



**ZXMN15A27K**

**150V N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = 25^\circ C$
150V	650m $\Omega$ @ $V_{GS} = 10V$	2.6A

**Description and Applications**

This MOSFET features low on-state resistance, fast switching and high avalanche withstand capability, making it ideal for high efficiency power management applications.

- SLIC line drivers for VoIP applications
- Transformer Driving Switch
- Power management functions
- Motor control
- Uninterrupted power supply

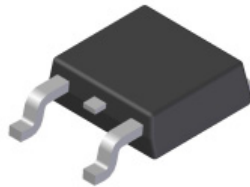
**Features and Benefits**

- 100% Unclamped Inductive Switch (UIS) test in production
- High avalanche energy pulse withstand capability
- Low input capacitance
- Low on-resistance
- Fast switching speed
- "Green" component and RoHS Compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

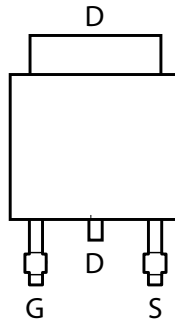
**Mechanical Data**

- Case: TO252-3L
- Case Material: Molded Plastic "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (approximate)

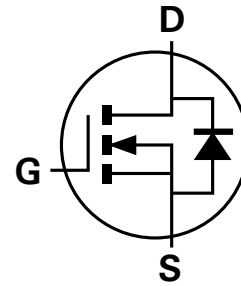
TO252-3L



Top View



Pin Out – Top View



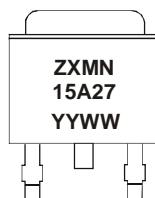
Equivalent Circuit

**Ordering Information (Note 1)**

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN15A27KTC	See Below	13	16	2,500

Notes: 1. Diodes, Inc. defines "Green" products as those which are Eu RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.'s "Green" Policy can be found on our website. For packaging details, go to our website.

**Marking Information**



ZXMN = Product Type Marking Code, Line 1  
15A27 = Product Type Marking Code, Line 2  
YYWW = Date Code Marking  
YY = Last two digits of year (ex: 09 = 2009)  
WW = Week (01-52)

