

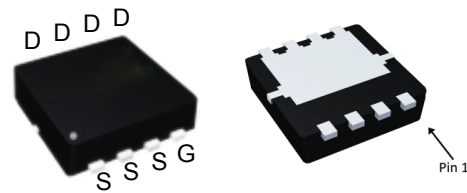
Features

- 40V/60A
 $R_{DS(ON)} = 4m\Omega (typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 5.5m\Omega (typ.) @ V_{GS} = 4.5V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)
- Moisture Sensitivity Level MSL1 (per JEDEC J-STD-020D)

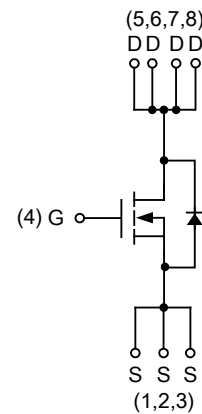
Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

Pin Description



DFN3X3



N-Channel MOSFET

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	60	A
I _D	Continuous Drain Current	T _C =25°C	60	A
		T _C =100°C	36	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	180	A
P _D	Maximum Power Dissipation	T _C =25°C	34.7	W
		T _C =100°C	13.9	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	3.6	°C/W
R _{θJA} ^c	Thermal Resistance-Junction to Ambient	t ≤ 10s	45	°C/W
		Steady State	80	
I _{AS} ^d	Avalanche Current, Single pulse	L=0.1mH	40	A
E _{AS} ^d	Avalanche Energy, Single pulse	L=0.1mH	80	mJ

Note a : Max. continuous current is limited by bonding wire.

Note b : Pulse width is limited by max. junction temperature.

Note c : Surface mounted on 1in^2 pad area, steady state $t = 999\text{s}$.

Note d : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^{\circ}\text{C}$).

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

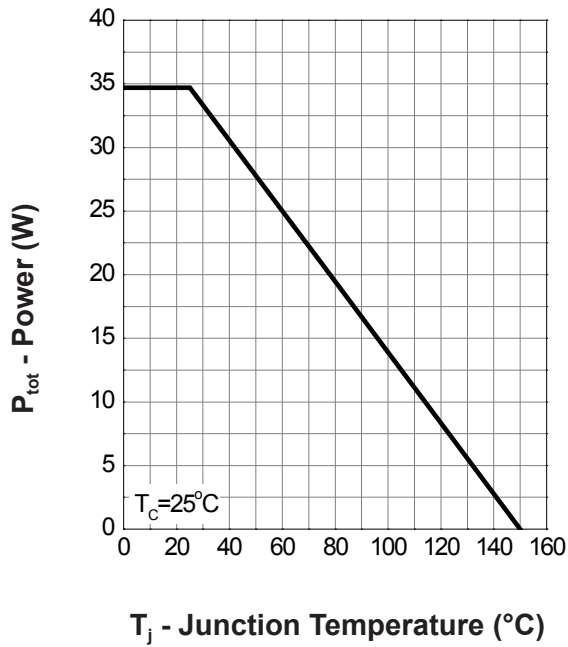
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.4	1.8	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A T _J =125°C V _{GS} =4.5V, I _{DS} =15A	- - -	4 6.3 5.5	5.3 - 7.6	mΩ
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =15A	-	25	-	S
Diode Characteristics ^f						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =20A, dI _{SD} /dt=100A/μs	-	23	-	ns
t _a	Charge Time		-	15	-	
t _b	Discharge Time		-	10	-	
Q _{rr}	Reverse Recovery Charge		-	15	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	1	2	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	790	920	pF
C _{oss}	Output Capacitance		-	344	-	
C _{rss}	Reverse Transfer Capacitance		-	29	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	13.5	25	ns
t _r	Turn-on Rise Time		-	8.3	15	
t _{d(OFF)}	Turn-off Delay Time		-	29.1	53	
t _f	Turn-off Fall Time		-	20.7	38	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =20A	-	22.2	31.1	nC
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _{DS} =20A	-	10.4	-	
Q _{gth}	Threshold Gate Charge		-	2.5	-	
Q _{gs}	Gate-Source Charge		-	4.5	-	
Q _{gd}	Gate-Drain Charge		-	2.9	-	

