

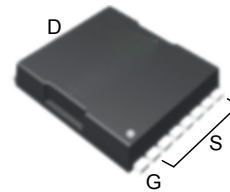
Features

- 40V/300A,
 $R_{DS(ON)} = 1.1 \text{ m}\Omega$ (typ.) @ $V_{GS}=10\text{V}$
 $R_{DS(ON)} = 1.4 \text{ m}\Omega$ (typ.) @ $V_{GS}=4.5\text{V}$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- Lead Free and Green Devices Available (RoHS Compliant)

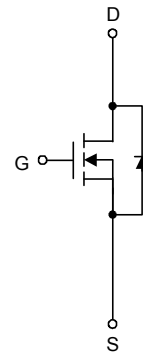
Applications

- SMPS Synchronous Rectification
- Load Switch
- DC-DC Conversion
- Or-ing

Pin Description



TOLL



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		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	
I _S ^a	Diode Continuous Forward Current	T _C =25°C	300	A
I _D ^a	Continuous Drain Current	T _C =25°C	300	
		T _C =100°C	190	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	900	
P _D	Maximum Power Dissipation	T _C =25°C	375	W
		T _C =100°C	187	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	0.85	°C/W
I _S ^c	Diode Continuous Forward Current	T _A =25°C	2.2	A
I _{DM} ^b	Pulsed Drain Current	T _A =25°C	950	A
R _{θJA} ^c	Thermal Resistance-Junction to Ambient		50	°C/W
I _{AS} ^d	Avalanche Current, Single pulse	L=0.5mH	90	A
E _{AS} ^d	Avalanche Energy, Single pulse	L=0.5mH	2000	mJ

Note a : Maximum continue current is limited by bonding wire.

Note b : Pulse width is limited by maximum junction temperature 175°C .

Note c : $R_{\theta JA}$ steady state $t=999\text{s}$.

Note d : UIS tested and pulse width limited by maximum junction temperature 175°C (Initial temperature $T_J=25^\circ\text{C}$).

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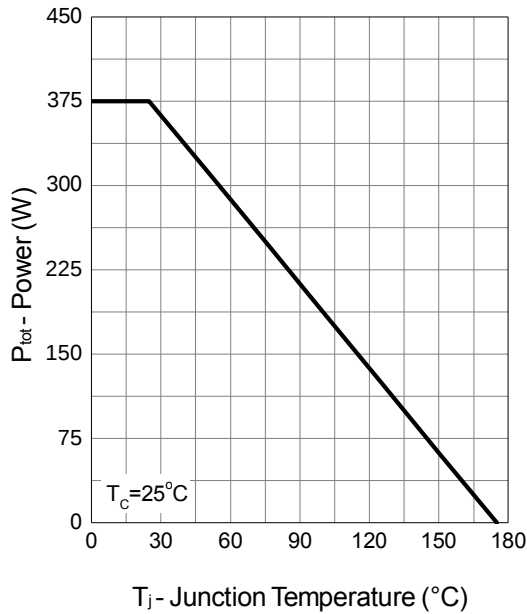
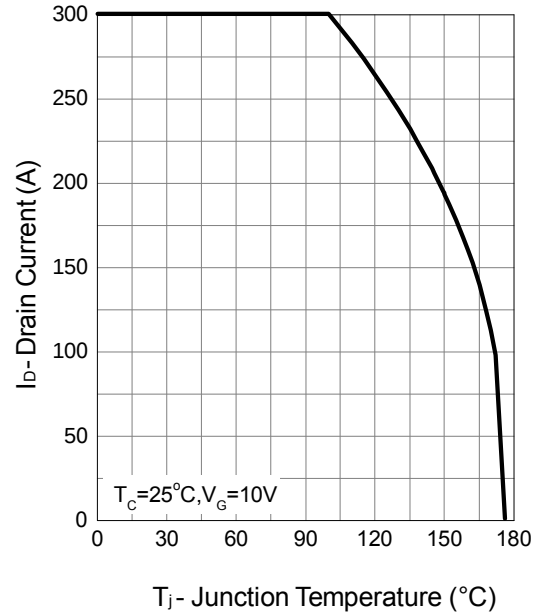
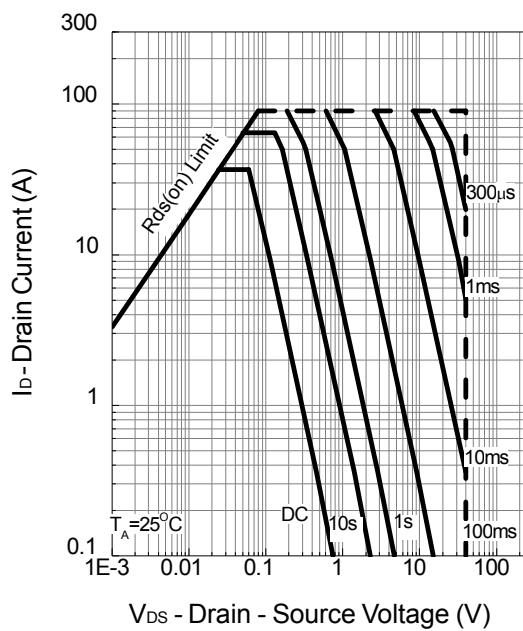
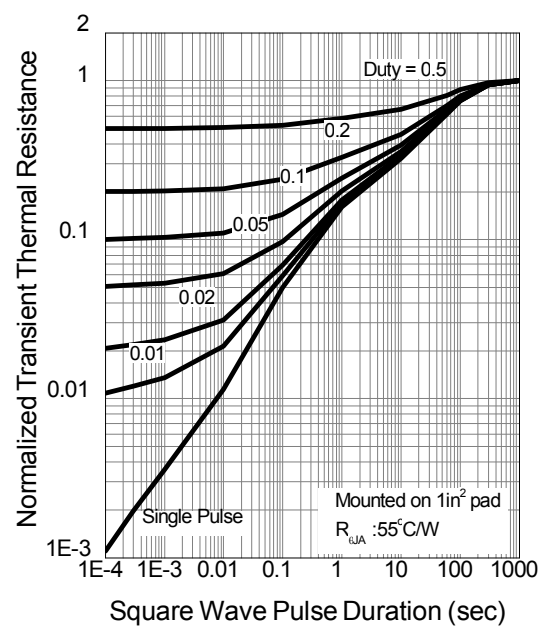
Electrical Characteristics (T_A = 25°C unless otherwise noted)

