

Dual N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^f	Q _g (Typ.)
100	0.071 at V _{GS} = 10 V	12.1	3.3 nC
	0.076 at V _{GS} = 7.5 V	11.8	
	0.086 at V _{GS} = 6 V	10.9	

FEATURES

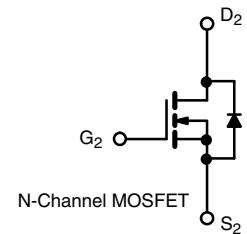
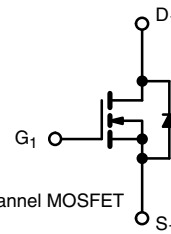
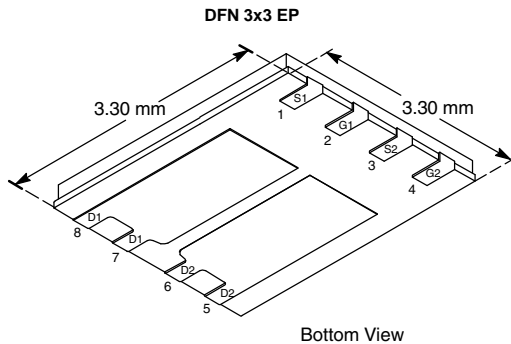
- TrenchFET[®] Power MOSFET
- 100 % R_g and UIS Tested



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- DC/DC Conversion
- Primary side switch
- Synchronous Rectification
- Industrial
- 48 V Battery Monitoring
- LED Driver



ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	100	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	A
		T _C = 70 °C	
		T _A = 25 °C	
		T _A = 70 °C	
Pulsed Drain Current (t = 300 μs)	I _{DM}	20	A
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	
		T _A = 25 °C	2.3 ^{a, b}
Single Pulse Avalanche Current	I _{AS}	7	mJ
Single Pulse Avalanche Energy	E _{AS}	2.5	
Maximum Power Dissipation	P _D	T _C = 25 °C	W
		T _C = 70 °C	
		T _A = 25 °C	
		T _A = 70 °C	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) ^{c, d}		260	

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, e}	R _{thJA}	35	44	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	4	5	

Notes:

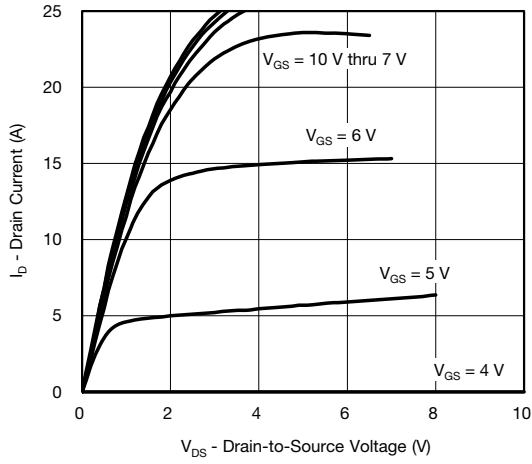
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- The DFN3x3 package is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- Maximum under steady state conditions is 94 °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	100			V	
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		61		mV/°C	
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 6.2			
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5		4	V	
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V			1	μA	
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 55 °C			10		
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	8			A	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 8 A		0.071		Ω	
		V _{GS} = 7.5 V, I _D = 6 A		0.076			
		V _{GS} = 6 V, I _D = 4 A		0.086			
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 8 A		11		S	
Dynamic^b							
Input Capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		250		pF	
Output Capacitance	C _{oss}			73			
Reverse Transfer Capacitance	C _{rss}			7			
Total Gate Charge	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 10 A		5.2	8	nC	
		V _{DS} = 50 V, V _{GS} = 7.5 V, I _D = 10 A		4	6		
Gate-Source Charge	Q _{gs}	V _{DS} = 50 V, V _{GS} = 6 V, I _D = 10 A		3.3	5		
			Gate-Drain Charge	Q _{gd}			1.4
Output Charge	Q _{oss}						1.5
					7		11
Gate Resistance	R _g		f = 1 MHz	1	3.1	5	Ω
Turn-On Delay Time	t _{d(on)}		V _{DD} = 50 V, R _L = 5 Ω I _D ≅ 10 A, V _{GEN} = 7.5 V, R _g = 1 Ω		8	16	ns
Rise Time	t _r			8	16		
Turn-Off Delay Time	t _{d(off)}			8	16		
Fall Time	t _f			6	12		
Turn-On Delay Time	t _{d(on)}	V _{DD} = 50 V, R _L = 5 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω		7	14		
Rise Time	t _r			7	14		
Turn-Off Delay Time	t _{d(off)}			8	16		
Fall Time	t _f			5	10		
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			20	A	
Pulse Diode Forward Current	I _{SM}				20		
Body Diode Voltage	V _{SD}	I _S = 4 A, V _{GS} = 0 V		0.87	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}	I _F = 5 A, di/dt = 100 A/μs, T _J = 25 °C		30	60	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			27	54	nC	
Reverse Recovery Fall Time	t _a			16		ns	
Reverse Recovery Rise Time	t _b			14			

