

**Description**

The 80N03 TO-252 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

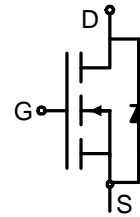
**General Features**

VDSS	RDS(typ)	ID
30V	4.9mΩ @10V	80A
	7.3mΩ @4.5V	

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

**Application**

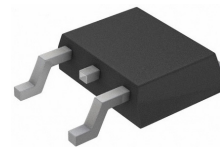
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



Marking and pin Assignment



TO-252

**Absolute Maximum Ratings (TA=25°C unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous	$I_D$	80	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	300	A
Maximum Power Dissipation	$P_D$	55	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

**Thermal Characteristic**

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	1.8	°C/W
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**Electrical Characteristics (TA=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	32	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=28V, V_{GS}=0V$	-	-	500	nA



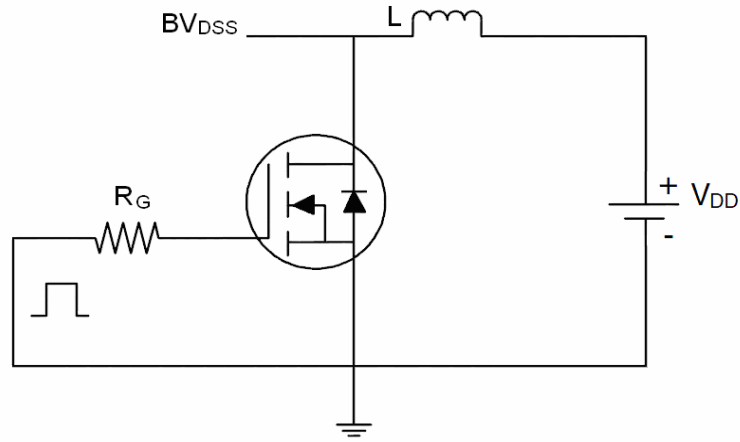
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.3	2.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$		4.9	5.5	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$		7.3	8.5	
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=20A$	15			S
<b>Dynamic Characteristics</b> (Note4)						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	2016	-	PF
Output Capacitance	$C_{oss}$		-	251	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	230	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=30A$ $V_{GS}=10V, R_G=2.7\Omega$	-	20	-	nS
Turn-on Rise Time	$t_r$		-	15	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	60	-	nS
Turn-Off Fall Time	$t_f$		-	10	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=30A,$ $V_{GS}=10V$	-	60.5	-	nC
Gate-Source Charge	$Q_{gs}$		-	8.1	-	nC
Gate-Drain Charge	$Q_{gd}$		-	7.8	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=30A$	-	0.90	12	V
Diode Forward Current (Note 2)	$I_S$		-	-	80	A

**Notes:**

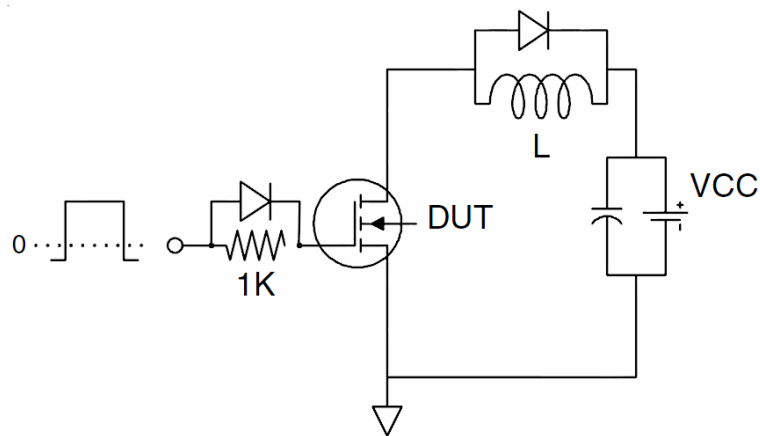
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