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 T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.5	2	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V		-	±100	nA
R _{DS(ON)}	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =25A T _J =125°C	-	1.1 2.4	1.3 -	mΩ
		V _{GS} =4.5V, I _{DS} =25A	-	1.4	1.8	
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	35	-	S
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	-	0.78	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =25A, dI _{SD} /dt=100A/μs V _{dd} =20V	-	61	-	ns
t _a	Charge Time		-	31	-	
t _b	Discharge Time		-	30	-	
Q _{rr}	Reverse Recovery Charge		-	67	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	0.6	0.9	2	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	5230	-	pF
C _{oss}	Output Capacitance		-	2000	-	
C _{rss}	Reverse Transfer Capacitance		-	175	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =1Ω	-	18.8	-	ns
t _r	Turn-on Rise Time		-	9.8	-	
t _{d(OFF)}	Turn-off Delay Time		-	50	-	
t _f	Turn-off Fall Time		-	15	-	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =25A	-	88.98	-	nC
Q _{gth}	Threshold Gate Charge		-	15.84	-	
Q _{gs}	Gate-Source Charge		-	24.75	-	
Q _{gd}	Gate-Drain Charge		-	15.63	-	

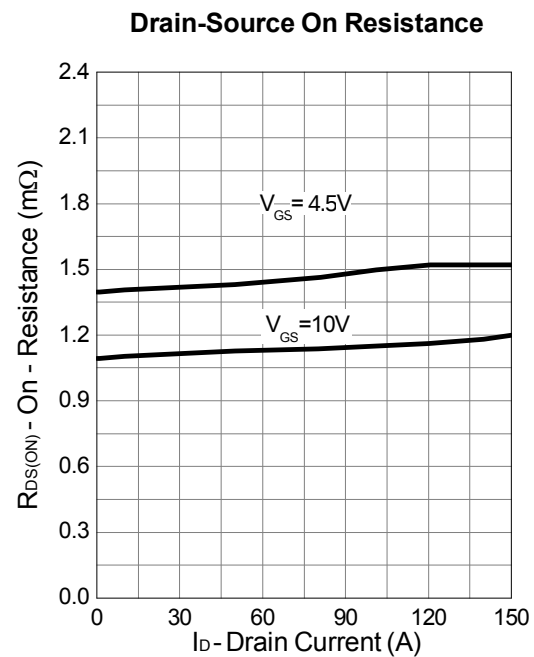
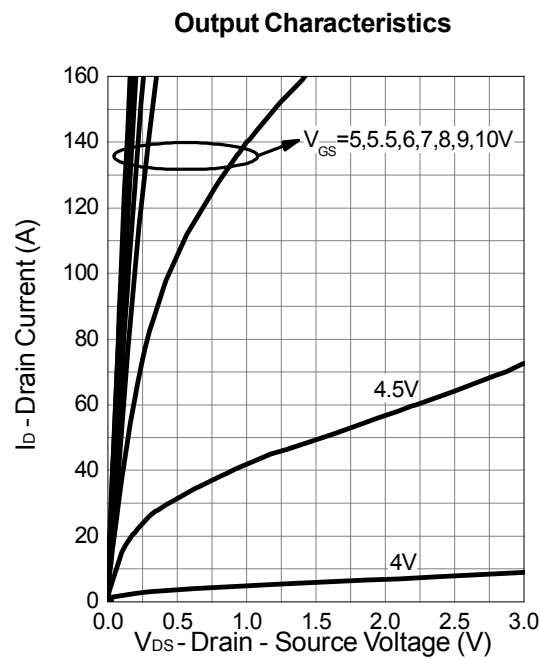
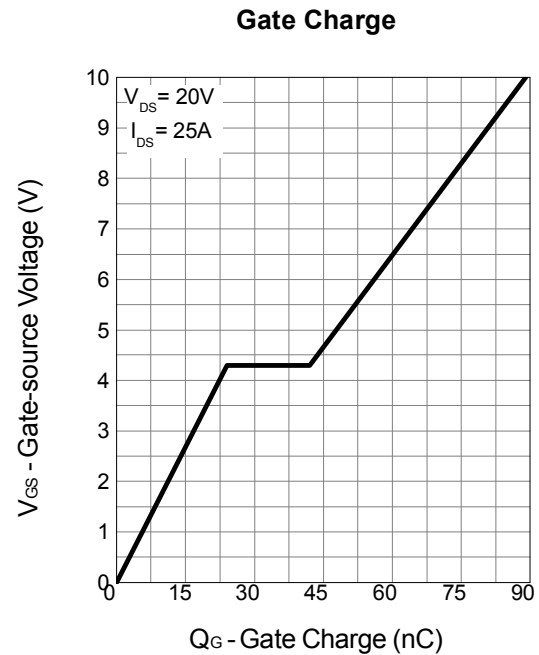
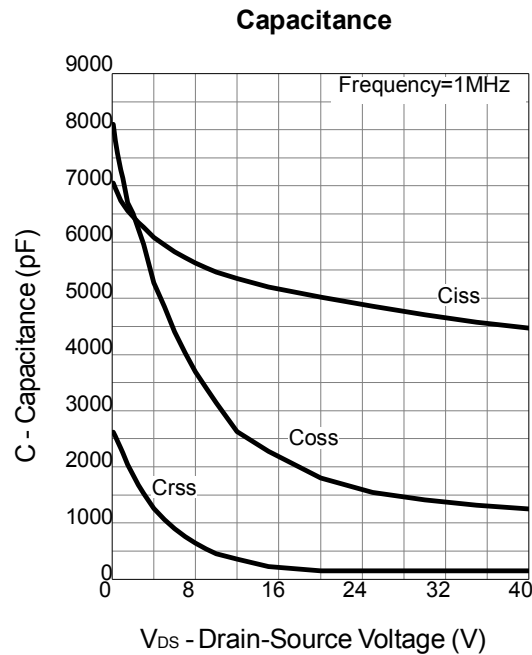
Note e[†] Pulse test ; pulse width≤300μs, duty cycle≤2%.

Note f[†] Guaranteed by design, not subject to production testing.