Note e : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

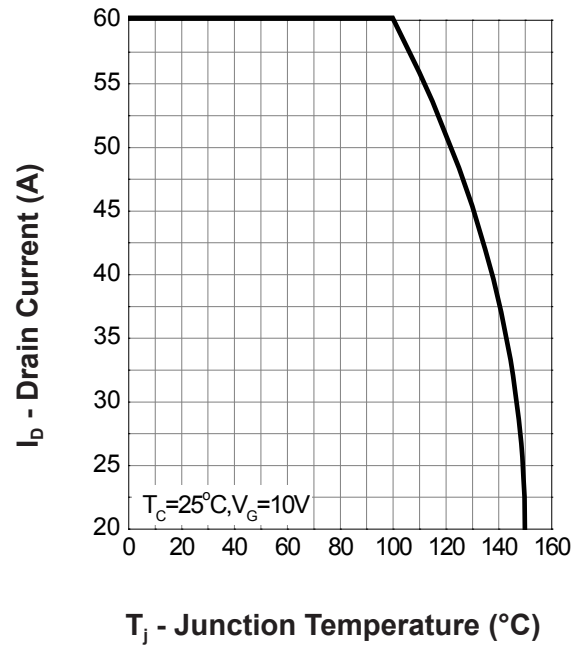
Note f : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