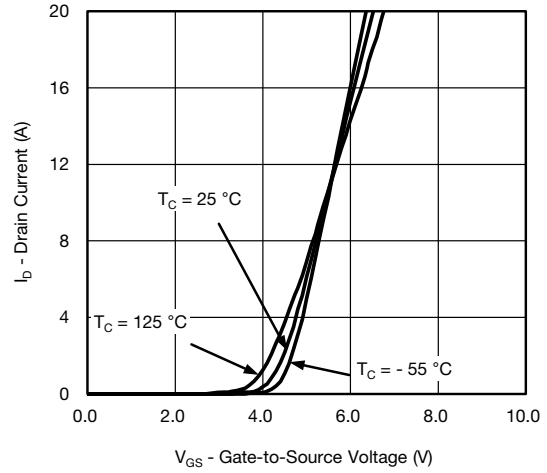
Notes:

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- b. Guaranteed by design, not subject to production testing.

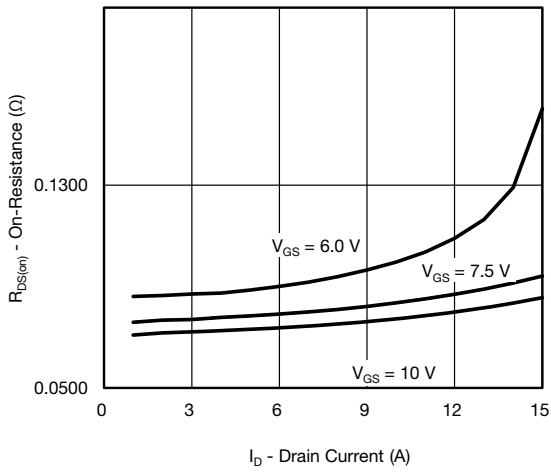
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



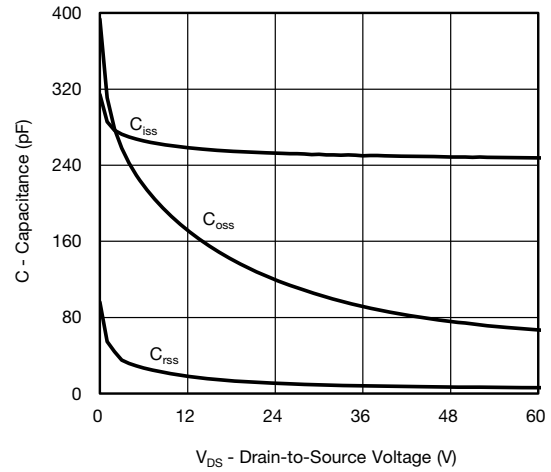
Output Characteristics



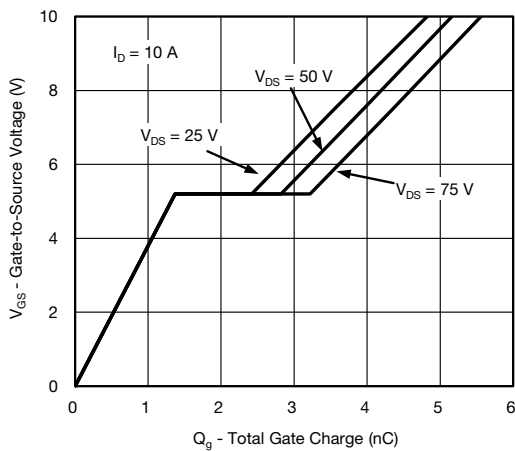
Transfer Characteristics



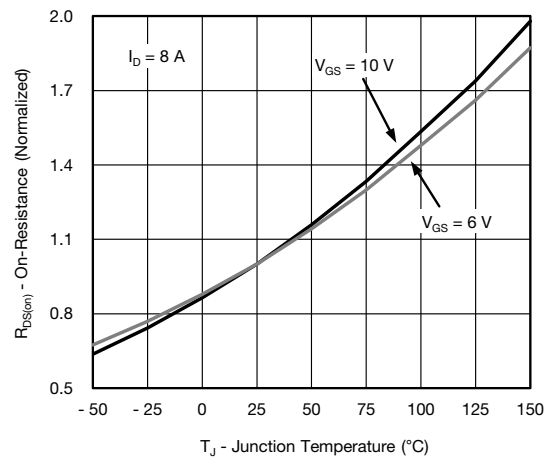
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