**Test Circuit**

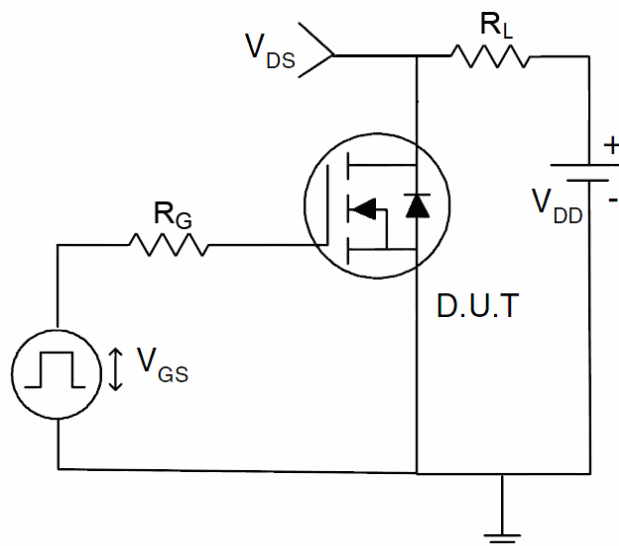
**1)  $E_{AS}$  Test Circuits**



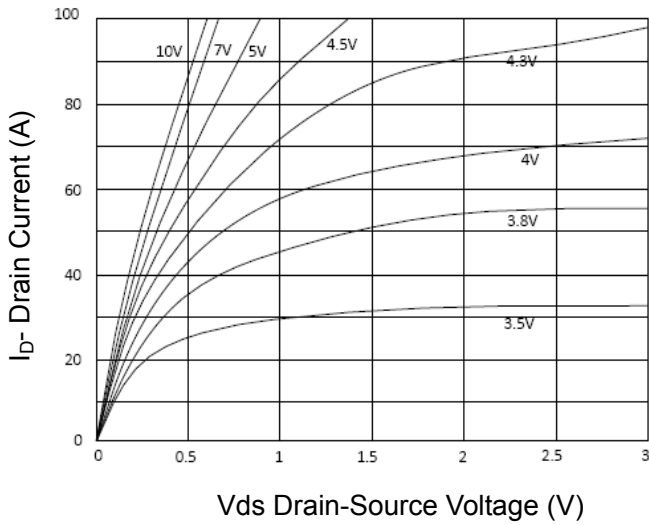
**2) Gate Charge Test Circuit:**



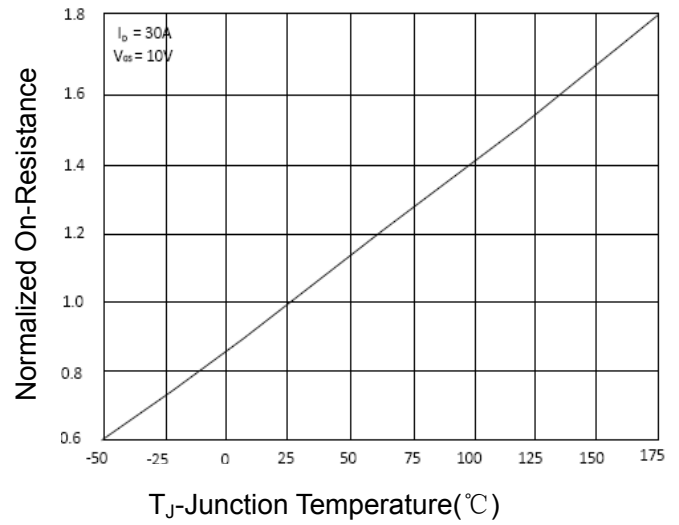
**3) Switch Time Test Circuit:**



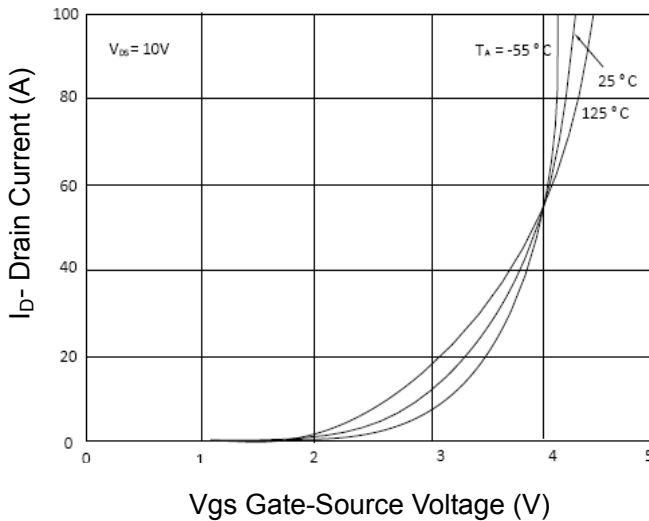
Typical Electrical and Thermal Characteristics (Curves)



