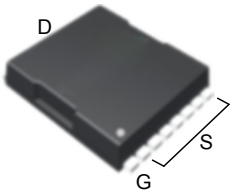
Features

- 40V/200A
  $R_{DS(ON)}$=1mΩ(typ.)@V_{GS}=10V
  $R_{DS(ON)}$=1.4mΩ(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)

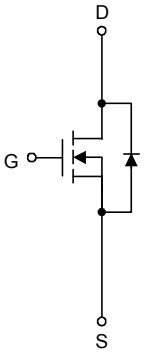
Applications

- SMPS Synchronous Rectification.
- Load Switch.
- DC-DC Conversion.

Pin Description



TO-LL



N-Channel MOSFET

Absolute Maximum Ratings (T_A=25°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	200	A
I_D	Continuous Drain Current	T_C=25°C	200	A
		T_C=100°C	120	
I_{DM} [b]	Pulsed Drain Current	T_C=25°C	380	
P_D	Maximum Power Dissipation	T_C=25°C	104	W
		T_C=100°C	42	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady state	1.2	°C/W
I_D	Continuous Drain Current	T_A=25°C	22.4	A
		T_A=70°C	18	
I_{DM} [b]	Pulsed Drain Current	T_C=25°C	90	
P_D	Maximum Power Dissipation	T_A=25°C	2.16	W
		T_A=70°C	1.38	
$R_{\theta JA}$ [c]	Thermal Resistance-Junction to Ambient	t ≤ 10s	17	°C/W
		Steady state	58	
I_{AS} [d]	Avalanche Current, Single pulse	L=0.1mH	150	A
E_{AS} [d]	Avalanche Energy, Single pulse	L=0.1mH	1125	mJ

Note a：Max. continuous current is limited by bonding wire.
Note b：Pulse width limited by max. junction temperature.
Note c：Surface mounted on 1in^2 pad area, steady state t = 999s.
Note d：UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_j=25°C).

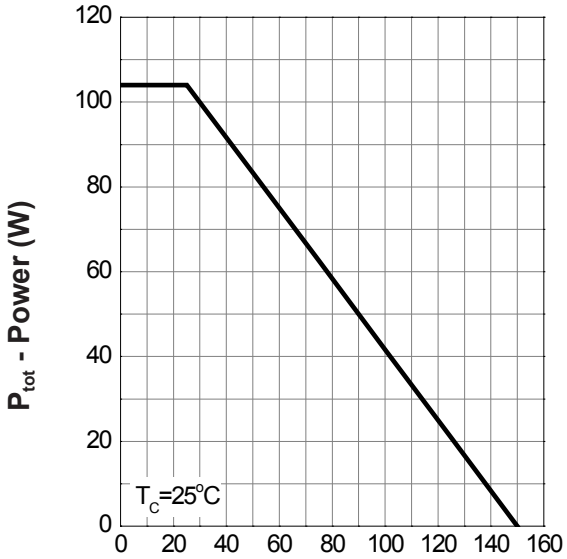
Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.3	1.7	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}=25A	-	1	1.5	mΩ
		T_J=125°C	-	2.2	-	
		V_{GS}=4.5V, I_{DS}=15A	-	1.4	2	
Gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=15A	-	47	-	S
Diode Characteristics						
V_{SD} [e]	Diode Forward Voltage	I_{SD}=25A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=25A, dI_{SD}/dt=100A/μs	-	38	-	ns
t_a	Charge Time		-	23.8	-	
t_b	Discharge Time		-	14.2	-	
Q_{rr}	Reverse Recovery Charge		-	30	-	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	-	9500	10389	pF
C_{oss}	Output Capacitance		-	4500	-	
C_{rss}	Reverse Transfer Capacitance		-	3200	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=20V, R_L=20Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	18.3	33	ns
t_r	Turn-on Rise Time		-	10.3	19	
$t_{d(OFF)}$	Turn-off Delay Time		-	57.5	104	
t_f	Turn-off Fall Time		-	51.3	93	
Gate Charge Characteristics [f]						
Q_g	Total Gate Charge	V_{DS}=20V, V_{GS}=10V, I_{DS}=25A	-	50	70	nC
Q_g	Total Gate Charge	V_{DS}=20V, V_{GS}=4.5V, I_{DS}=25A	-	23	-	
Q_{gth}	Threshold Gate Charge		-	5.3	-	
Q_{gs}	Gate-Source Charge		-	9.6	-	
Q_{gd}	Gate-Drain Charge		-	6.7	-	

