

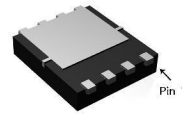
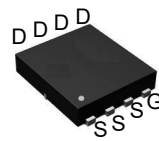
Features

- 30V/54A,
 $R_{DS(ON)} = 4m\Omega(\text{typ.}) @ V_{GS} = 10V$
 $R_{DS(ON)} = 6.3m\Omega(\text{typ.}) @ V_{GS} = 4.5V$
- Avalanche Rated
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available
(RoHS Compliant)

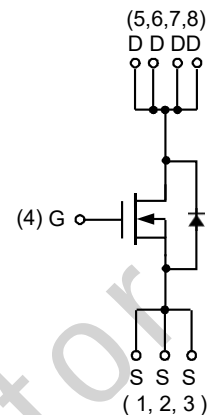
Applications

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

Pin Description



PDFN3x3_8L_EP1_P



N-Channel MOSFET

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

Symbol	Parameter		Rating	Unit
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		± 20	
I_D^a	Continuous Drain Current ($V_{GS}=10V$)	$T_A=25^\circ\text{C}$	12	A
		$T_A=70^\circ\text{C}$	9.5	
I_{DM}^a	Pulsed Drain Current ($V_{GS}=10V$)	$T_A=25^\circ\text{C}$	40	
I_D^d		$T_C=25^\circ\text{C}$	54	
	Continuous Drain Current ($V_{GS}=10V$)	$T_C=70^\circ\text{C}$	42	
I_{DM}		$T_C=25^\circ\text{C}$	110	
I_S	Diode Continuous Forward Current		40	mJ
I_{AS}^b	Avalanche Current, Single pulse	$L=0.1mH$	25	
E_{AS}^b	Avalanche Energy, Single pulse	$L=0.1mH$	31.25	$^\circ\text{C}$
T_J	Maximum Junction Temperature		150	
T_{STG}	Storage Temperature Range		-55 to 150	W
P_D^a	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	1.6	
		$T_A=70^\circ\text{C}$	1	W
P_D^d	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	29	
		$T_C=70^\circ\text{C}$	19	$^\circ\text{C}/\text{W}$
$R_{\theta JA}^{a,c}$	Thermal Resistance-Junction to Ambient	$t \leq 10s$	35	
		Steady State	60	$^\circ\text{C}/\text{W}$
$R_{\theta JC}^d$	Thermal Resistance-Junction to Case	Steady State	3.5	

Note a: Surface Mounted on 1in^2 pad area, $t \leq 10\text{sec}$.

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

Note c: Maximum under Steady State conditions is $75^\circ\text{C}/\text{W}$.

Note d: The power dissipation P_D is based on $T_{J(MAX)} = 150^\circ\text{C}$, and it is useful for reducing junction-to-case thermal resistance ($R_{\theta JC}$) when additional heat sink is used.