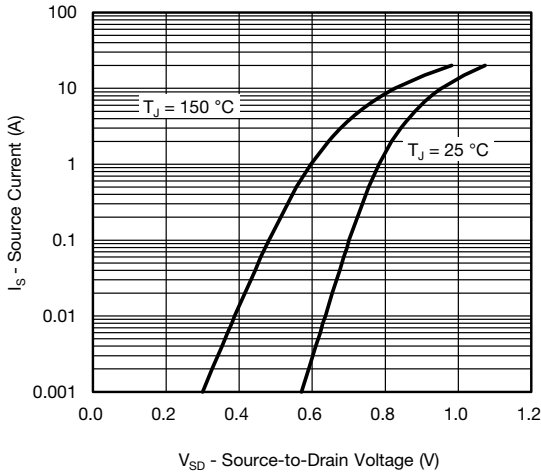


Gate Charge

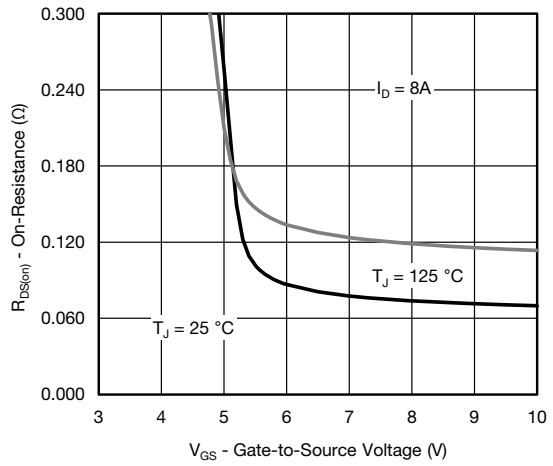


On-Resistance vs. Junction Temperature

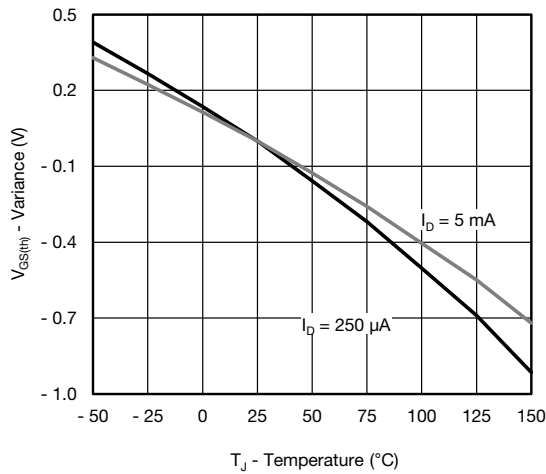
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