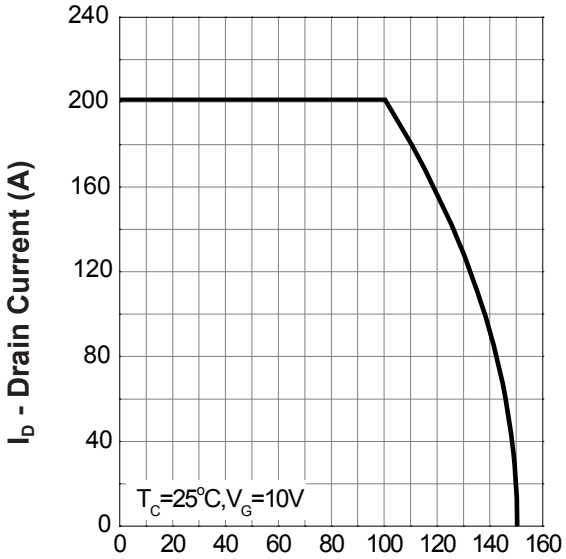
Note e：Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note f：Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

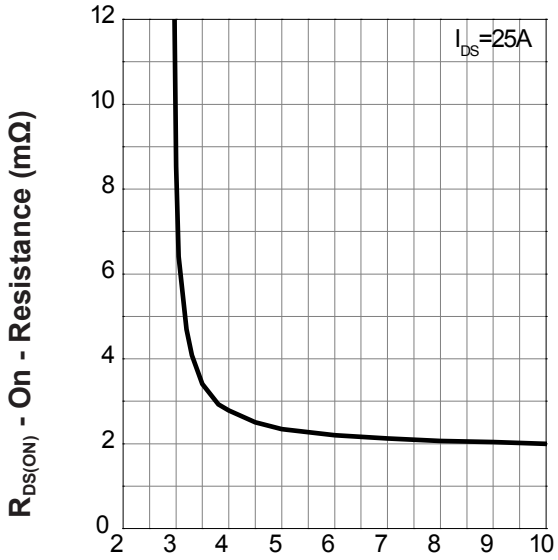
Power Dissipation