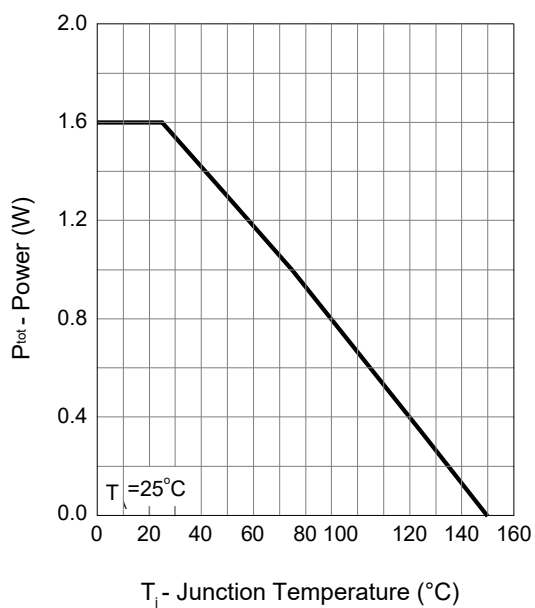
Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	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	1.5	1.8	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =12A V _{GS} =4.5V, I _{DS} =9A	- -	4.0 6.3	5.5 7.5	mΩ
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =2A, V _{GS} =0V	-	0.8	1.1	V
t _{rr} ^b	Reverse Recovery Time	I _{SD} =12A, dI _{SD} /dt=100A/μs	-	10	-	ns
t _a	Charge Time		-	7	-	
t _b	Discharge Time		-	2.7	-	
Q _{rr} ^b	Reverse Recovery Charge		-	3	-	nC
Dynamic Characteristics ^b						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	3	4.5	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	560	1100	1540	pF
C _{oss}	Output Capacitance		185	265	345	
C _{rss}	Reverse Transfer Capacitance		99	105	231	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	14	26	ns
t _r	Turn-on Rise Time		-	10	19	
t _{d(OFF)}	Turn-off Delay Time		-	44	80	
t _f	Turn-off Fall Time		-	12	23	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =12A	-	28.3	39.6	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =12A	-	12.9	18	
Q _{gth}	Threshold Gate Charge		-	2.46	3.44	
Q _{gs}	Gate-Source Charge		-	4.22	5.9	
Q _{gd}	Gate-Drain Charge		-	7.3	10.2	

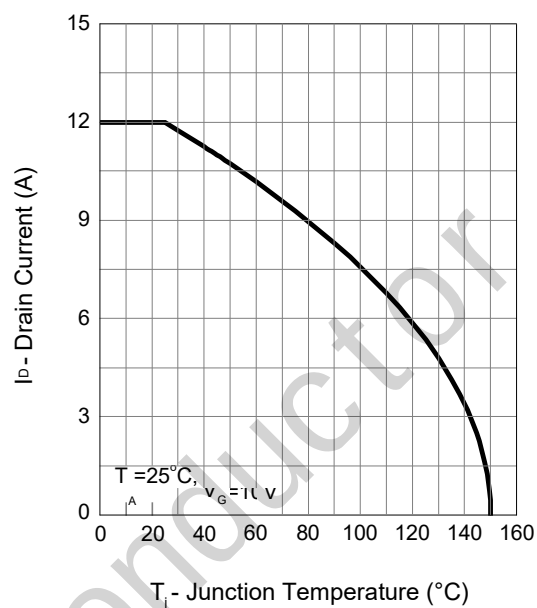
Note a: Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%.