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

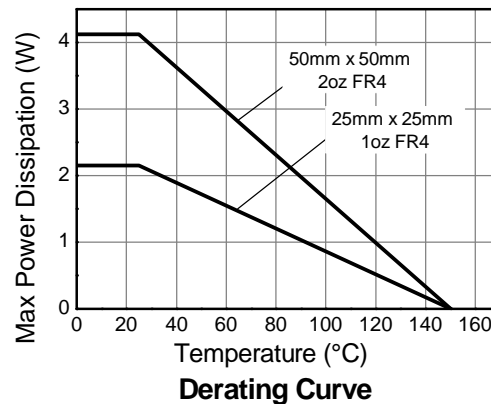
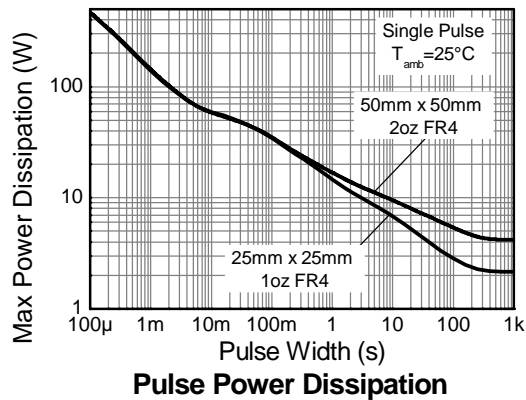
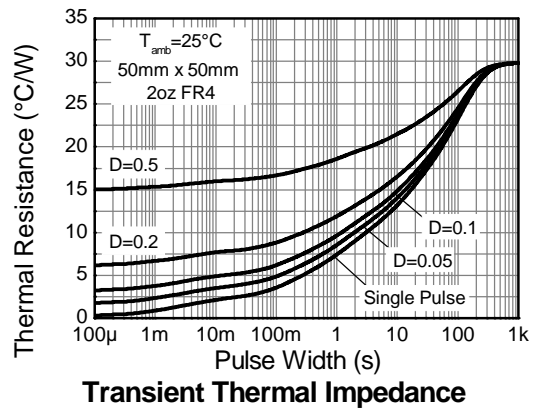
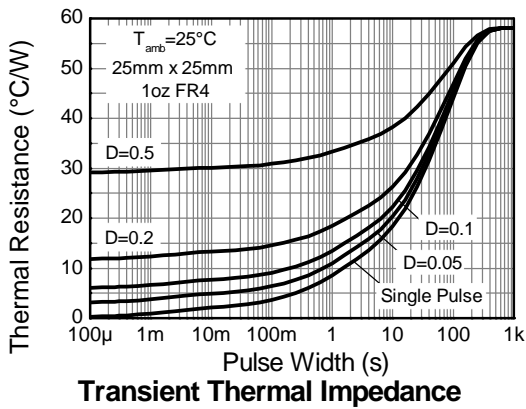
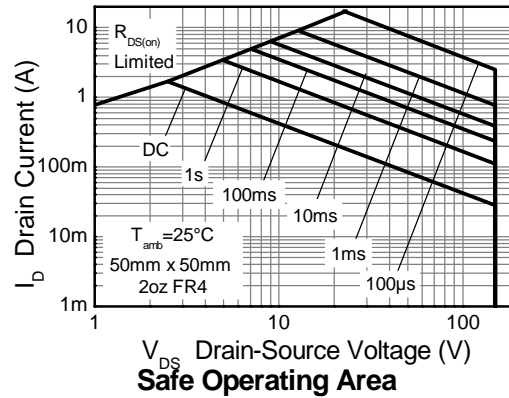
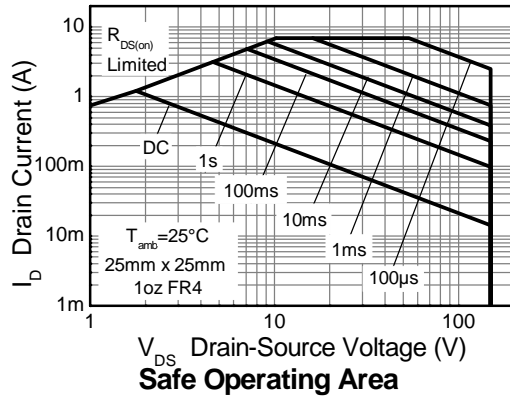
Characteristic		Symbol	Value	Unit
Drain-Source voltage		V <sub>DSS</sub>	150	V
Gate-Source voltage		V <sub>GS</sub>	±25	V
Single Pulsed Avalanche Energy	(Note 7)	E <sub>AS</sub>	55	mJ
Single Pulsed Avalanche Energy	(Note 7)	I <sub>AS</sub>	4.3	A
Repetitive Avalanche Energy	(Note 4)	E <sub>AR</sub>	3.0	mJ
Repetitive Avalanche Current	(Note 4)	I <sub>AR</sub>	4.3	A
Continuous Drain current	V <sub>GS</sub> = 10V T <sub>A</sub> = 70°C (Note 3)	I <sub>D</sub>	2.55	A
			2.0	
			1.7	
Pulsed Drain current	V <sub>GS</sub> = 10V (Note 4)	I <sub>DM</sub>	17.2	A
Continuous Source current (Body diode)		I <sub>S</sub>	5.2	A
Pulsed Source current (Body diode)		I <sub>SM</sub>	17.2	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 2)	P <sub>D</sub>	4.2	W mW/°C
			33.6	
	(Note 3)		9.5	
			76.0	
	(Note 6)		2.2	
			17.2	
Thermal Resistance, Junction to Ambient	(Note 2)	R <sub>θJA</sub>	30.2	°C/W
	(Note 3)		13.1	
	(Note 6)		58.1	
Thermal Resistance, Junction to Lead	(Note 5)	R <sub>θJL</sub>	2.06	°C/W
Operating and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

- Notes:
2. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions. The device is measured when operating in a steady-state condition.
  3. Same as note 2, except the device is measured at t ≤ 10 sec.
  4. Same as note 2, except the device is operating in a repetitive state with pulse width and duty cycle limited by maximum junction temperature.
  5. Thermal resistance from junction to solder-point at the end of the drain lead.
  6. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition..
  7. UIS in production with L = 5.95mH, I<sub>AS</sub> = 4.3A, R<sub>G</sub> = 25Ω, V<sub>DD</sub> = 100V, starting T<sub>J</sub> = 25°C.