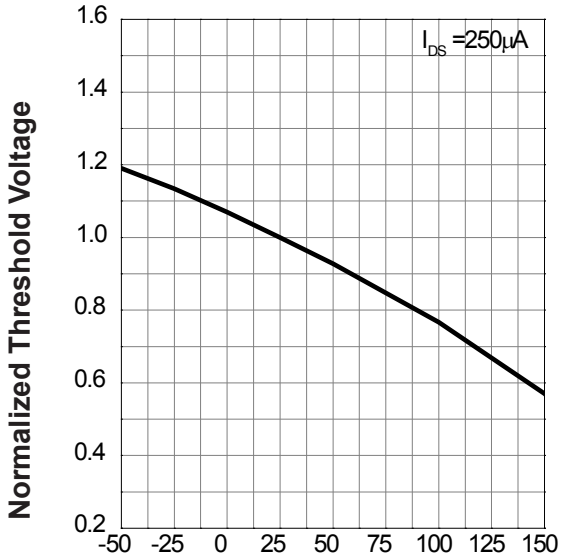
Drain Current



Gate-Source On Resistance

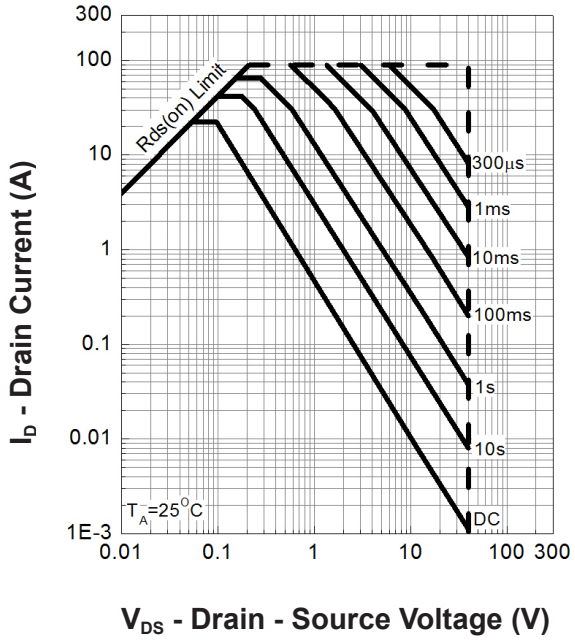


Gate Threshold Voltage

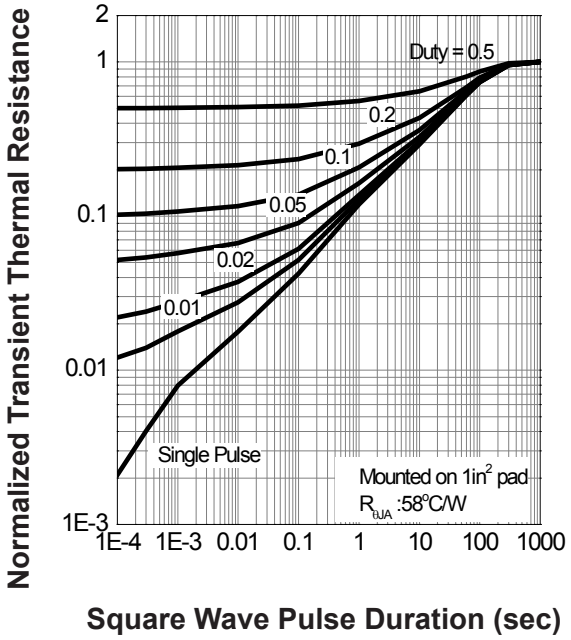


Typical Operating Characteristics(Cont.)