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

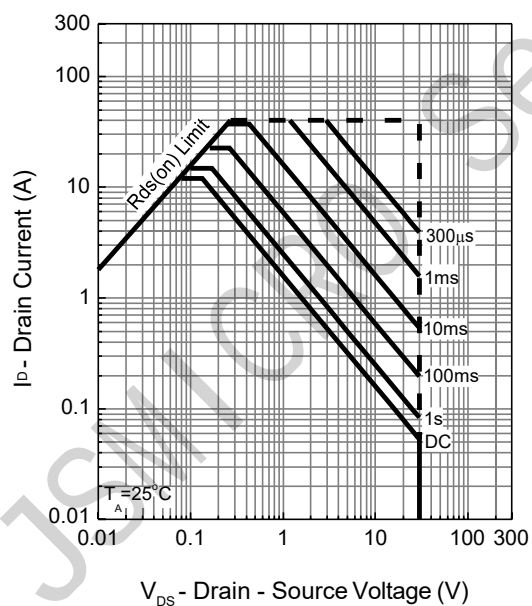
Power Dissipation



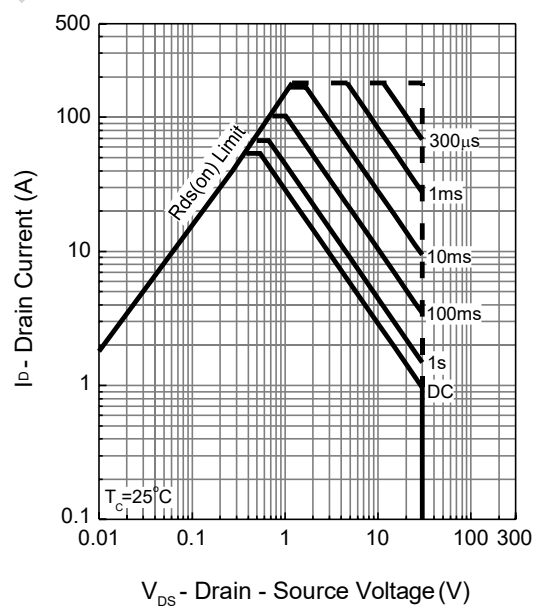
Drain Current



Safe Operation Area

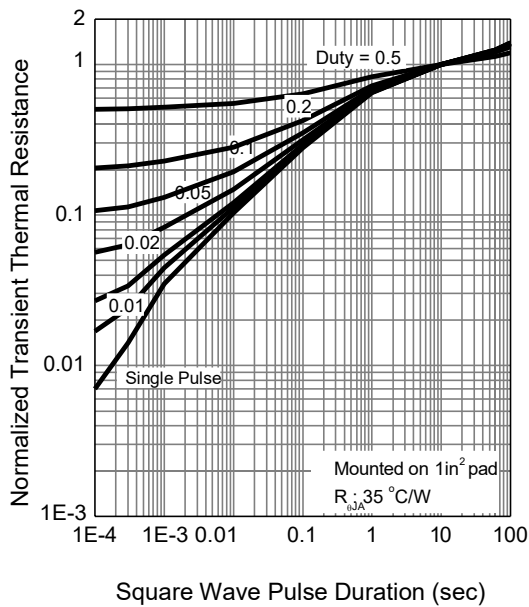


Safe Operation Area

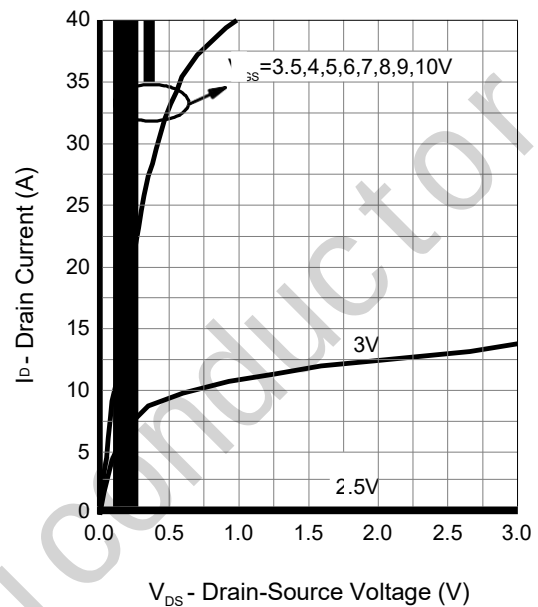


Typical Operating Characteristics (Cont.)