## Thermal Characteristics

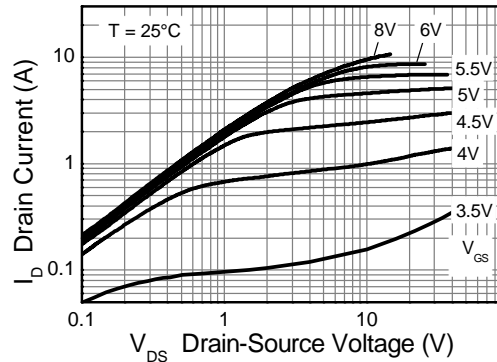


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

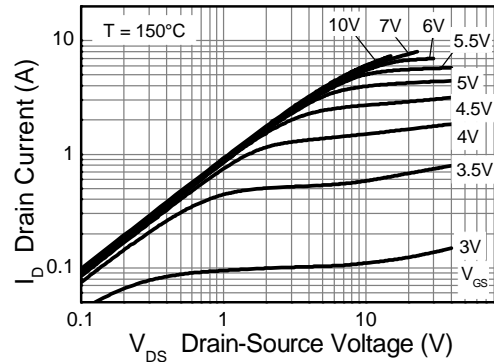
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	150	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	500	nA	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V <sub>GS(th)</sub>	2	2.7	4	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 8)	R <sub>DS (ON)</sub>	—	0.500	0.650	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.15A
Forward Transconductance (Notes 8 & 9)	g <sub>fs</sub>	—	2.8	—	S	V <sub>DS</sub> = 40V, I <sub>D</sub> = 2.15A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	0.880	0.950	V	I <sub>S</sub> = 4.3A, V <sub>GS</sub> = 0V
Reverse recovery time (Note 9)	t <sub>rr</sub>	—	153	—	ns	I <sub>S</sub> = 5.4A, V <sub>GS</sub> = 0V, di/dt = 100A/μs
Reverse recovery charge (Note 9)	Q <sub>rr</sub>	—	1.1	—	μC	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C <sub>iss</sub>	—	169	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	64.5	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	23.3	—	pF	
Total Gate Charge	Q <sub>g</sub>	—	6.6	—	nC	V <sub>DS</sub> = 120V, V <sub>GS</sub> = 10V I <sub>D</sub> = 5.4A
Gate-Source Charge	Q <sub>gs</sub>	—	1.0	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	3.4	—	nC	
Turn-On Delay Time (Note 10)	t <sub>D(on)</sub>	—	3.3	—	ns	V <sub>DD</sub> = 75V, V <sub>GS</sub> = 10V I <sub>D</sub> = 5.4A, R <sub>G</sub> ≅ 25Ω
Turn-On Rise Time (Note 10)	t <sub>r</sub>	—	12.7	—	ns	
Turn-Off Delay Time (Note 10)	t <sub>D(off)</sub>	—	17.1	—	ns	
Turn-Off Fall Time (Note 10)	t <sub>f</sub>	—	13.3	—	ns	

Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%  
9. For design aid only, not subject to production testing.  
10. Switching characteristics are independent of operating junction temperatures.