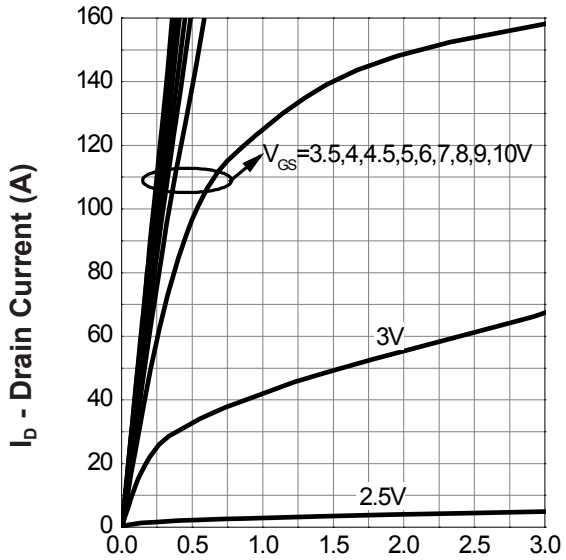
Safe Operation Area



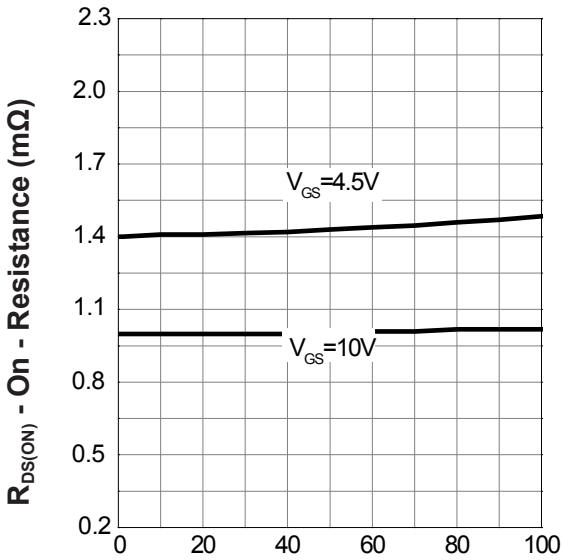
Thermal Transient Impedance



Output Characteristics

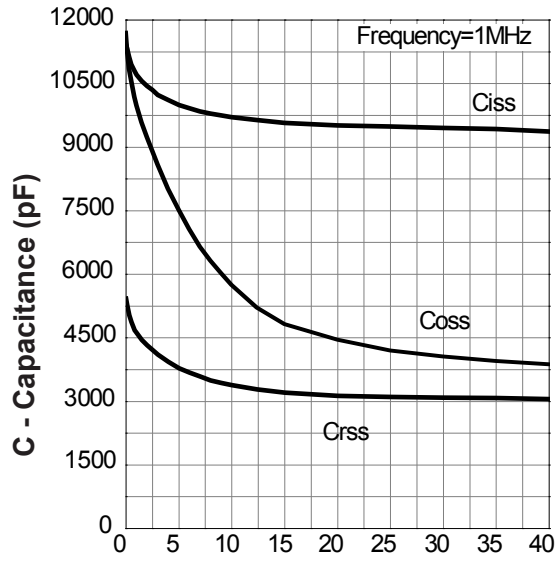


Drain-Source On Resistance

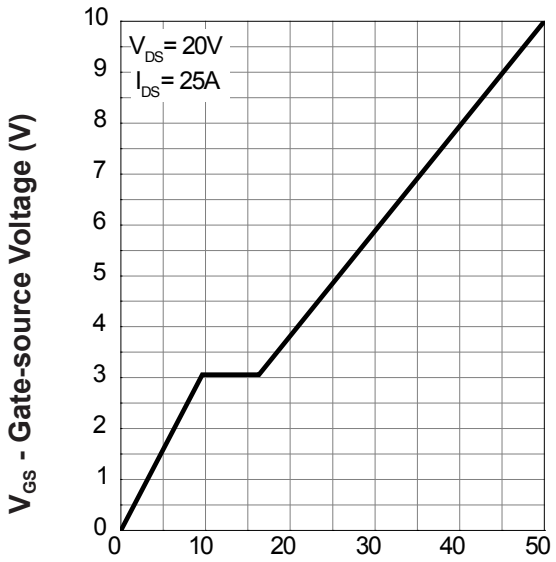


Typical Operating Characteristics(Cont.)

