NCE P-Channel Enhancement Mode Power MOSFET

Description

The NCE30P20Q uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge . This device is suitable for use as a load switch or in PWM applications.

General Features

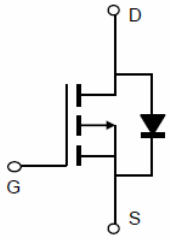
- V_{DS} = -30V,I_D = -20A
  $R_{DS(ON)}$ < 25mΩ @ V_{GS}=-4.5V
  $R_{DS(ON)}$ < 15mΩ @ V_{GS}=-10V
- High Power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

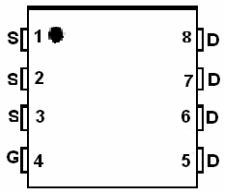
- PWM applications
- Load switch
- Power management

100% UIS TESTED!

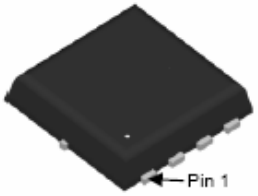
100% ΔVds TESTED!



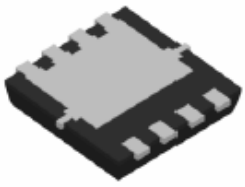
Schematic diagram



pin assignment



Top View



Bottom View

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE30P20Q	NCE30P20Q	DFN3.3X3.3-8L	Ø330mm	12mm	5000 units

Absolute Maximum Ratings (T_A=25℃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	-20	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	-14.1	A
Drain Current-Pulsed (Note 1)	I_{DM}	-80	A
Maximum Power Dissipation	P_D	35	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta JC}$	3.57	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1	-1.5	-1.9	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-15A	-	11.5	15	mΩ
		V_{GS}=-4.5V, I_D=-15A	-	18	25	mΩ
Gate resistance	R_G		-	5.2	-	Ω
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-15A	15	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-25V,V_{GS}=0V, F=1.0MHz	-	2130	-	PF
Output Capacitance	C_{oss}		-	302	-	PF
Reverse Transfer Capacitance	C_{rss}		-	227	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, ID=-15A, V_{GS}=-10V,R_{GEN}=1Ω	-	12	-	nS
Turn-on Rise Time	t_r		-	10	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	25	-	nS
Turn-Off Fall Time	t_f		-	13	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-20A,V_{GS}=-10V	-	45.6	-	nC
Gate-Source Charge	Q_{gs}		-	4.6	-	nC
Gate-Drain Charge	Q_{gd}		-	11.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-20A	-	-	-1.2	V

Notes:

