

P-Channel 30V (D-S) MOSFET

Product Summary		
V _{DS} (V)	R _{DS(on)} (mΩ) (Max.)	I _D (A)
-30	21 at V _{GS} = -10 V	-20
	34 at V _{GS} = -4.5 V	-18.7

Features

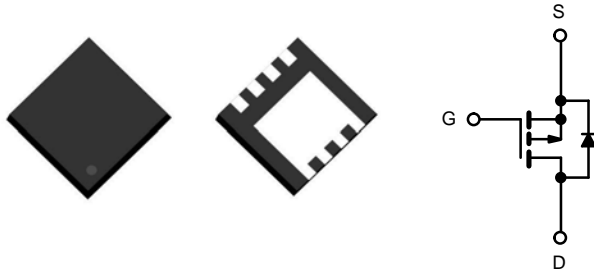
- Very Low R_{DS(on)} at 4.5V V_{gs}
- Low Gate Charge
- High Current Capability
- 100% R_g and UIS Tested
- RoHS and Halogen-Free Compliant

Applications

- Notebook PC
 - Load switch
 - Battery switch
 - Adaptor switch

Pin Configuration

DFN3x3



P-Channel MOSFET

Packing Information

Device	Marking	Reel Size	Tape Width	Quantity
EC4329	ECX .XXX	13"	12mm	3000pcs

Absolute Maximum Ratings

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V _{DS}	-30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current ^D	I _D	T _C =25°C	-20
		T _C =70°C	-20
Pulsed Drain Current ^C	I _{DM}	-50	A
Continuous Drain Current	I _{DSM}	T _A =25°C	-10.5
		T _A =70°C	-8.3
Avalanche Current ^C	I _{AS} , I _{AR}	-20	A
Avalanche energy L=0.1mH ^C	E _{AS} , E _{AR}	20	mJ
Power Dissipation ^B	P _D	T _C =25°C	27.8
		T _C =70°C	17.8
Power Dissipation ^A	P _{DSM}	T _A =25°C	3.5
		T _A =70°C	2.2
Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

Thermal Data

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	R _{θJA}	29	36	°C/W
Maximum Junction-to-Case	R _{θJC}	3.6	4.5	°C/W

Electrical Characteristics (T_J = 25 °C Unless Otherwise Specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
B _V DSS	Drain-Source Breakdown Voltage	I _D = -250 μA, V _{GS} = 0V	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -30V, V _{GS} = 0V T _J = 55 °C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} = 0V, V _{GS} = ±20V			± 100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250 μA	-1.0		-3	V
I _{D(ON)}	On state drain current	V _{GS} = -10V, V _{DS} ≥ -10V	-30			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = -10V, I _D = -10.5A		17.5	21	mΩ
		V _{GS} = -4.5V, I _D = -8.3A		28.3	34	mΩ
g _{FS}	Forward Transconductance	V _{DS} = -10V, I _D = -10.5A		23		S
V _{SD}	Diode Forward Voltage	I _S = -8.4A, V _{GS} = 0V		-0.85	-1.2	V
I _S	Maximum Body-Diode Continuous Current ^D	T _C = 25 °C			-20	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{DS} = -15 V, V _{GS} = 0V, f = 1MHz		1350		pF
C _{oss}	Output Capacitance			215		
C _{rss}	Reverse Transfer Capacitance			185		
R _g	Gate resistance	f = 1MHz	1.2	5.8	11.6	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{DS} = -15V, V _{GS} = -10 V, I _D = -10.5 A		32	50	nC
Q _g (4.5V)	Total Gate Charge			15	25	
Q _{gs}	Gate Source Charge	V _{DS} = -15V, V _{GS} = -4.5V, I _D = -10.5 A		4		nC
Q _{gd}	Gate Drain Charge			7.5		
t _{D(on)}	Turn-On Delay Time	V _{DD} = -15 V, R _L = 1.8 Ω I _D ≅ -8.4 A, V _{GEN} = -4.5V, R _g = 1Ω		42	70	ns
t _r	Turn-On Rise Time			35	60	ns
t _{D(off)}	Turn-Off Delay Time			40	70	ns
t _f	Turn-Off Fall Time			16	30	ns
t _{rr}	Body Diode Reverse Recovery Time		I _F = -8.4A, di/dt = 100 A/μs, T _J = 25 °C		34	60
Q _{rr}	Body Diode Reverse Recovery Charge			22	40	nC