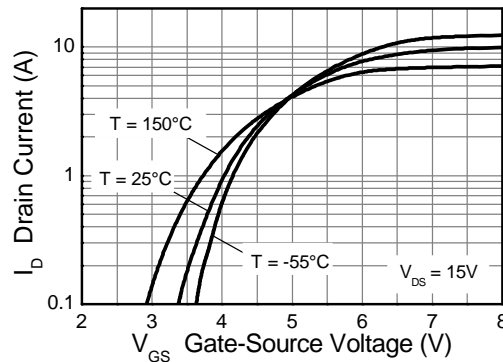
## Typical Characteristics



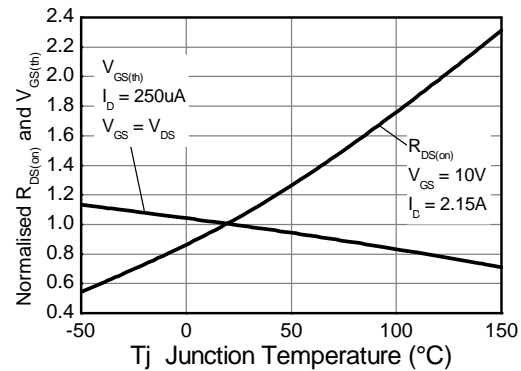
**Output Characteristics**



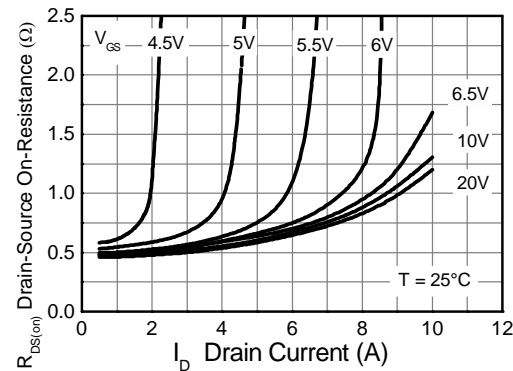
**Output Characteristics**



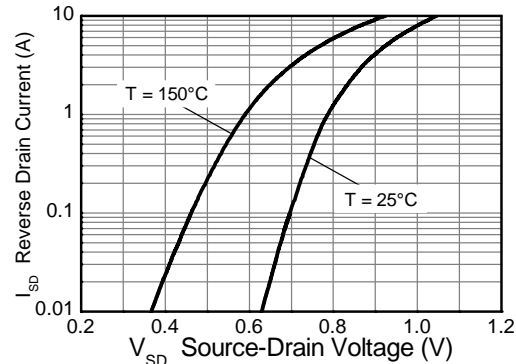
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