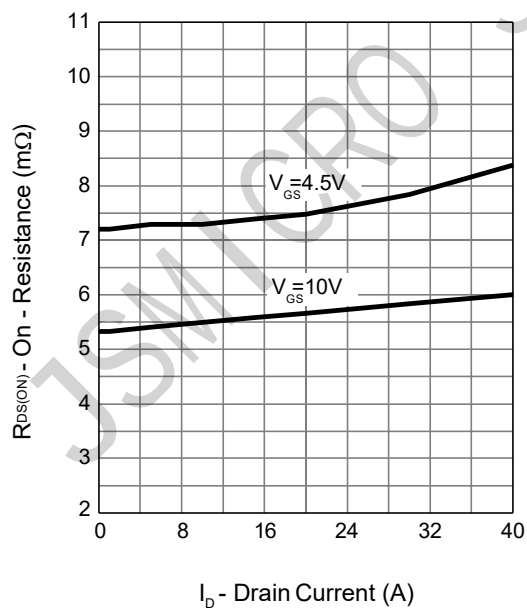
Thermal Transient Impedance



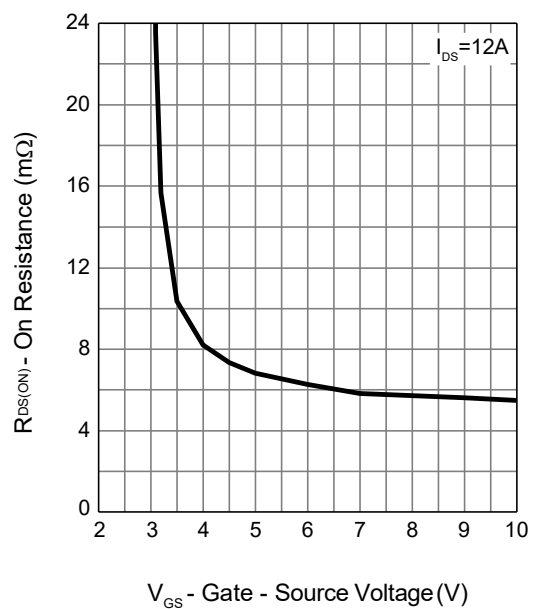
Output Characteristics



Drain-Source On Resistance

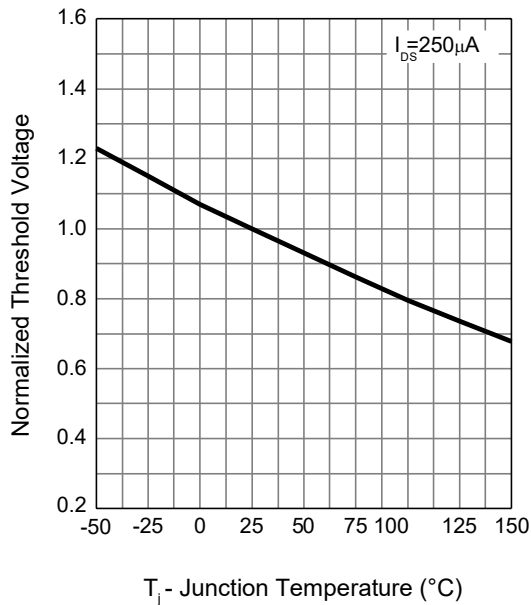


Gate-Source On Resistance

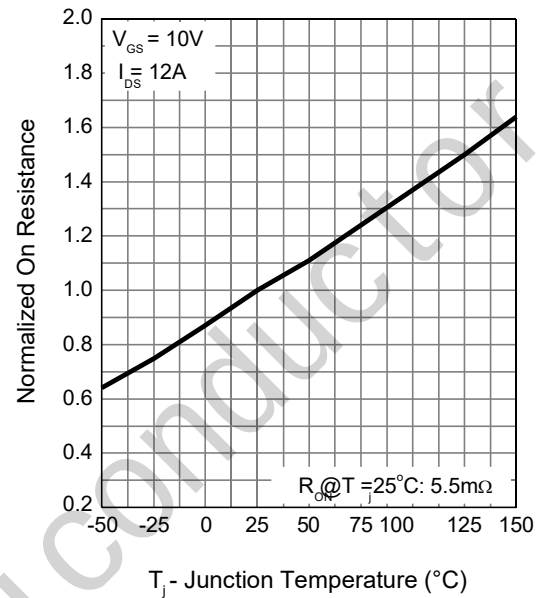


Typical Operating Characteristics (Cont.)