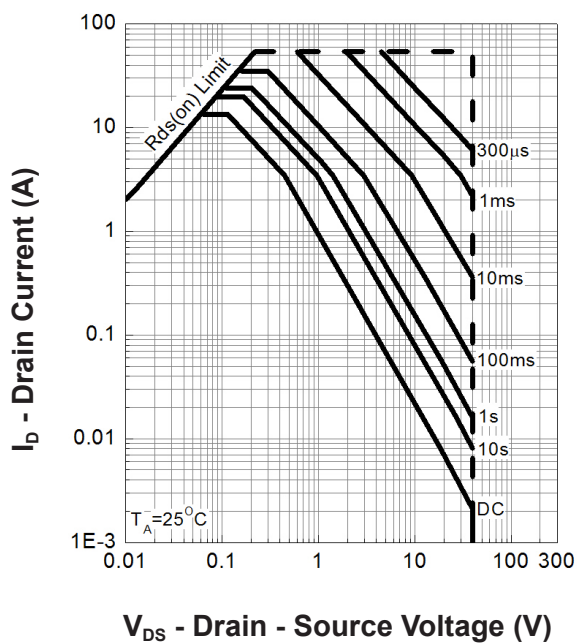
Power Dissipation



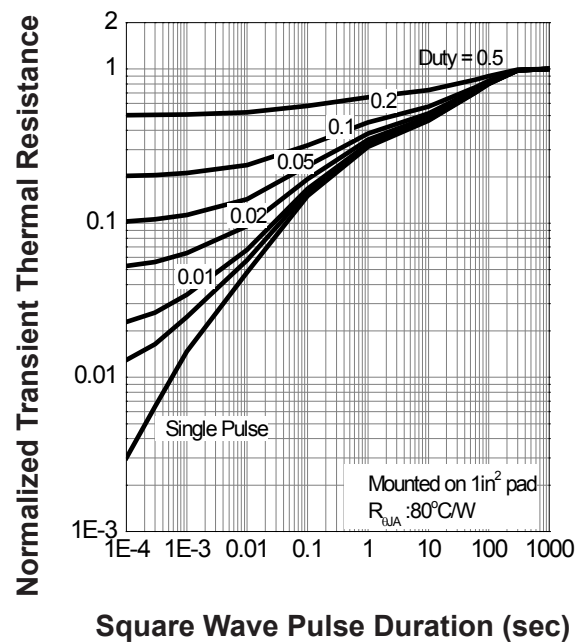
Drain Current



Safe Operation Area

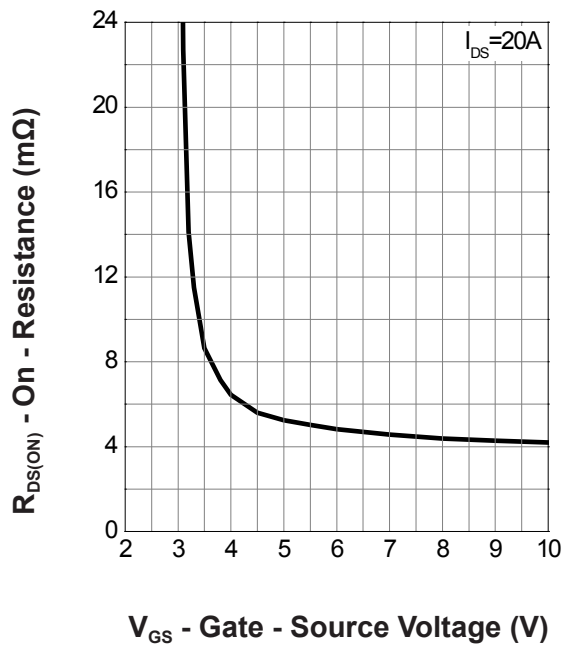


Thermal Transient Impedance

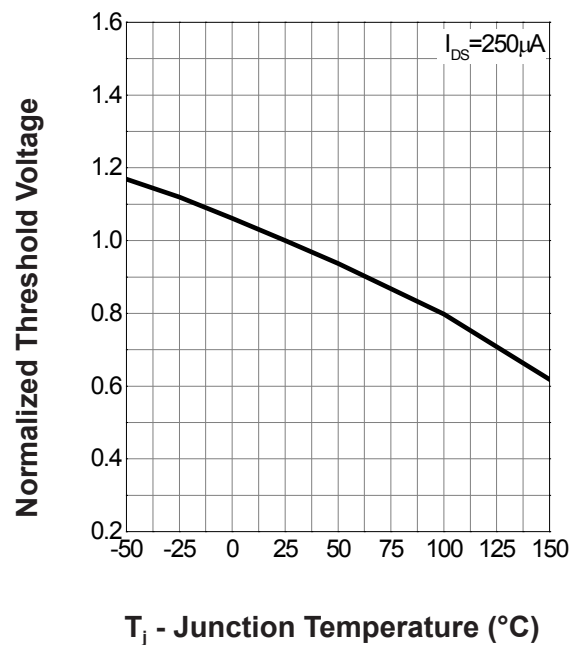


Typical Operating Characteristics(Cont.)