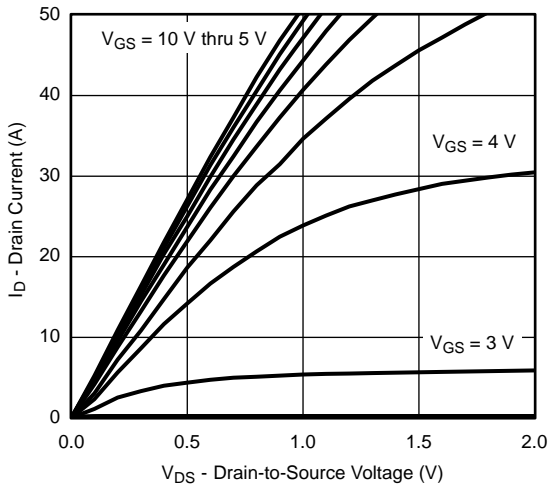
A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A = 25 °C. The Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150 °C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150 °C may be used if the PCB allows it.

B. The power dissipation P_D is based on T_{J(MAX)} = 150 °C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

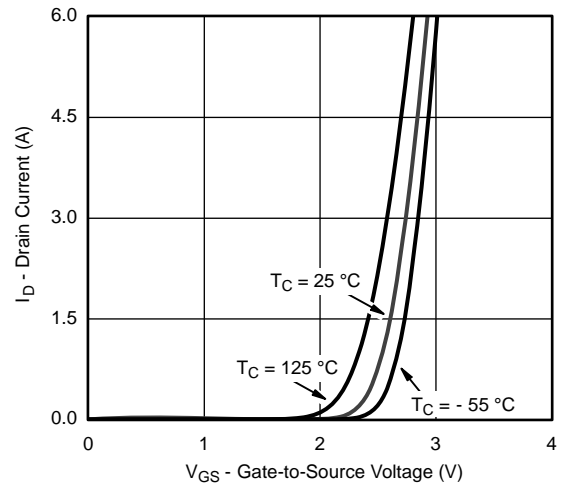
C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)} = 150 °C. Ratings are based on low frequency and duty cycles to keep initial T_J = 25 °C.

D. The maximum current rating is package limited.

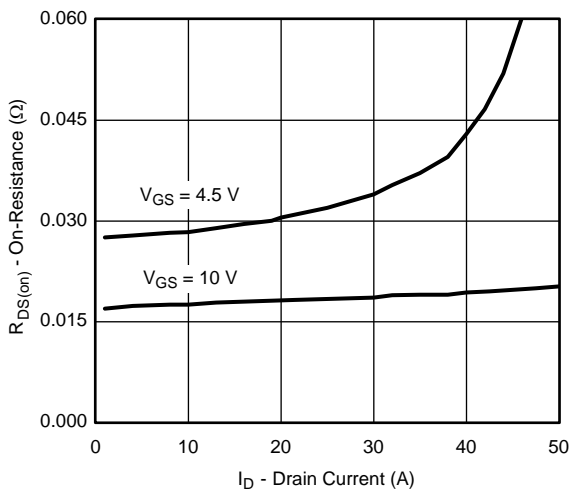
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