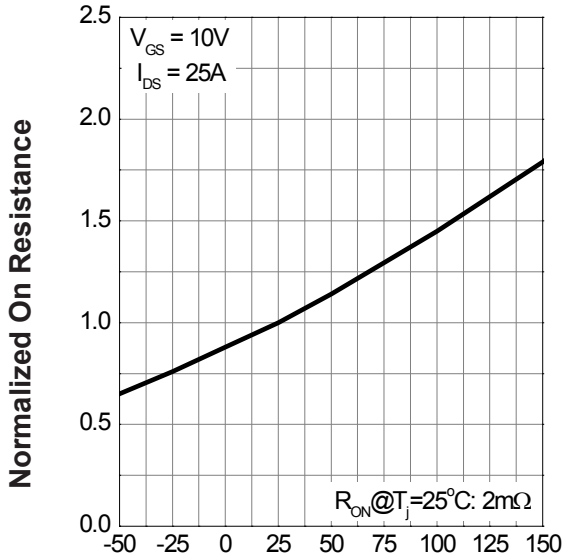
Capacitance



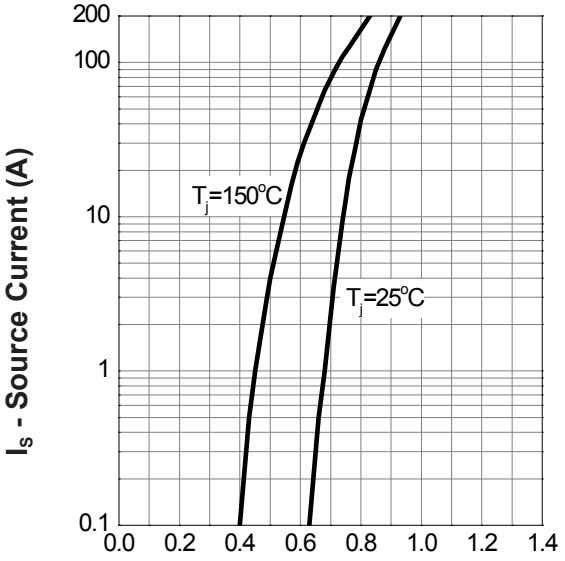
Gate Charge



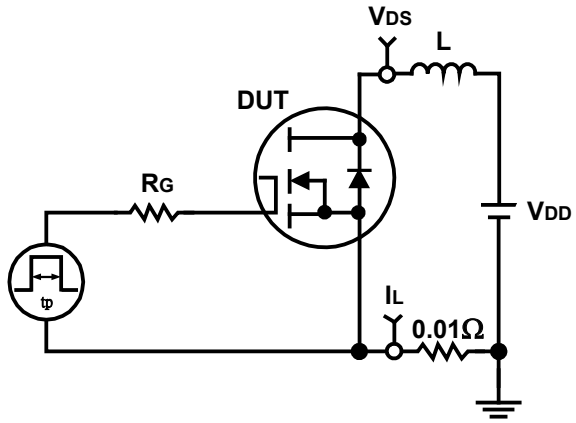
Drain-Source On Resistance

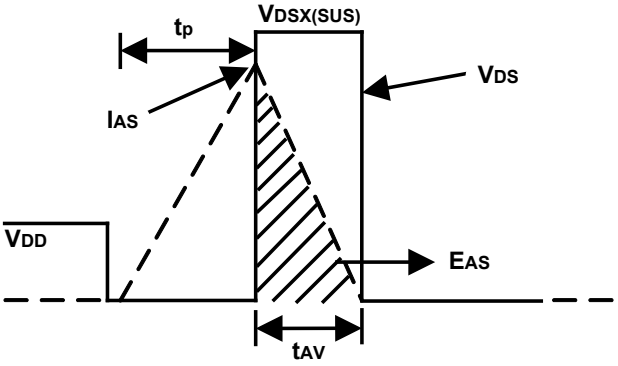


Source-Drain Diode Forward

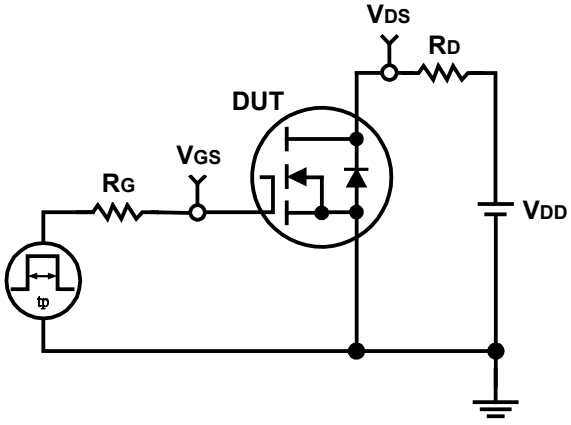


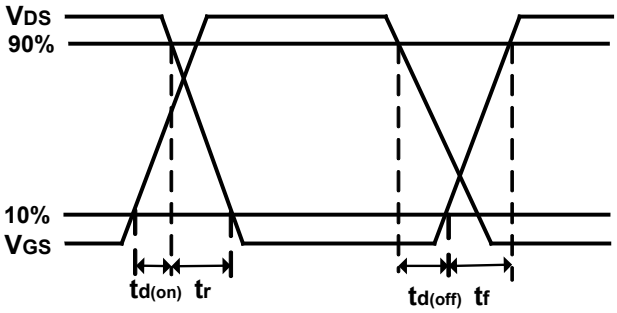
Avalanche Test Circuit and Waveforms





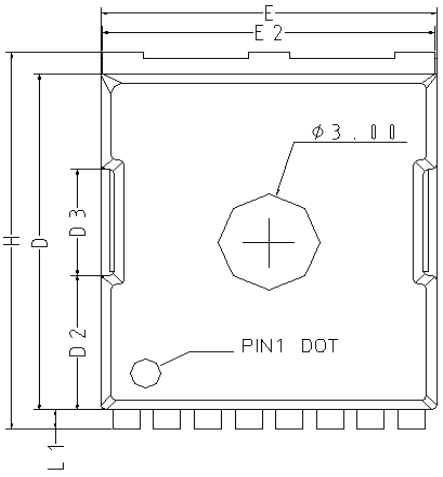
Switching Time Test Circuit and Waveforms



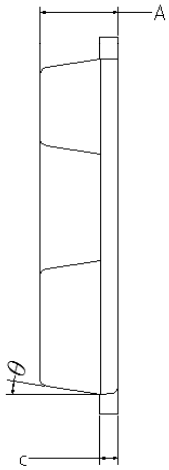


Package Information

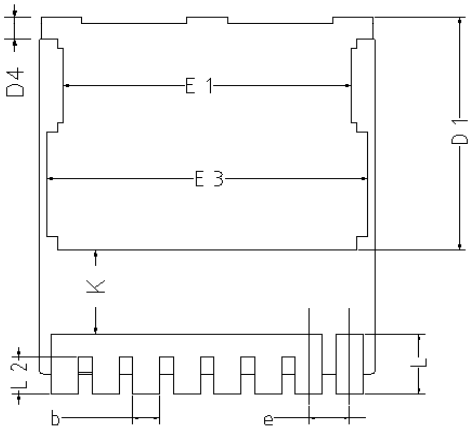
TOLL



Top View



Side View