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

Typical Electrical and Thermal Characteristics

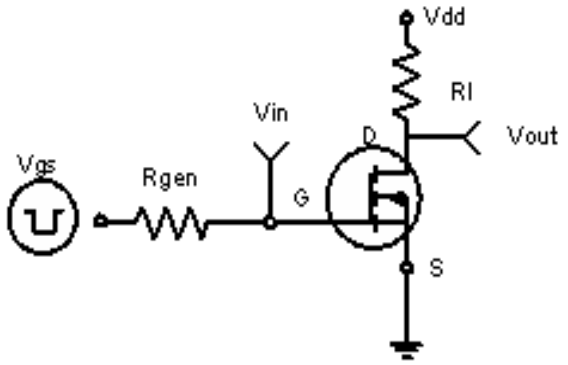


Figure 1:Switching Test Circuit

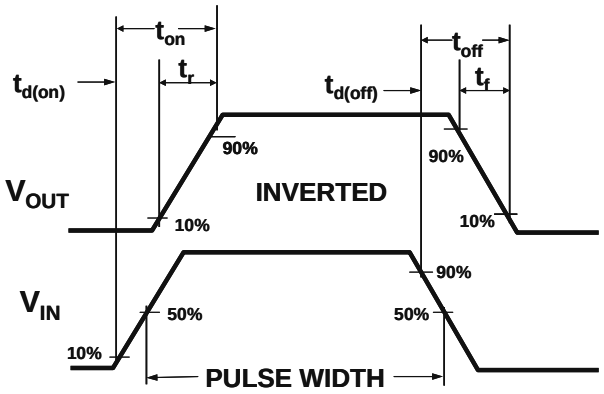


Figure 2:Switching Waveforms

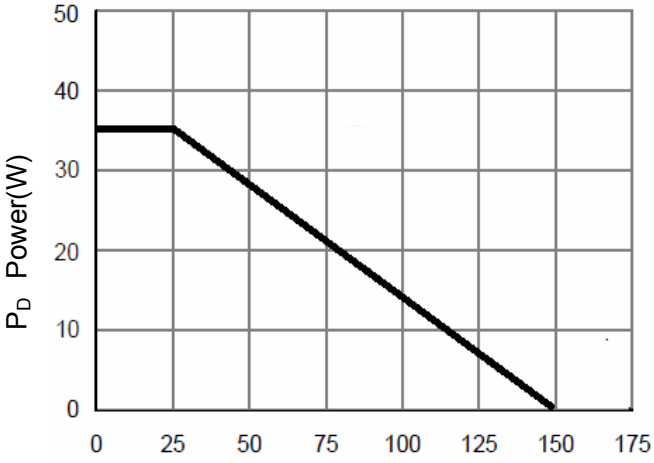


Figure 3 Power Dissipation

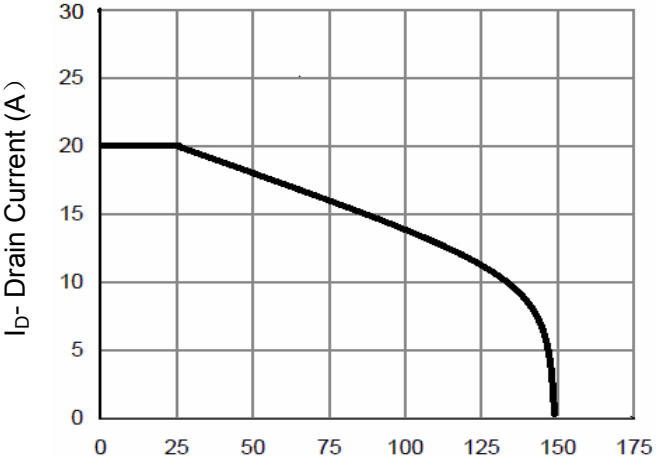


Figure 4 Drain Current