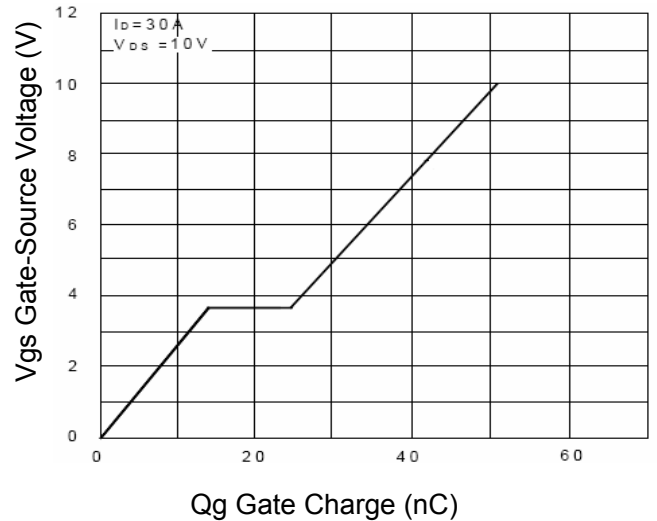
Vds Drain-Source Voltage (V)  
**Figure 1 Output Characteristics**



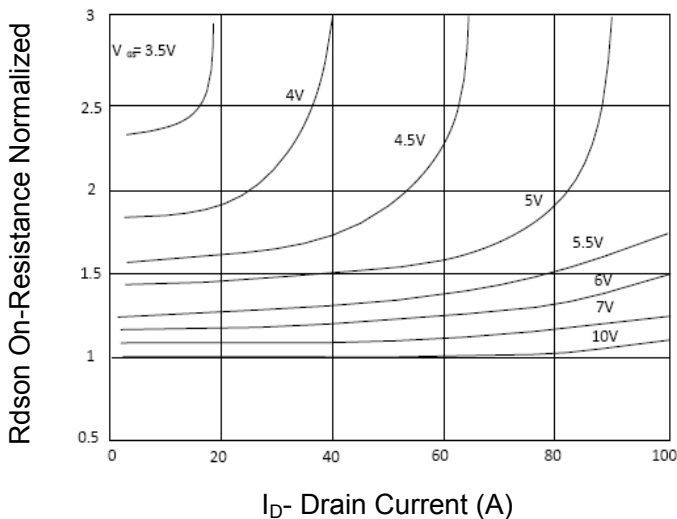
Tj-Junction Temperature(°C)  
**Figure 4 Rdson-Junction Temperature**



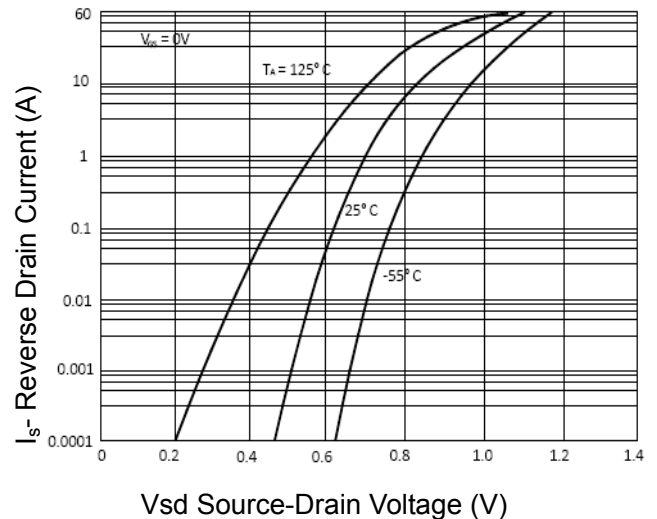
Vgs Gate-Source Voltage (V)  
**Figure 2 Transfer Characteristics**