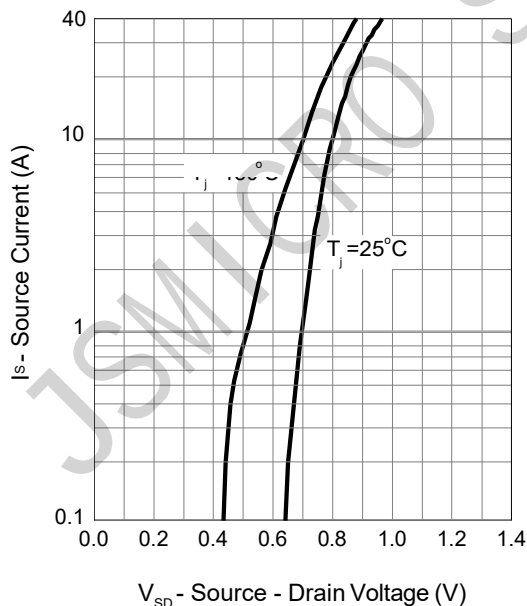
Gate Threshold Voltage



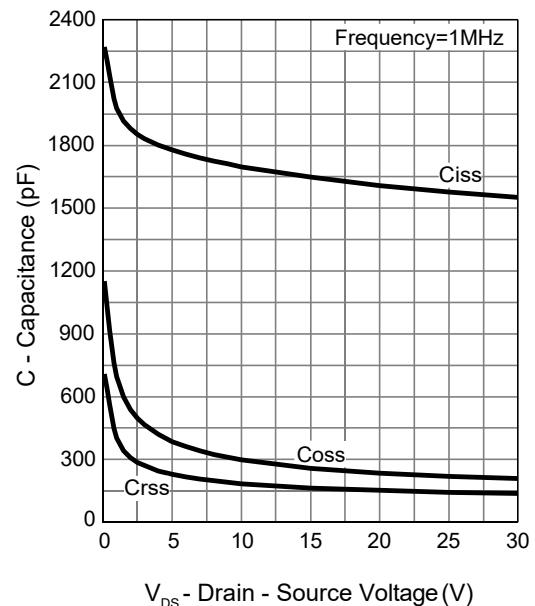
Drain-Source On Resistance



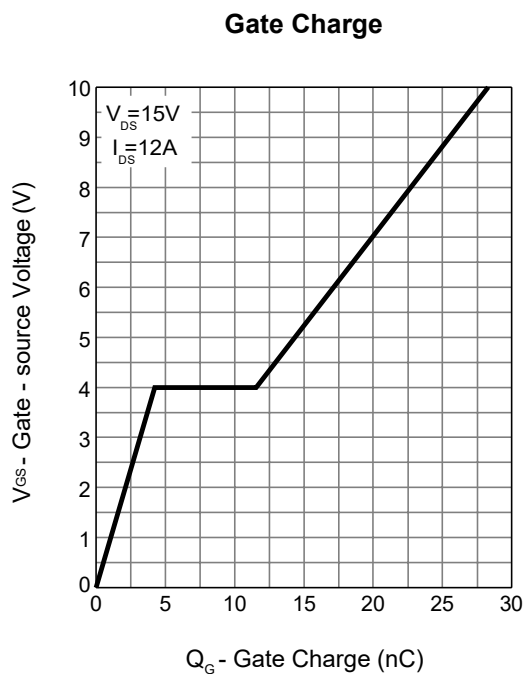
Source-Drain Diode Forward



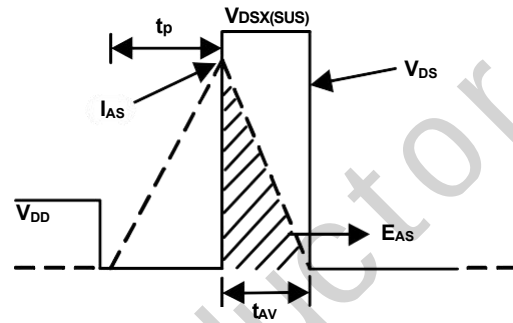
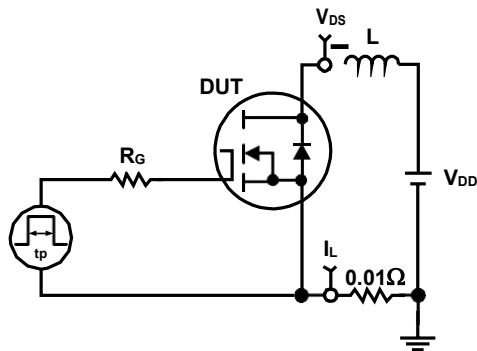
Capacitance