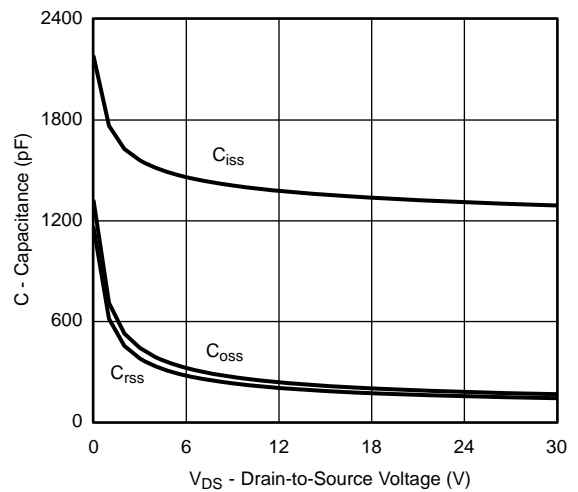
Output Characteristics



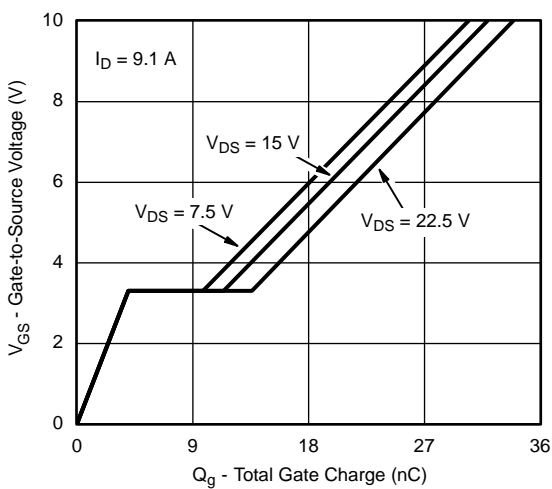
Transfer Characteristics



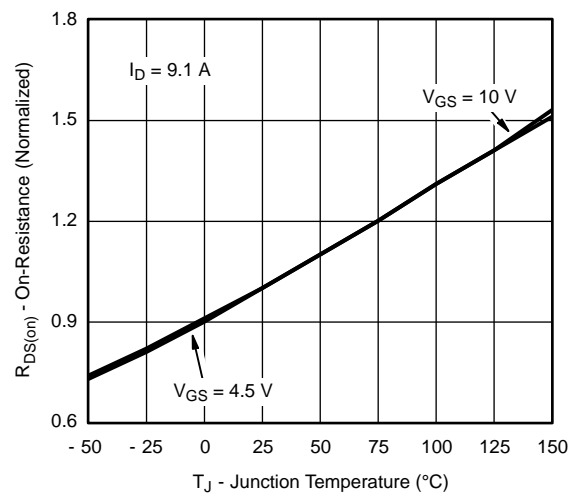
On-Resistance vs. Drain Current



Capacitance

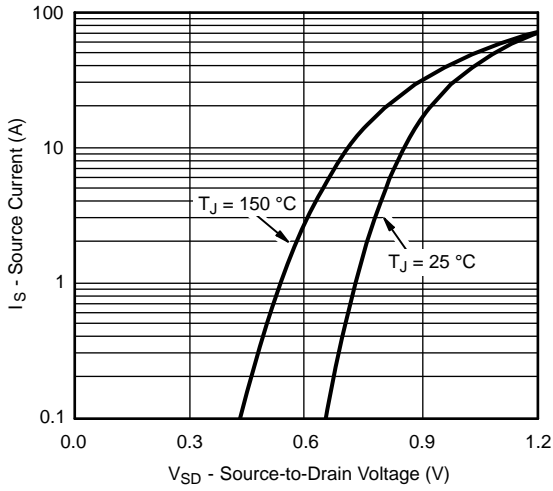


Gate Charge

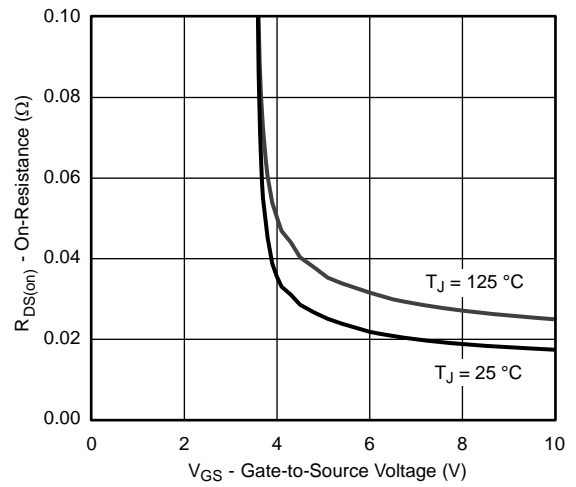


On-Resistance vs. Junction Temperature

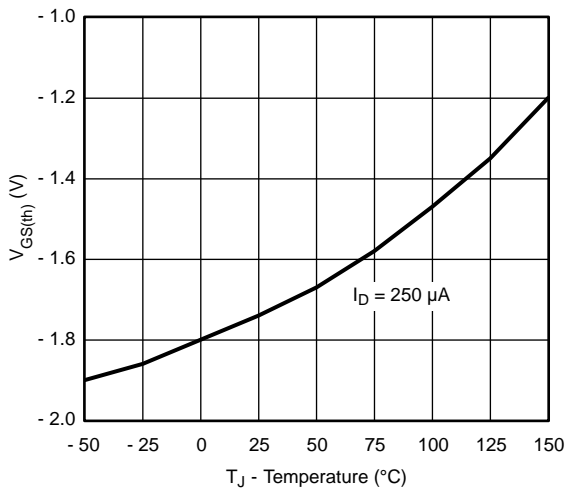
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