Qg Gate Charge (nC)  
**Figure 5 Gate Charge**



Id- Drain Current (A)  
**Figure 3 Rdson- Drain Current**



Vsd Source-Drain Voltage (V)  
**Figure 6 Source- Drain Diode Forward**

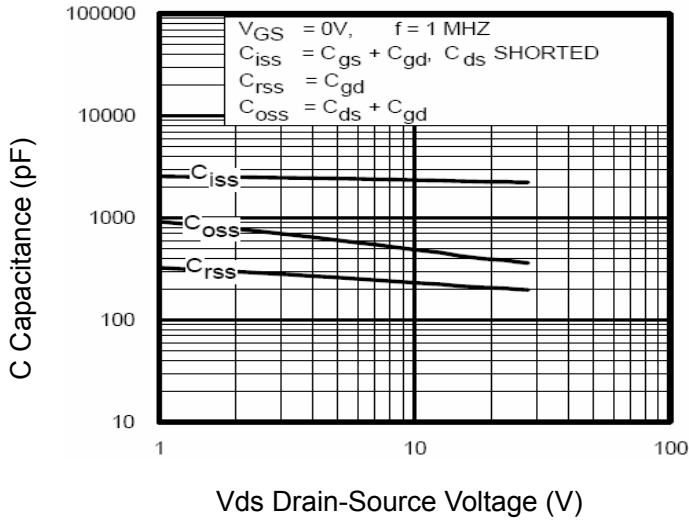


Figure 7 Capacitance vs Vds

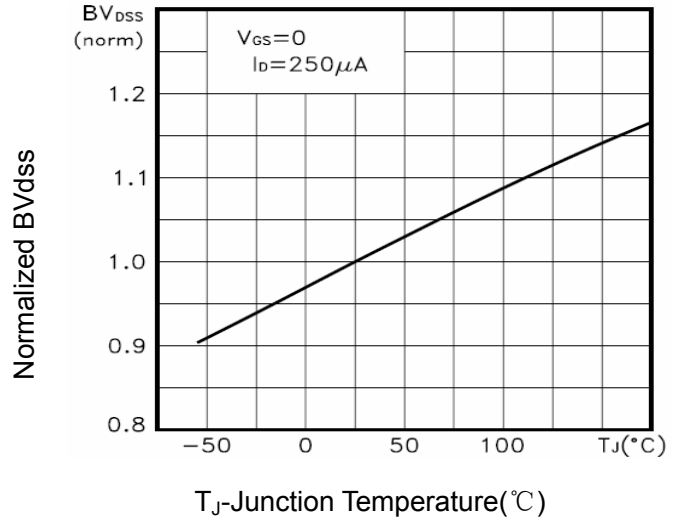


Figure 9  $BV_{DSS}$  vs Junction Temperature

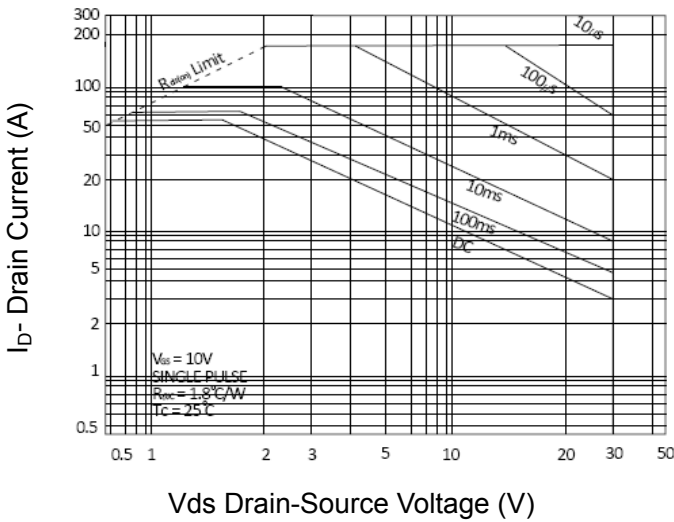


Figure 8 Safe Operation Area

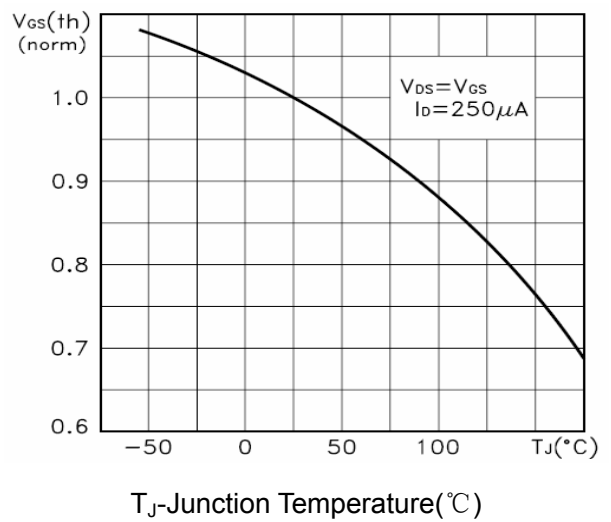