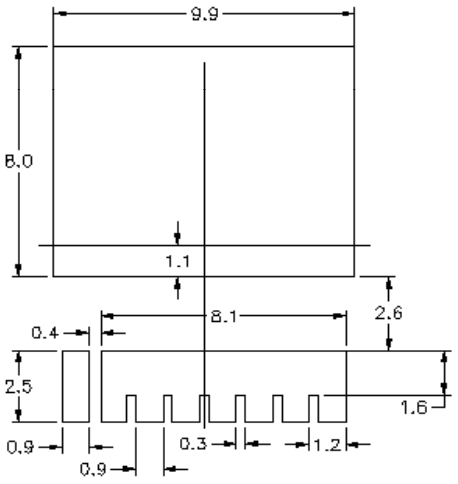


Bottom View

Side View

SYMBOLS	TO-LL			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.20	2.40	0.087	0.094
b	0.70	0.90	0.028	0.035
c	0.40	0.60	0.016	0.024
D	10.23	10.63	0.403	0.419
D1	7.05	7.45	0.278	0.293
D2	3.98	4.38	0.157	0.172
D3	3.10	3.50	0.122	0.138
D4	0.50	0.90	0.020	0.035
E	9.70	10.10	0.382	0.398
E1	8.30	8.70	0.327	0.343
E2	9.60	10.00	0.378	0.394
E3	9.26	9.66	0.365	0.380
H	11.53	11.93	0.454	0.470
e	1.2 BSC		0.0472 BSC	
K	2.43	2.83	0.096	0.111
L	1.65	2.05	0.065	0.081
L1	0.40	0.80	0.016	0.031
L2	0.95	1.35	0.037	0.053
θ	6°	10°	6°	10°

RECOMMENDED LAND PATTERN



UNIT: mm