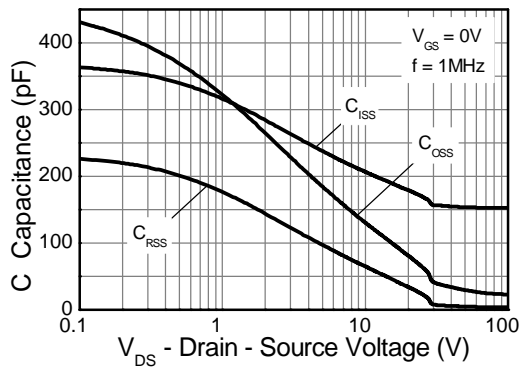


**On-Resistance v Drain Current**

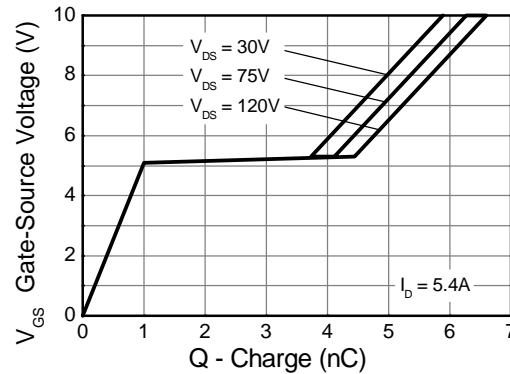


**Source-Drain Diode Forward Voltage**

## Typical Characteristics - continued

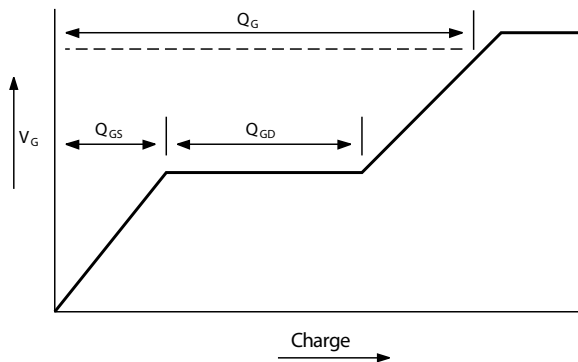


Capacitance v Drain-Source Voltage

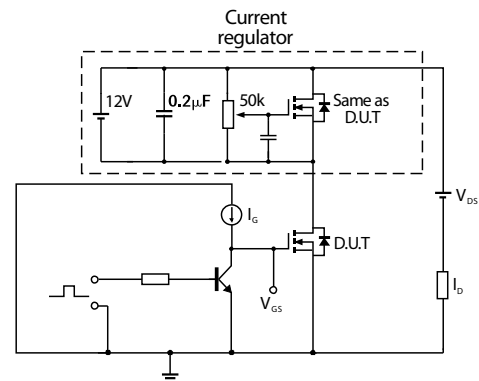


Gate-Source Voltage v Gate Charge

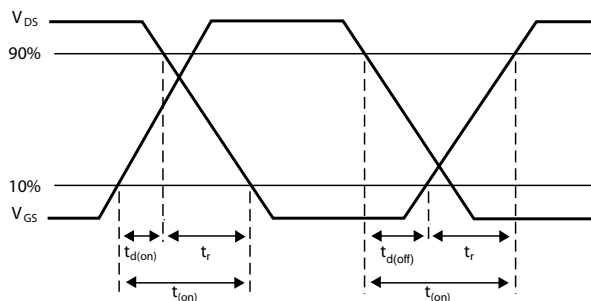
## Test Circuits



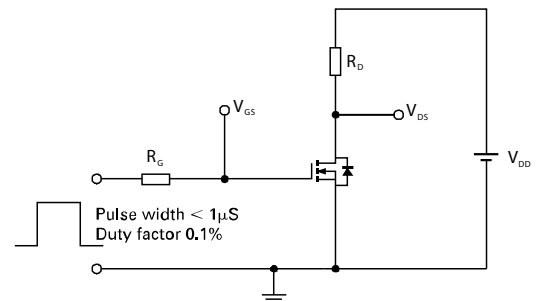
Basic gate charge waveform



Gate charge test circuit



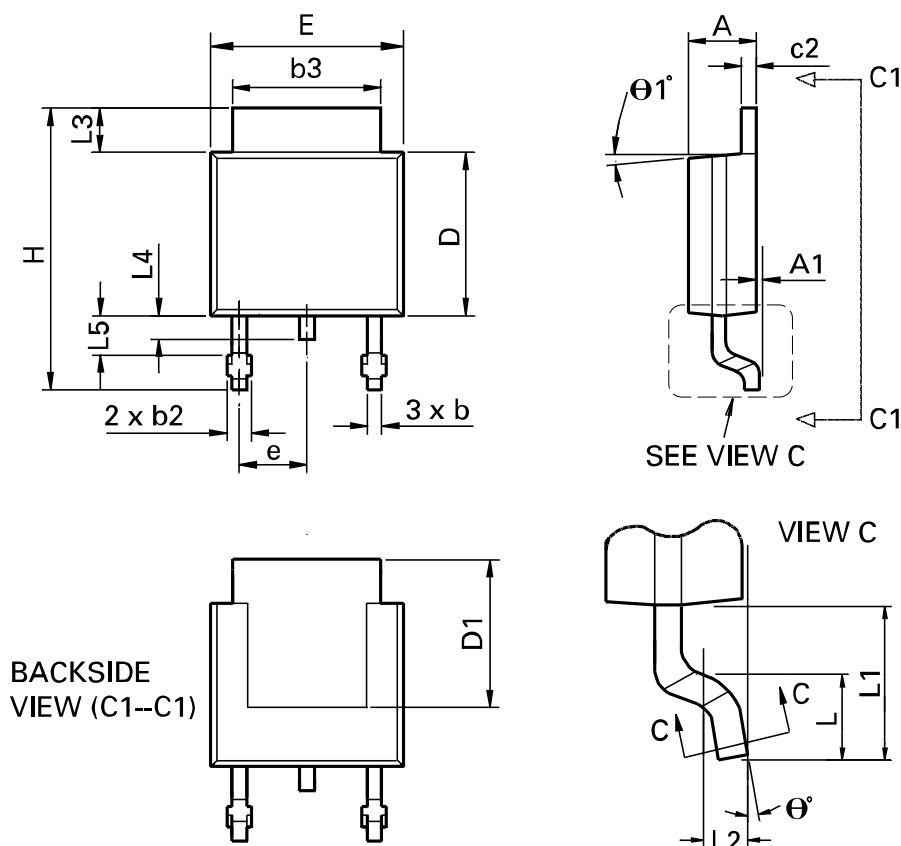
Switching time waveforms



Switching time test circuit

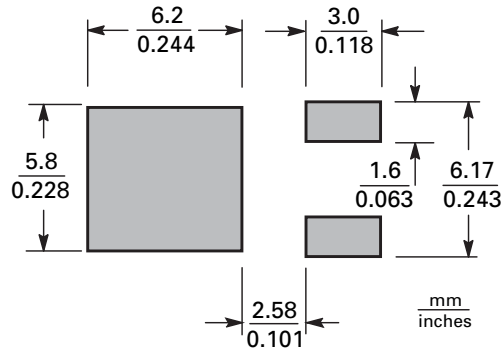
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## Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.086	0.094	2.18	2.39	e	0.090 BSC		2.29 BSC	
A1	-	0.005	-	0.127	H	0.370	0.410	9.40	10.41
b	0.020	0.035	0.508	0.89	L	0.055	0.070	1.40	1.78
b2	0.030	0.045	0.762	1.14	L1	0.108 REF		2.74 REF	
b3	0.205	0.215	5.21	5.46	L2	0.020 BSC		0.508 BSC	
c	0.018	0.024	0.457	0.61	L3	0.035	0.065	0.89	1.65
c2	0.018	0.023	0.457	0.584	L4	0.025	0.040	0.635	1.016
D	0.213	0.245	5.41	6.22	L5	0.045	0.060	1.14	1.52
D1	0.205	-	5.21	-	theta 1 degree	0 degree	10 degree	0 degree	10 degree
E	0.250	0.265	6.35	6.73	theta degree	0 degree	15 degree	0 degree	15 degree
E1	0.170	-	4.32	-	-	-	-	-	-

## Suggested Pad Layout



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