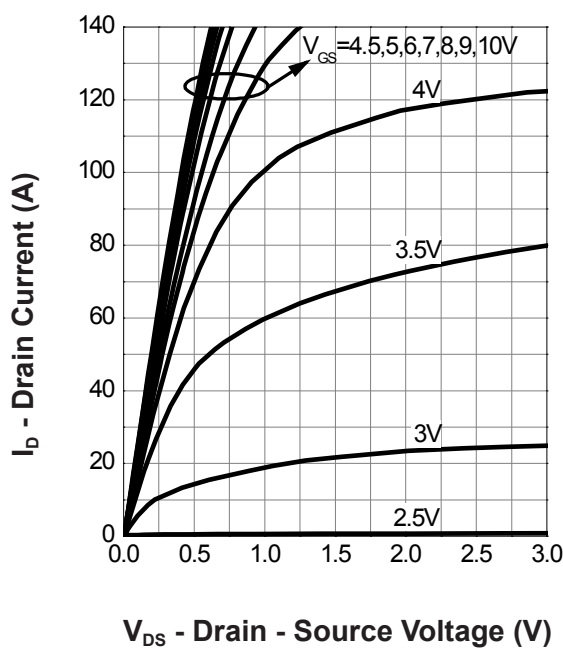
Gate-Source On Resistance



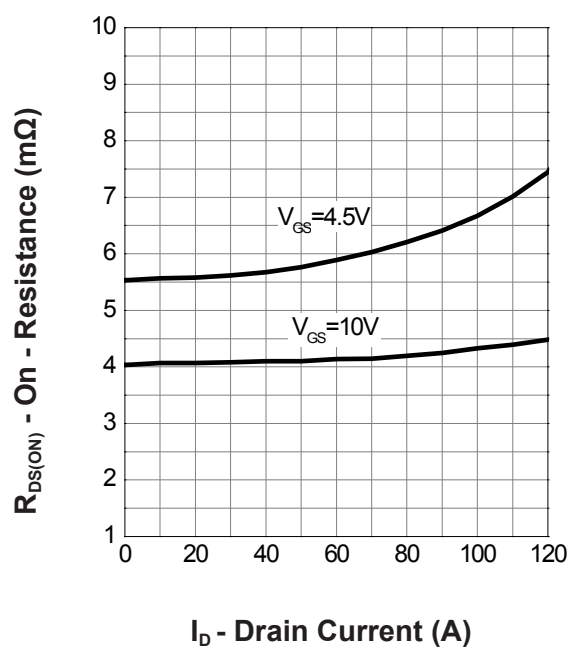
Gate Threshold Voltage



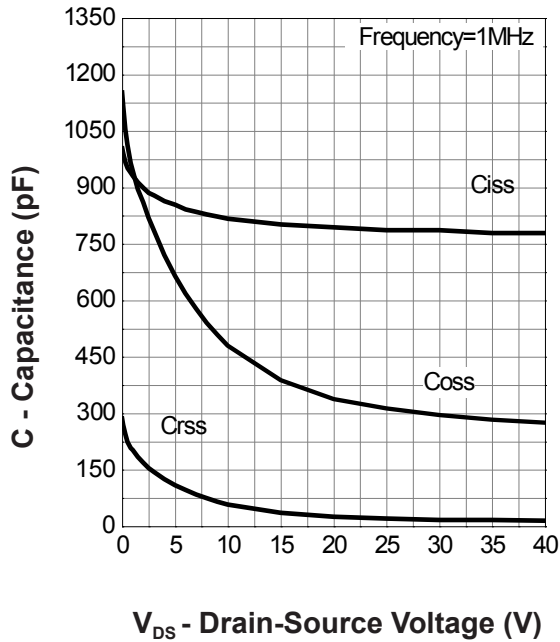
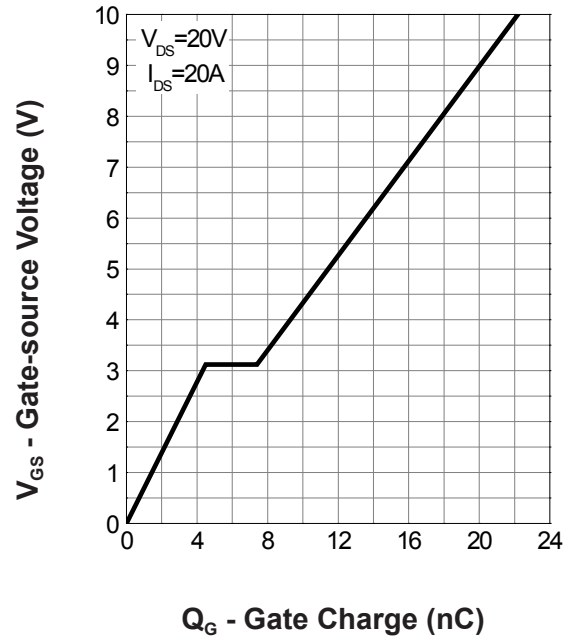
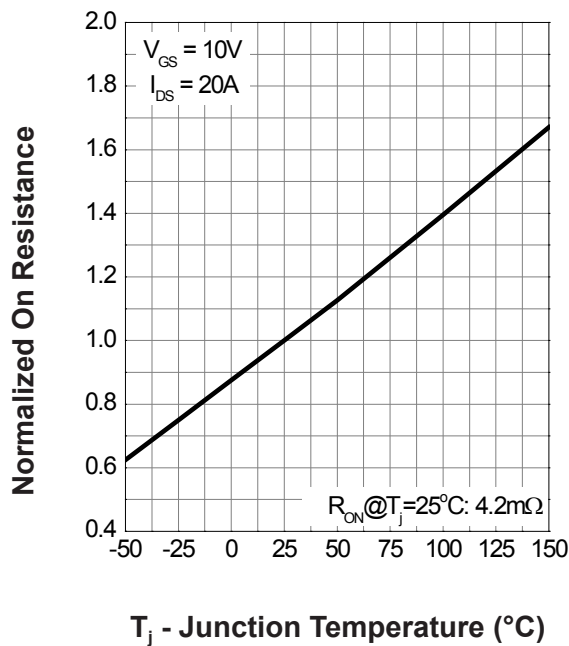
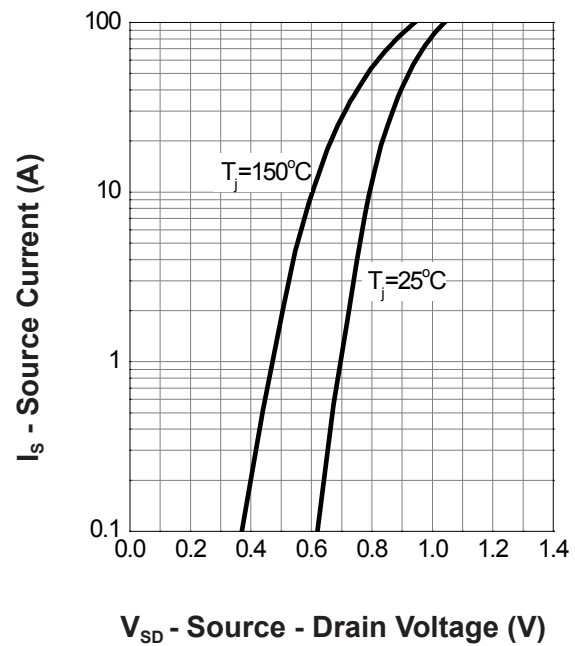
Output Characteristics