Figure 10  $V_{GS(th)}$  vs Junction Temperature

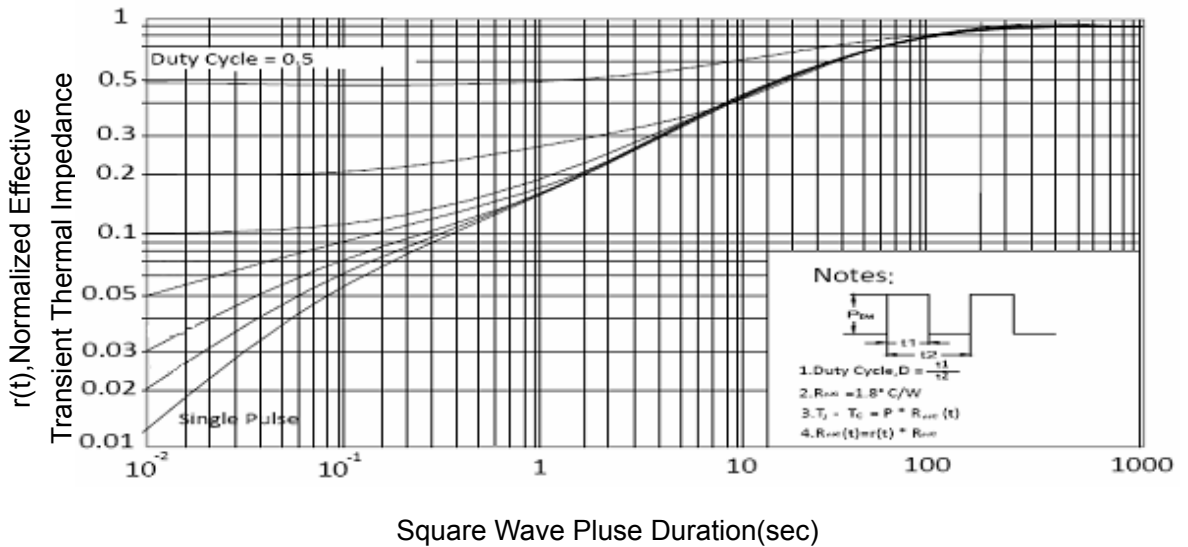
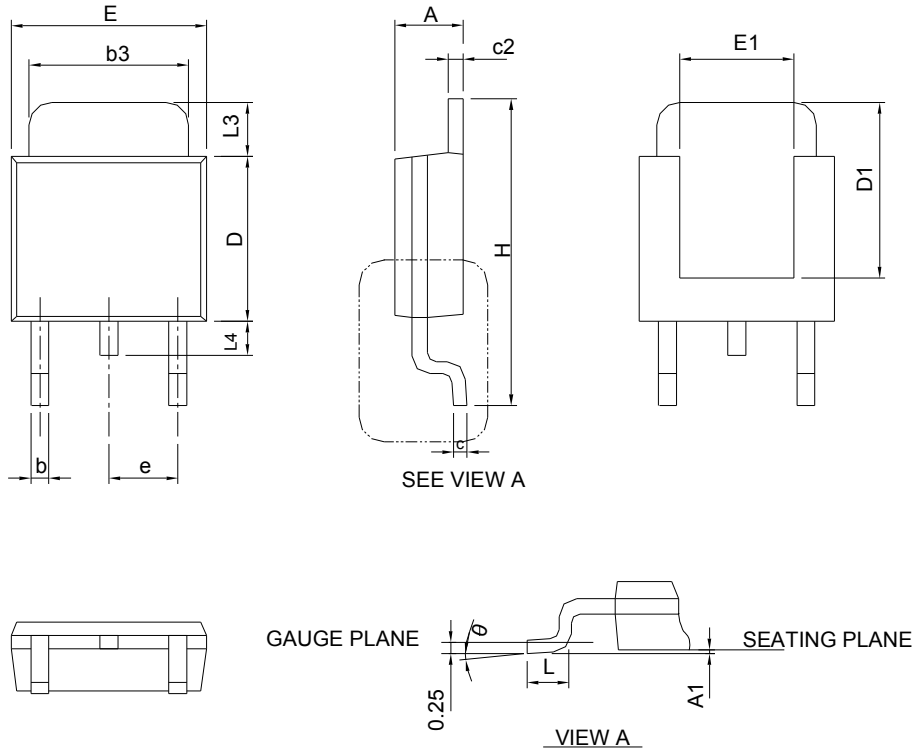


Figure 11 Normalized Maximum Transient Thermal Impedance

**Package Information**

TO-252-2L



SYMBOL	TO-252-3			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1		0.13		0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4		1.02		0.040
θ	0°	8°	0°	8°

**RECOMMENDED LAND PATTERN**