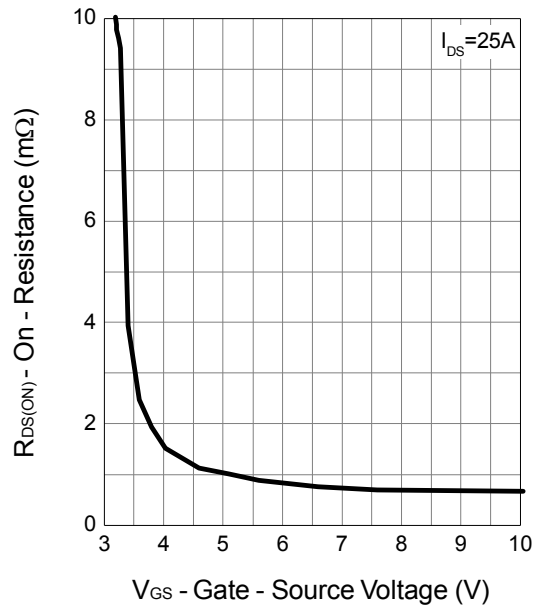
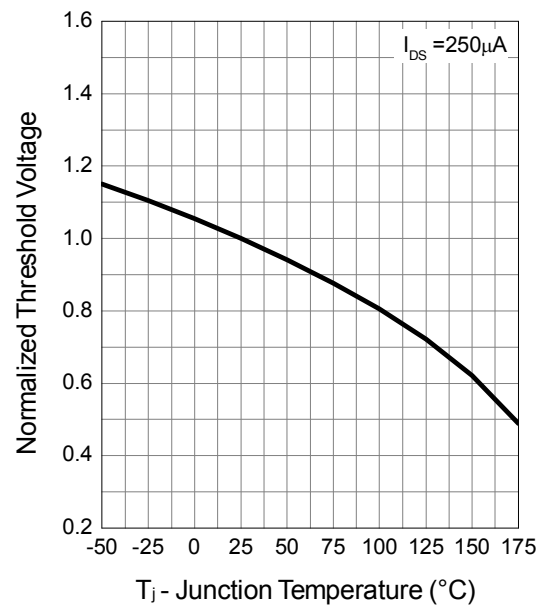
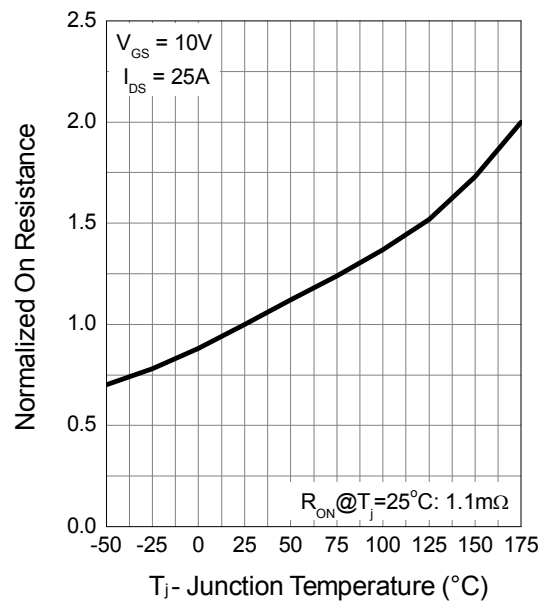
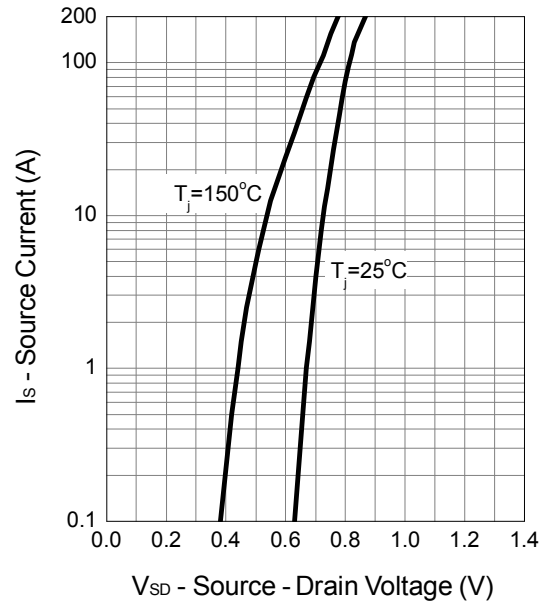
Typical Operating Characteristics

Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance


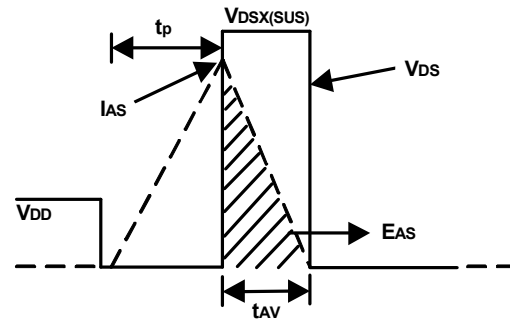
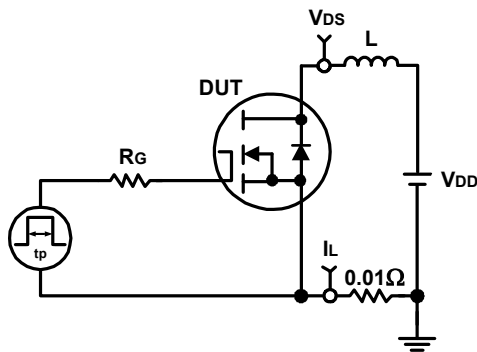
Typical Operating Characteristics (Cont.)