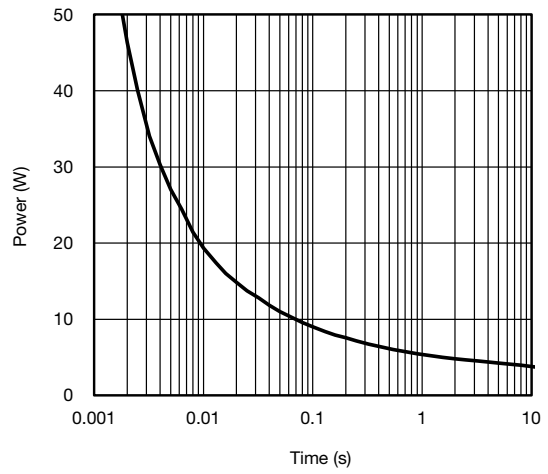
Source-Drain Diode Forward Voltage



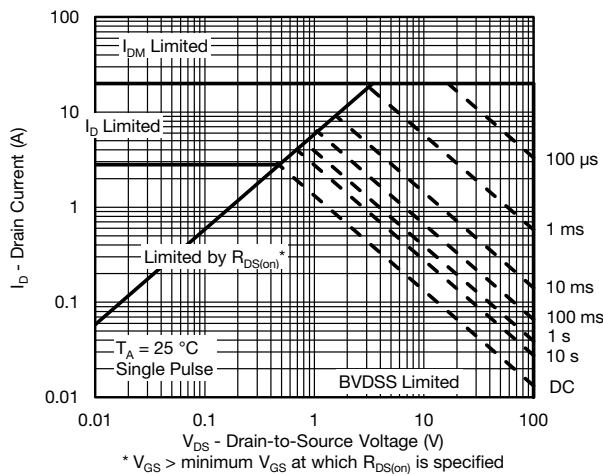
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

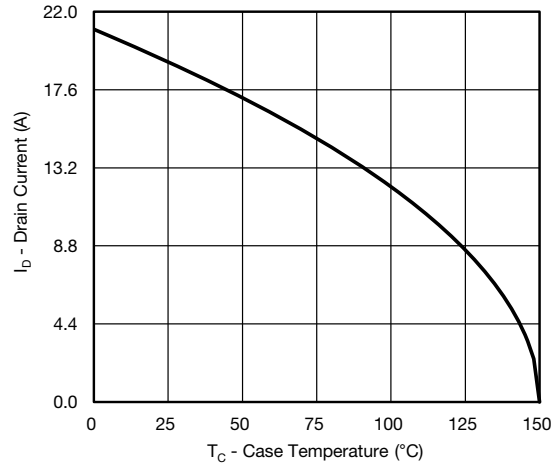


Single Pulse Power, Junction-to-Ambient

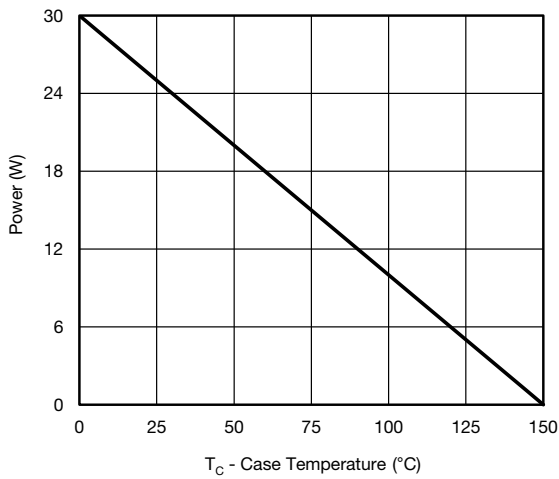


Safe Operating Area, Junction-to-Ambient

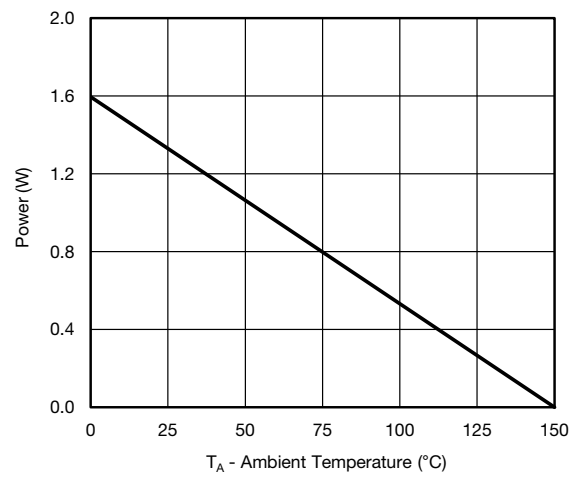
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*