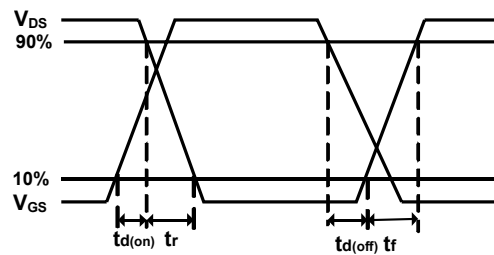
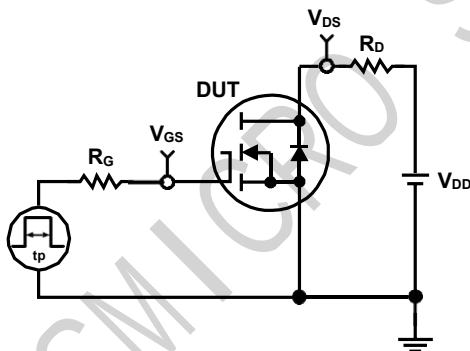
Typical Operating Characteristics (Cont.)



Avalanche Test Circuit and Waveforms

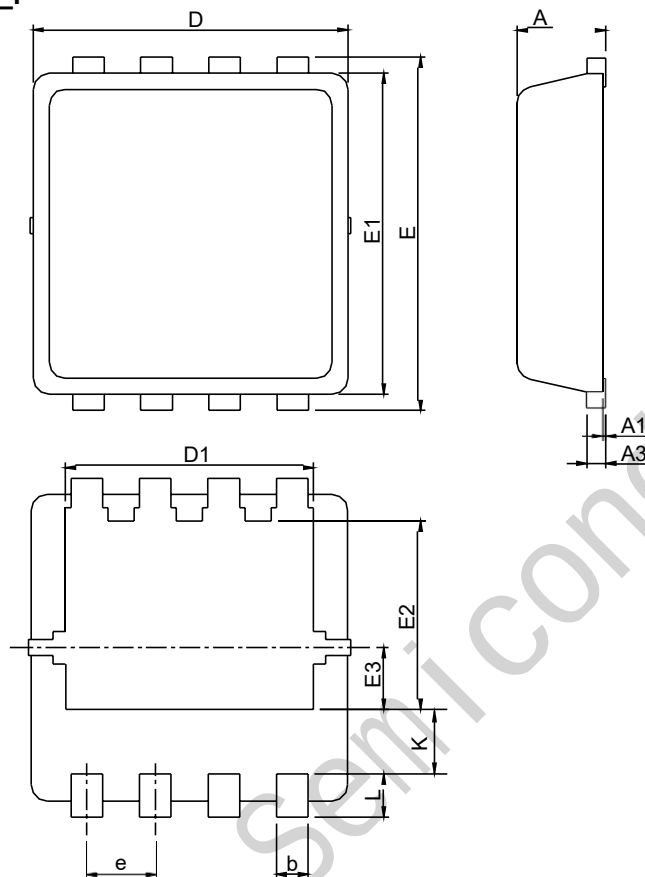


Switching Time Test Circuit and Waveforms



Package Information

PDFN3x3_8L_EP1_P



SYMBOL	PDFN3x3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.80	1.00	0.031	0.039
A1	0.00	0.05	0.000	0.002
A3	0.10	0.25	0.004	0.010
b	0.24	0.35	0.009	0.014
D	2.90	3.10	0.114	0.122
D1	2.25	2.45	0.089	0.096
E	3.10	3.30	0.122	0.130
E1	2.90	3.10	0.114	0.122
E2	1.65	1.85	0.065	0.073
E3	0.56	0.58	0.022	0.023
e	0.65 BSC		0.026 BSC	
K	0.475	0.775	0.019	0.031
L	0.30	0.50	0.012	0.020

RECOMMENDED LAND PATTERN

