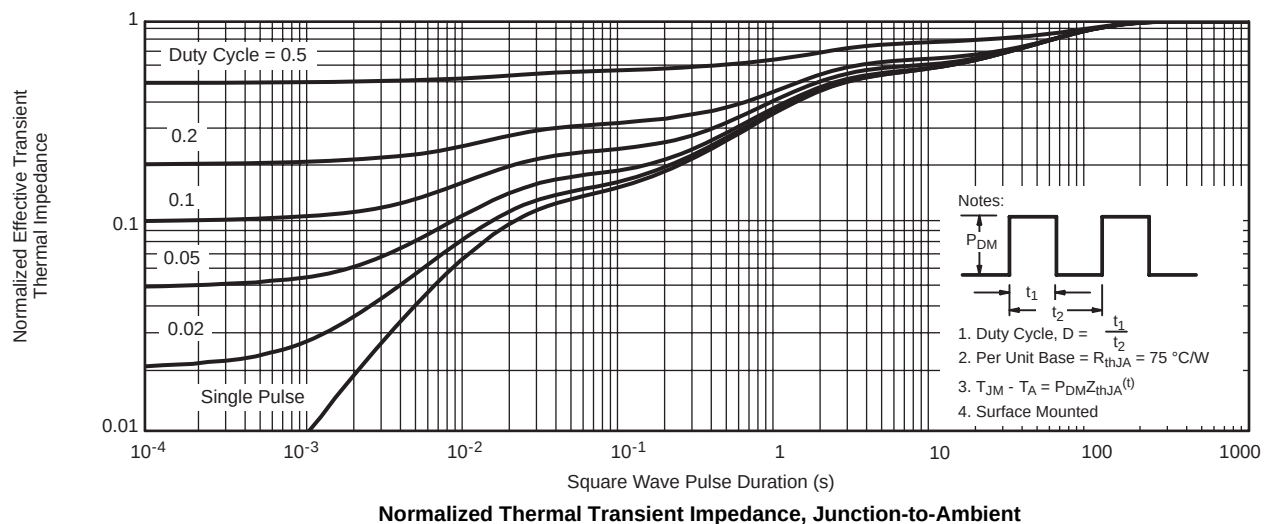
Power, Junction-to-Foot



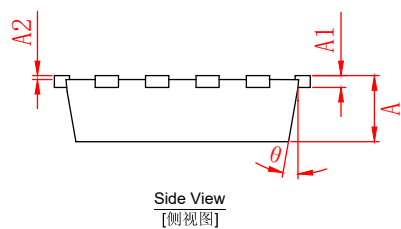
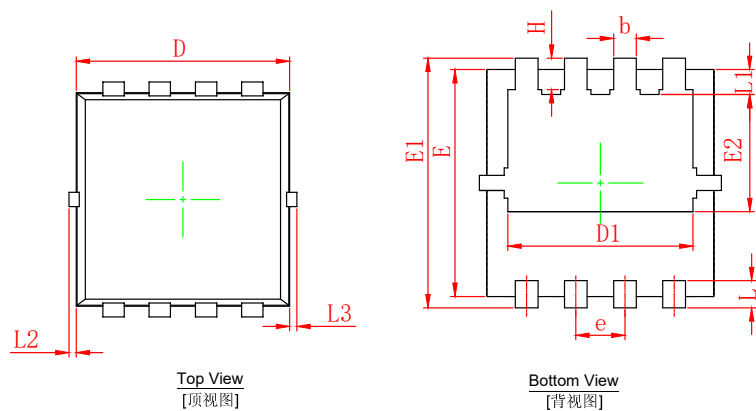
Power Derating, Junction-to-Ambient

* 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

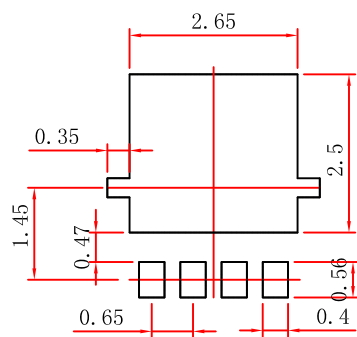


PDFNWB3×3-8L Package Outline Dimensions



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.650	0.850	0.026	0.033
A1	0.203REF.		0.008REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.050	2.550	0.081	0.100
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.450	1.650	0.057	0.065
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
Φ	9°	13°	9°	13°

Suggested Pad Layout



- Note:
- 1.Controlling dimension:in millimeters.
 - 2.General tolerance:±0.05mm.
 - 3.The pad layout is for reference purposes only.

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