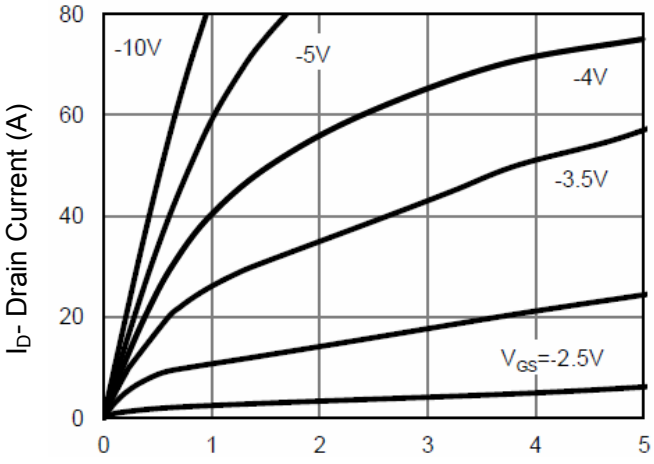


Figure 5 Output Characteristics

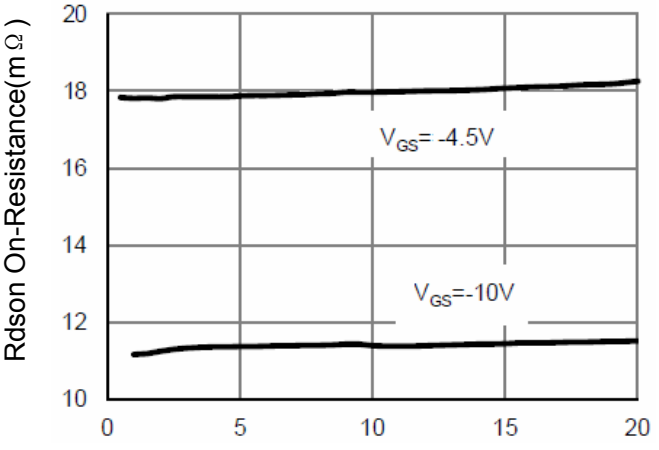


Figure 6 Drain-Source On-Resistance

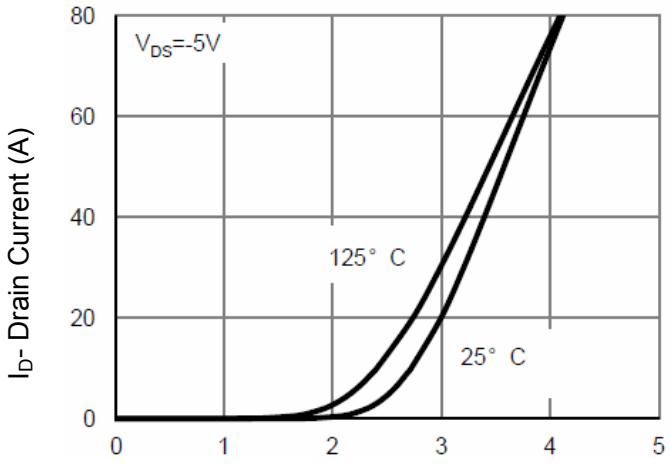


Figure 7 Transfer Characteristics

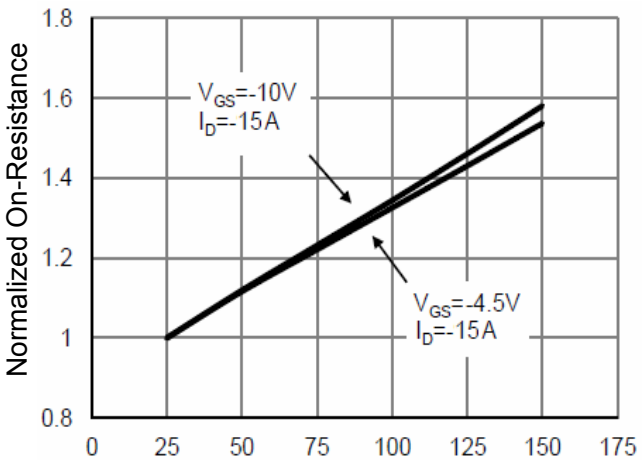


Figure 8 Drain-Source On-Resistance

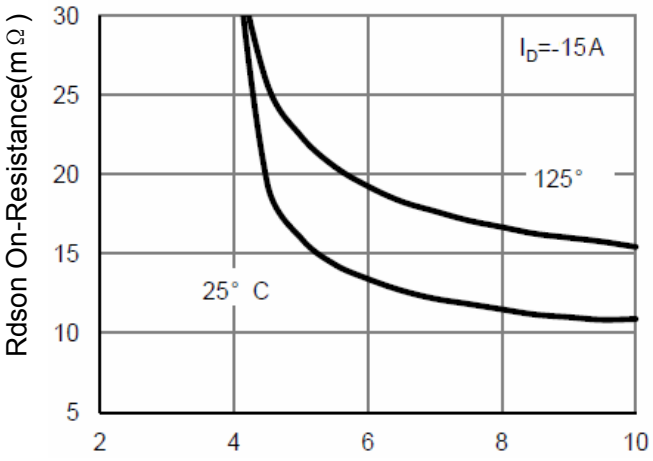


Figure 9 Rdson vs Vgs