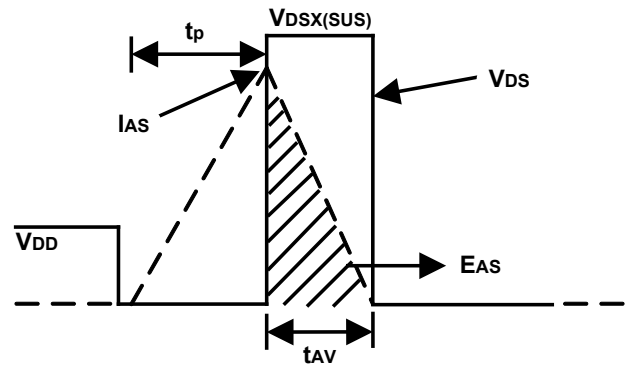
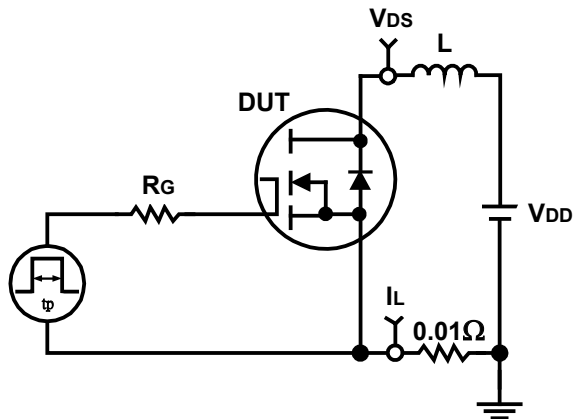
Drain-Source On Resistance