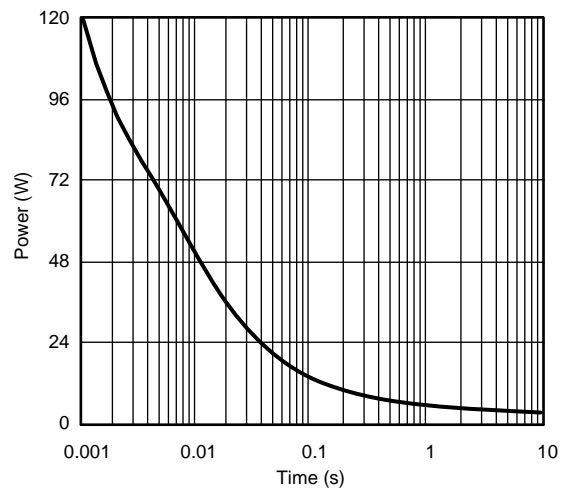
Source-Drain Diode Forward Voltage



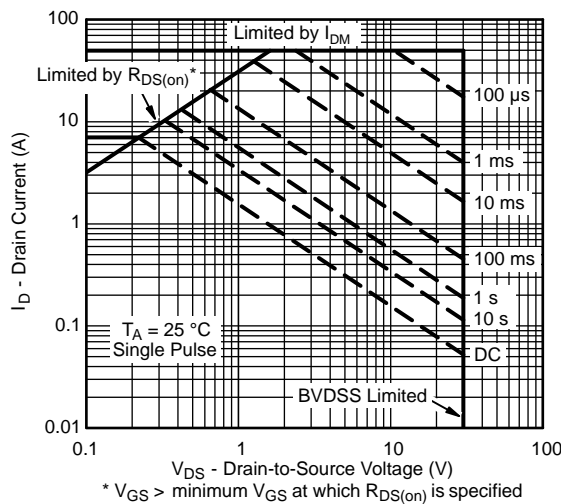
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