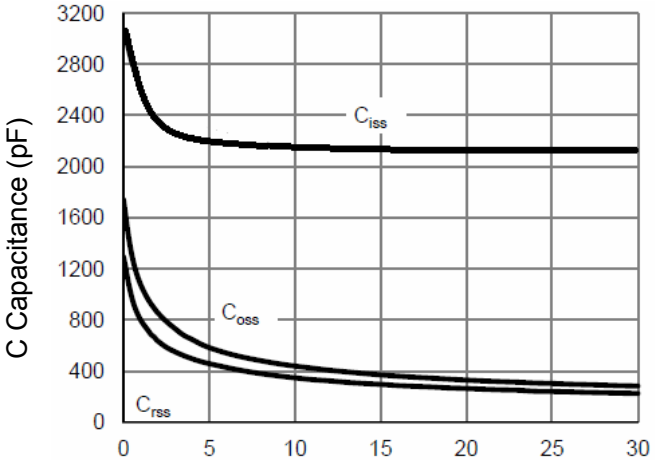


Figure 10 Capacitance vs Vds

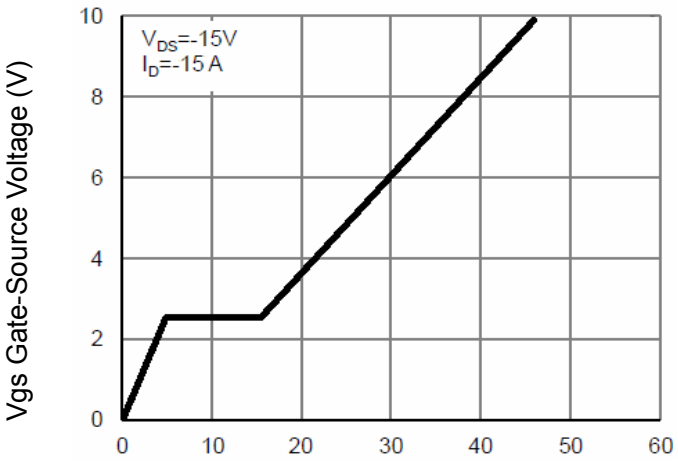


Figure 11 Gate Charge

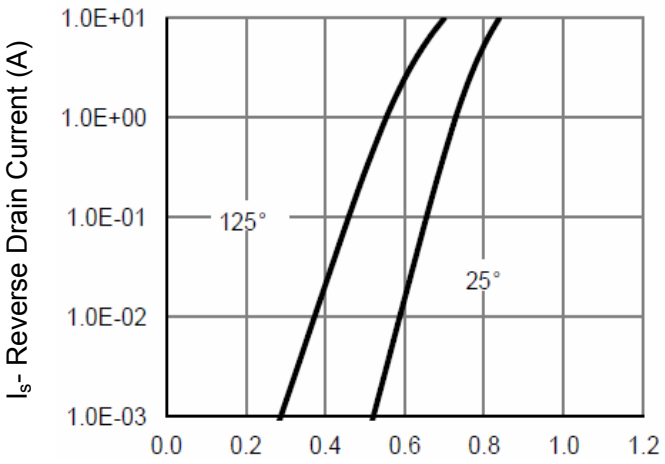
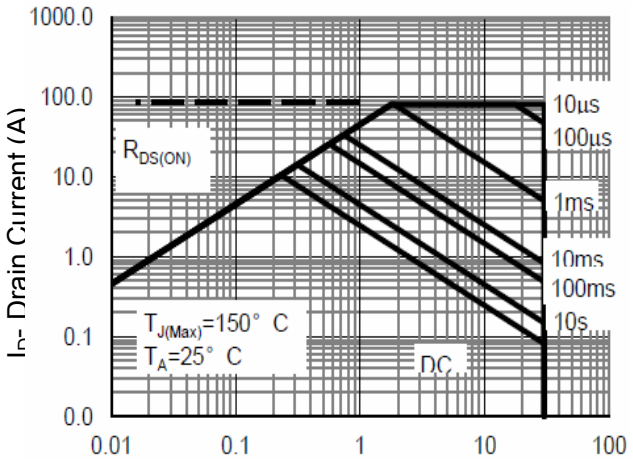
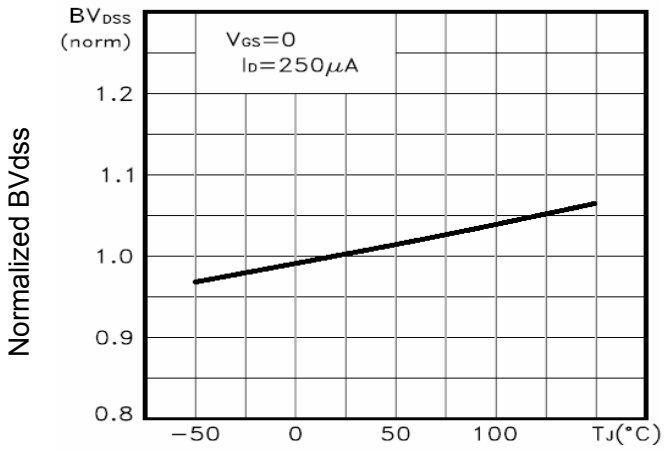


Figure 12 Source- Drain Diode Forward



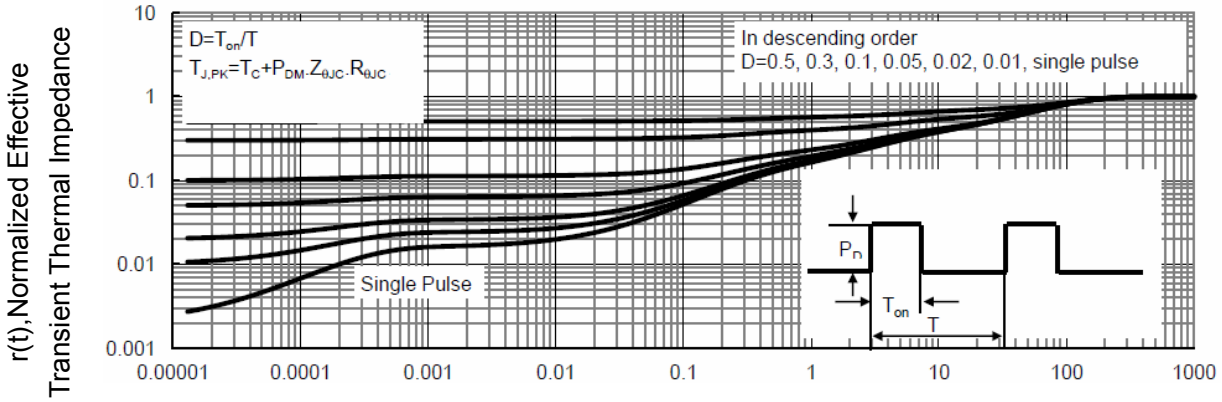
Vds Drain-Source Voltage (V)