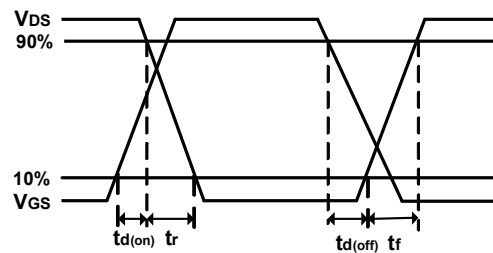
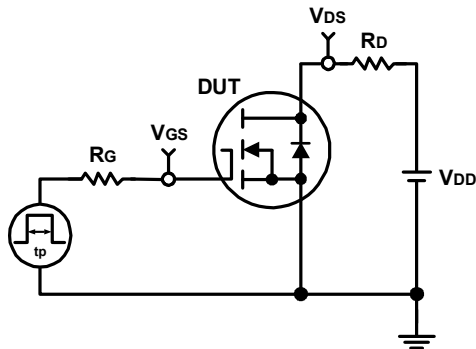
Typical Operating Characteristics (Cont.)

Gate-Source On Resistance

Gate Threshold Voltage

Drain-Source On Resistance

Source-Drain Diode Forward


Avalanche Test Circuit and Waveforms

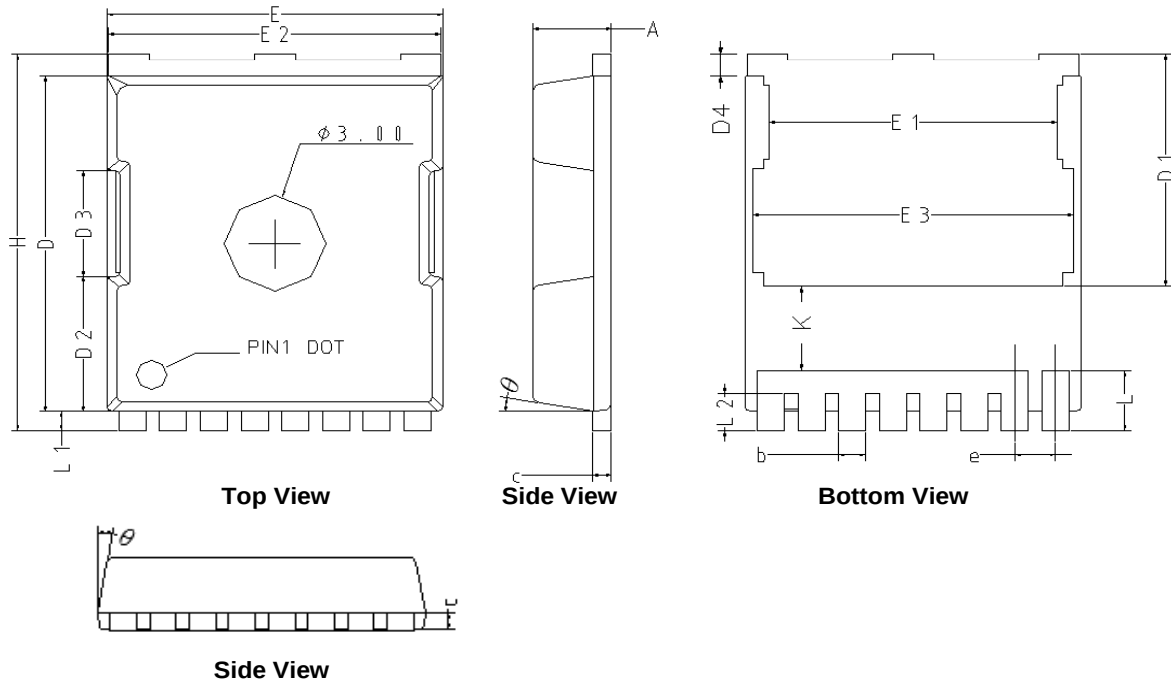


Switching Time Test Circuit and Waveforms



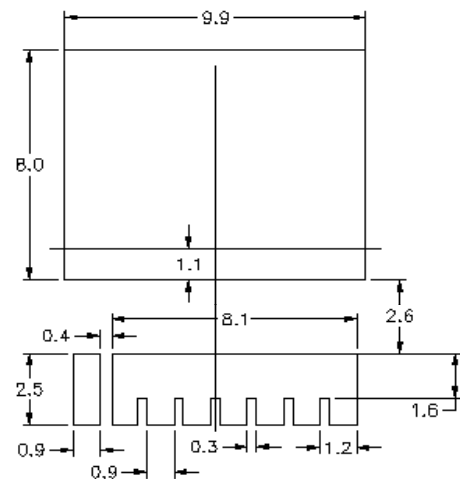
Package Information

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SYMBOLS	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