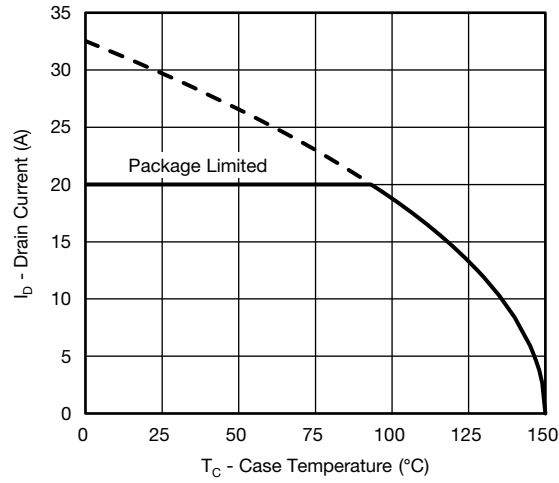
Single Pulse Power, Junction-to-Ambient



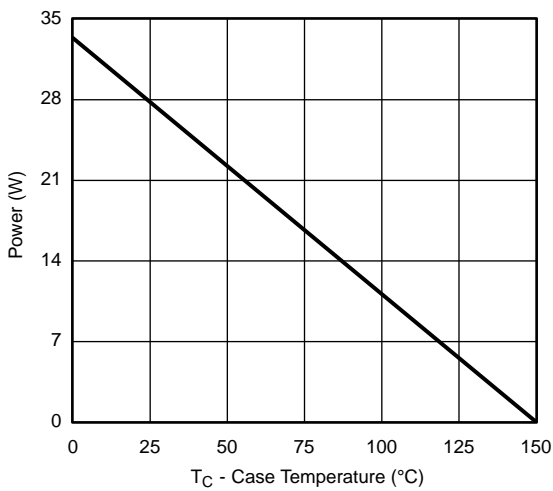
Safe Operating Area

Safe Operating Area, Junction-to-Ambient

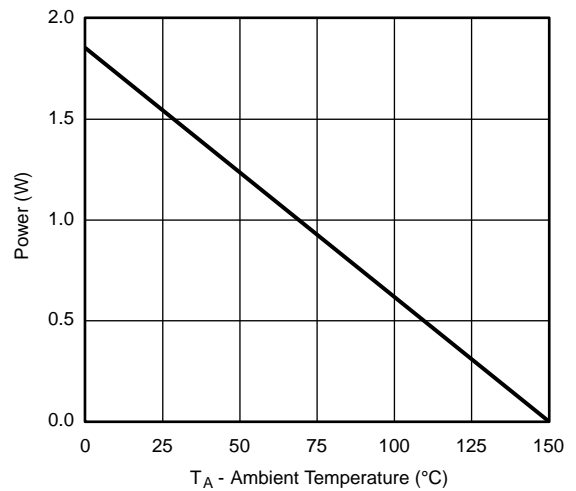
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



Current Derating*



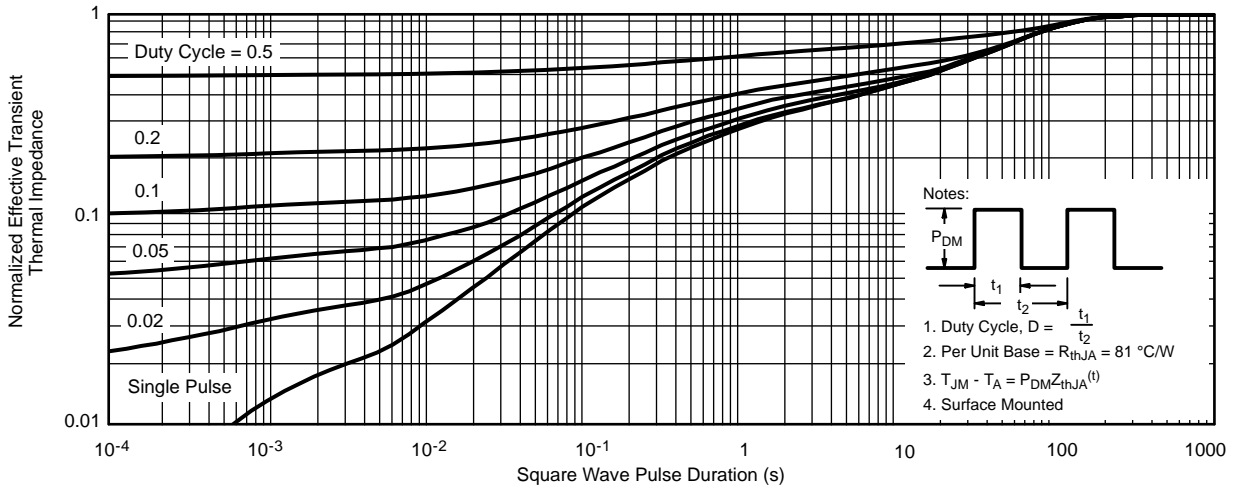
Power, Junction-to-Case



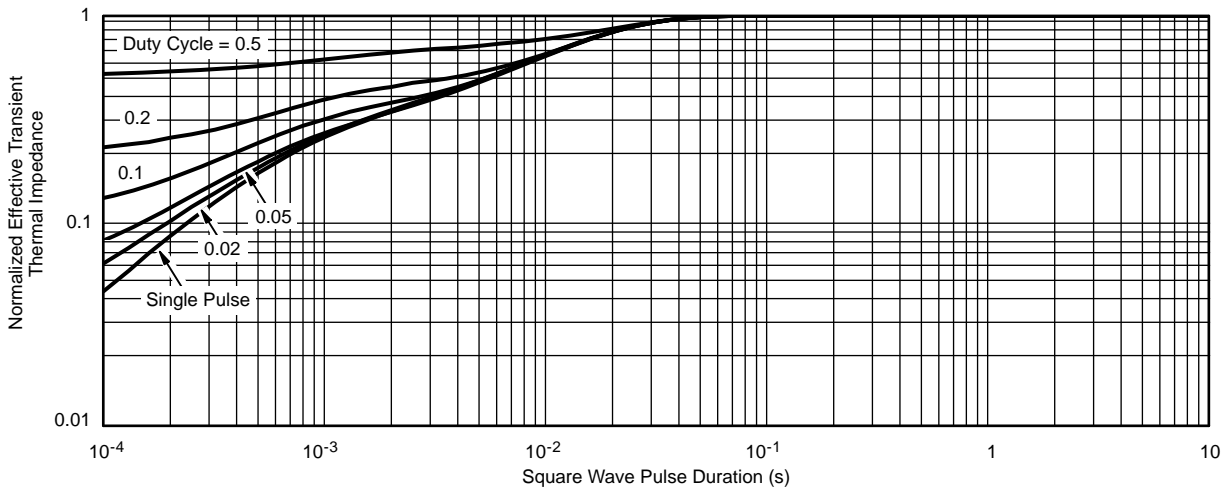
Power Derating, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)} = 150\text{ }^\circ\text{C}$, 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 ELECTRICAL AND THERMAL CHARACTERISTICS