Figure 13 Safe Operation Area



T_J-Junction Temperature(℃)

Figure 14 BV_{DSS} vs Junction Temperature



Square Wave Pluse Duration(sec)

Figure 15 Normalized Maximum Transient Thermal Impedance

DFN3.3X3.3-8L Package Information

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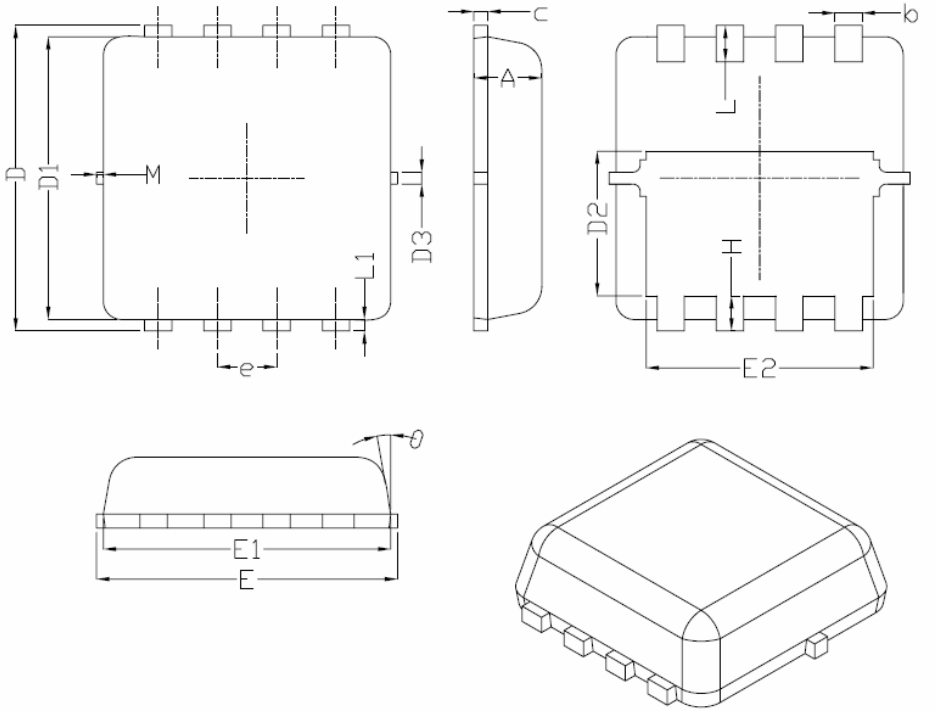
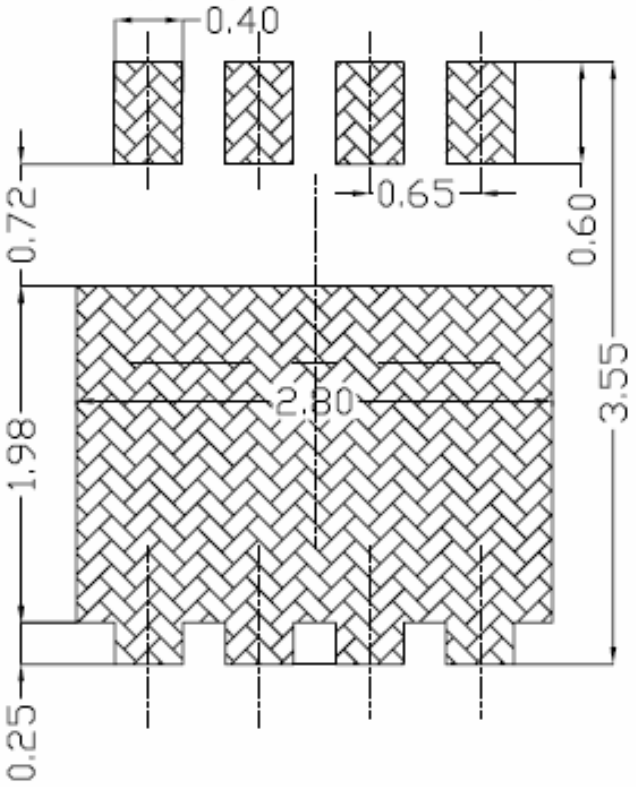


Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°

Land Pattern
(Only for Reference)



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