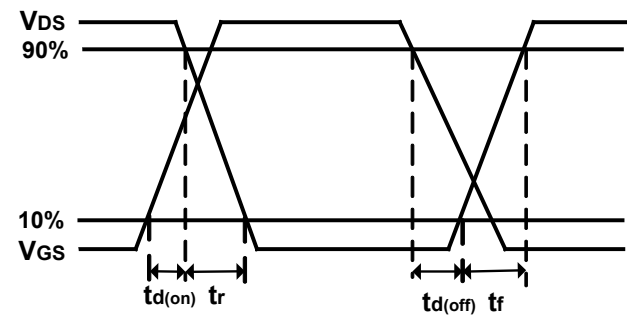
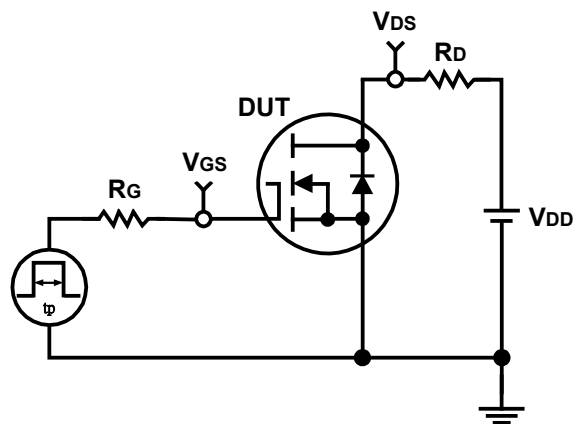
Typical Operating Characteristics(Cont.)

Capacitance

Gate Charge

Drain-Source On Resistance

Source-Drain Diode Forward


Avalanche Test Circuit and Waveforms

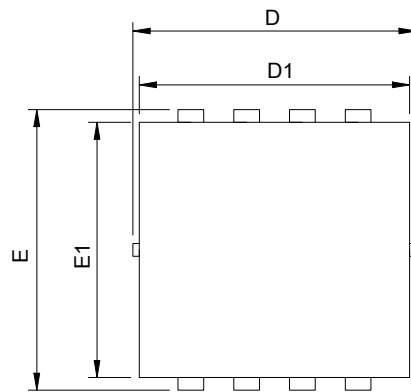


Switching Time Test Circuit and Waveforms

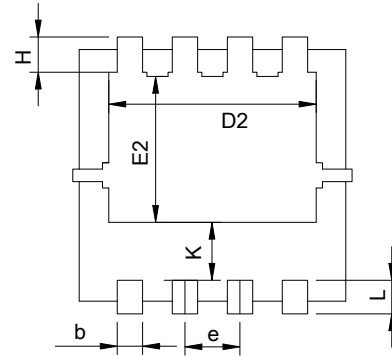


Package Information

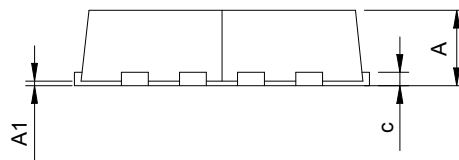
DFN3X3



Top View



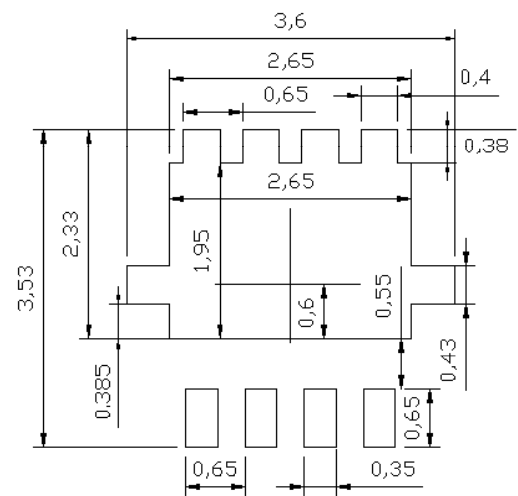
Bottom View



Side View

SYMBOL	DFN3X3			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.10	0.25	0.004	0.010
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.59	0.093	0.102
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.98	0.065	0.078
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022

RECOMMENDED LAND PATTERN



UNIT: mm