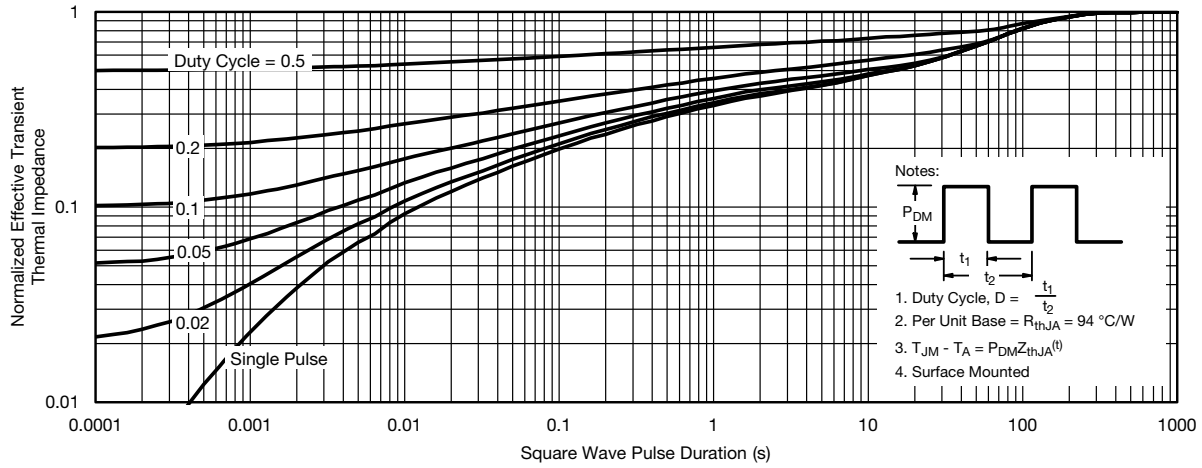
Power, Junction-to-Case



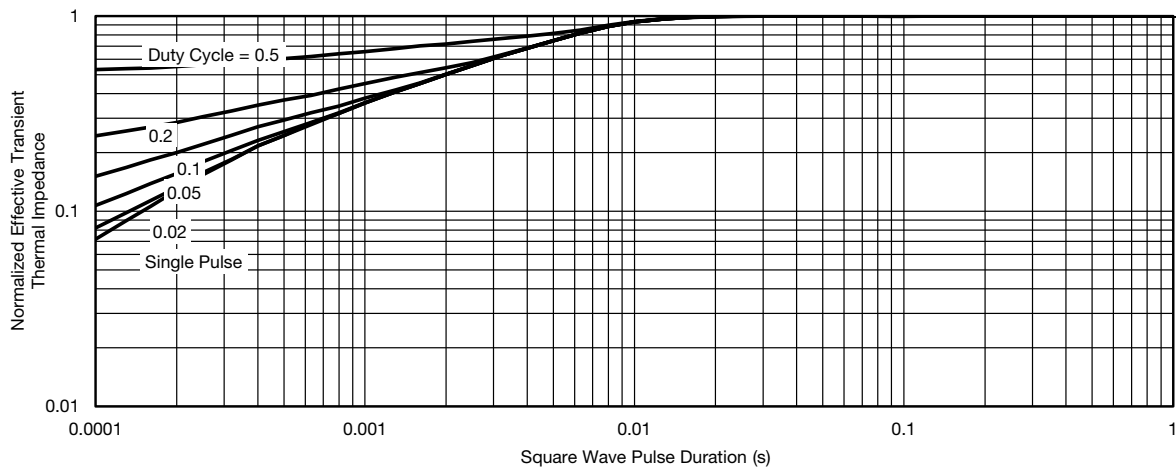
Power, Junction-to-Ambient

* 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)