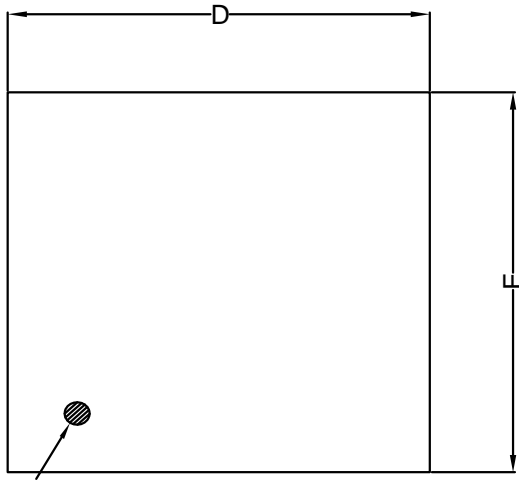


Normalized Thermal Transient Impedance, Junction-to-Ambient



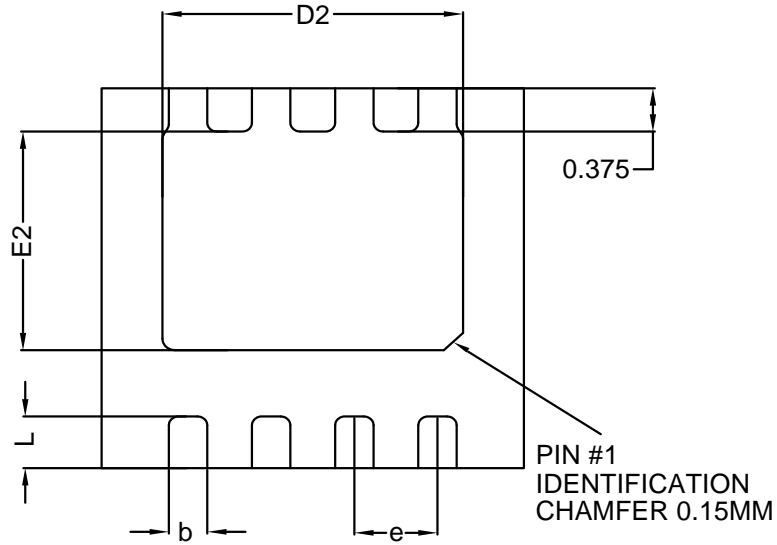
Normalized Thermal Transient Impedance, Junction-to-Case

DFN3x3 Package Information

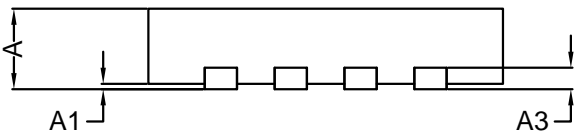


PIN 1 DOT BY MARKING

TOP VIEW



BOTTOM VIEW



SIDE VIEW

COMMON DIMENSIONS(MM)			
PKG.	UT:ULTRA THIN		
REF.	MIN.	NOM.	MAX
A	0.70	0.75	0.80
A1	0.00	-	0.05
A3	0.20 REF.		
D	3.25	3.30	3.35
E	3.25	3.30	3.35
D2	2.30	2.35	2.40
E2	1.85	1.90	1.95
b	0.25	0.30	0.35
L	0.35	0.45	0.55
e	0.65 BSC		