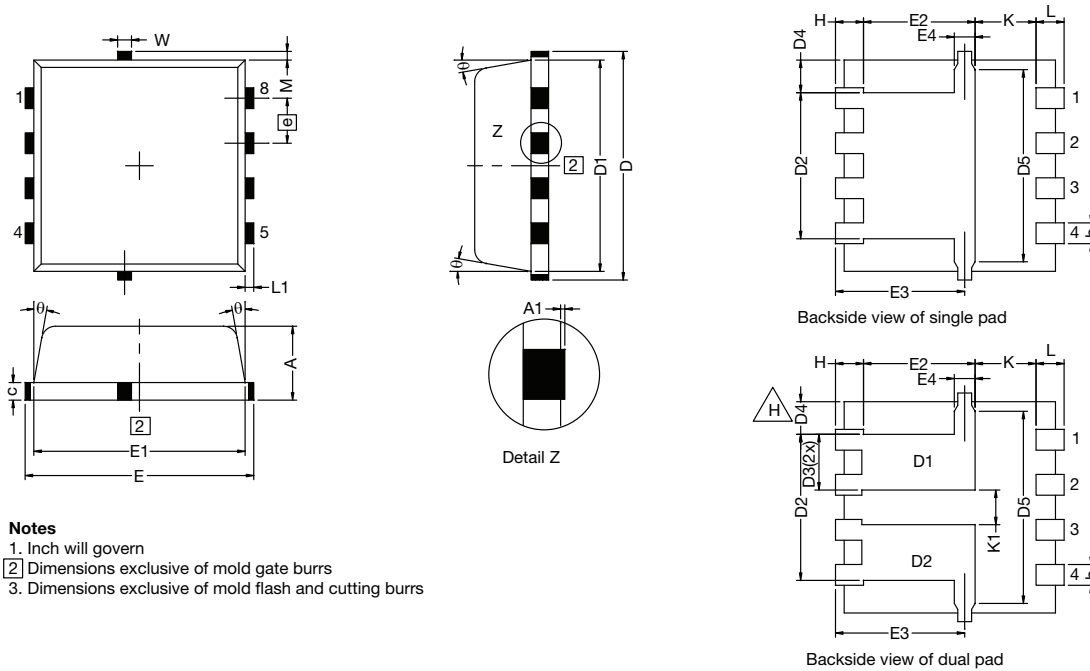


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

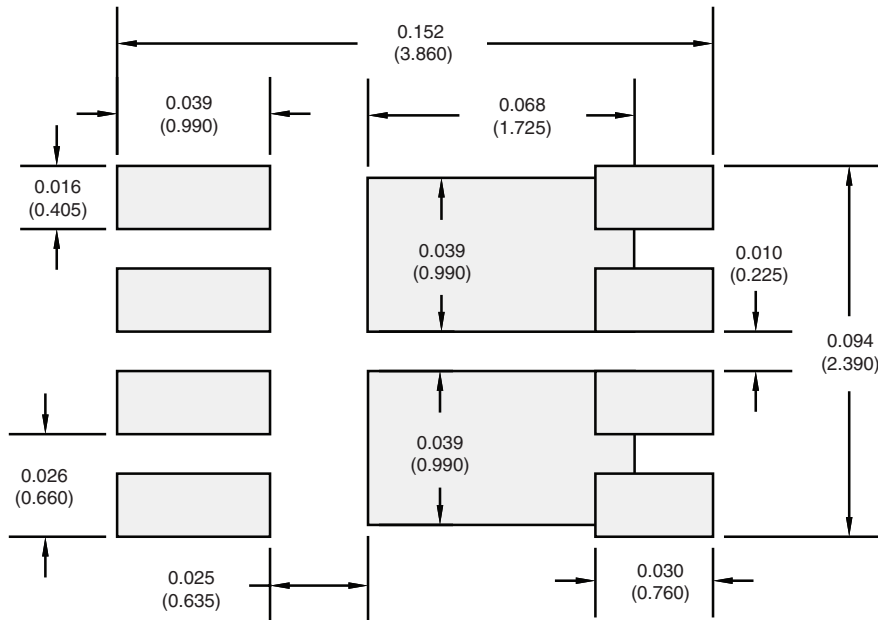
DFN3x3, (Single / Dual)



DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.97	1.04	1.12	0.038	0.041	0.044
A1	0.00	-	0.05	0.000	-	0.002
b	0.23	0.30	0.41	0.009	0.012	0.016
c	0.23	0.28	0.33	0.009	0.011	0.013
D	3.20	3.30	3.40	0.126	0.130	0.134
D1	2.95	3.05	3.15	0.116	0.120	0.124
D2	1.98	2.11	2.24	0.078	0.083	0.088
D3	0.48	-	0.89	0.019	-	0.035
D4	0.47 typ.			0.0185 typ		
D5	2.3 typ.			0.090 typ		
E	3.20	3.30	3.40	0.126	0.130	0.134
E1	2.95	3.05	3.15	0.116	0.120	0.124
E2	1.47	1.60	1.73	0.058	0.063	0.068
E3	1.75	1.85	1.98	0.069	0.073	0.078
E4	0.034 typ.			0.013 typ.		
e	0.65 BSC			0.026 BSC		
K	0.86 typ.			0.034 typ.		
K1	0.35	-	-	0.014	-	-
H	0.30	0.41	0.51	0.012	0.016	0.020
L	0.30	0.43	0.56	0.012	0.017	0.022
L1	0.06	0.13	0.20	0.002	0.005	0.008
θ	0°	-	12°	0°	-	12°
W	0.15	0.25	0.36	0.006	0.010	0.014
M	0.125 typ.			0.005 typ.		

ECN: S16-2667-Rev. M, 09-Jan-17
 DWG: 5882

RECOMMENDED MINIMUM PADS FOR DFN 3x3 Dual



Recommended Minimum PADS for PowerPAK 1212-8 Dual
Dimensions in Inches/(mm)

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