



# 100V 16.5mΩ Dual N-Ch Power MOSFET

## Features

- Low ON-resistance,  $R_{DS(ON)}$
- Low Gate Charge,  $Q_g$
- 100% UIS and  $R_g$  Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant
- AEC-Q101 Qualified for Automotive Applications

## Product Summary

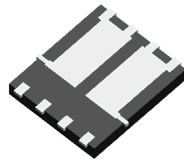
Parameter	Value	Unit
$V_{DS}$	100	V
$V_{GS(th\_Typ)}$	1.8	V
$I_D (@ V_{GS} = 10V)^{(1)}$	27	A
$R_{DS(ON\_Typ)} (@ V_{GS} = 10V)$	16.5	mΩ
$R_{DS(ON\_Typ)} (@ V_{GS} = 4.5V)$	21	mΩ

PDFN5x6-8L-D

Top View

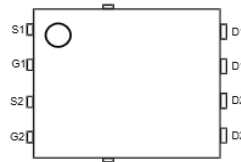


Bottom View

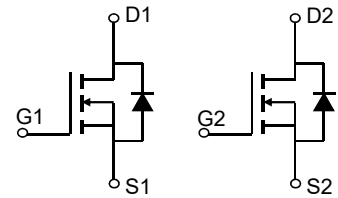


Pin Configuration

Top View



Chip-1 & Chip-2

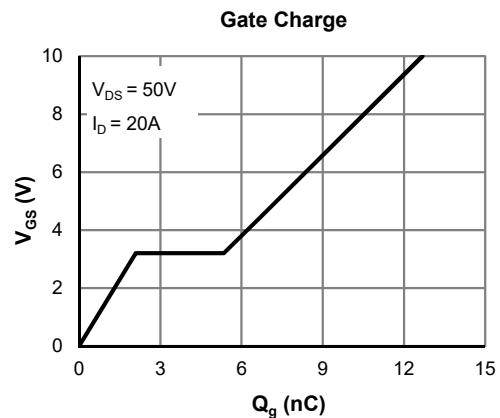
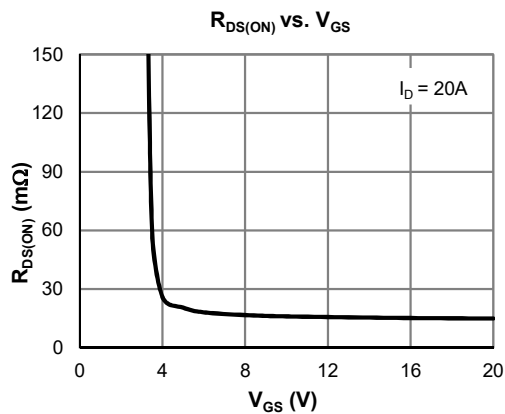


## Ordering Information

Device	Package	# of Pins	Marking	MSL	$T_J$ (°C)	Media	Quantity (pcs)
JMSL1020AGDQ-13	PDFN5x6-8L-D	8	L1020AD	1	-55 to 175	13-inch Reel	3000

## Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DS}$	100	V
Gate-to-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current <sup>(1)</sup>	$I_D$	$T_C = 25^\circ\text{C}$	27
		$T_C = 100^\circ\text{C}$	19
Pulsed Drain Current <sup>(2)</sup>	$I_{DM}$	107	A
Avalanche Current <sup>(3)</sup>	$I_{AS}$	24	A
Avalanche Energy <sup>(3)</sup>	$E_{AS}$	29	mJ
Power Dissipation <sup>(4)</sup>	$P_D$	$T_C = 25^\circ\text{C}$	31
		$T_C = 100^\circ\text{C}$	16
Junction & Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	°C



**Electrical Characteristics** (@  $T_J = 25^\circ\text{C}$  unless otherwise specified)

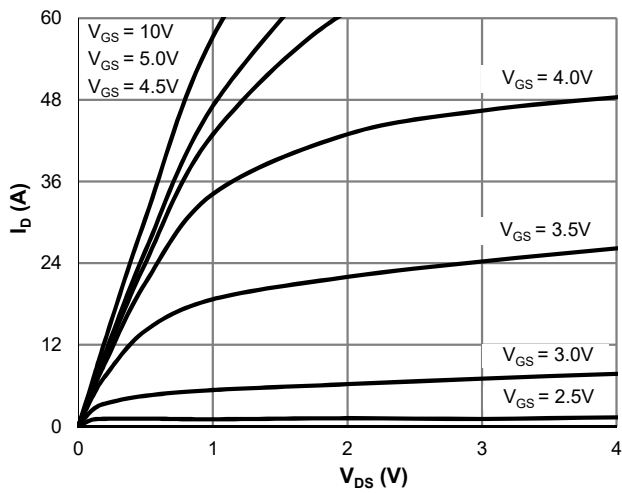
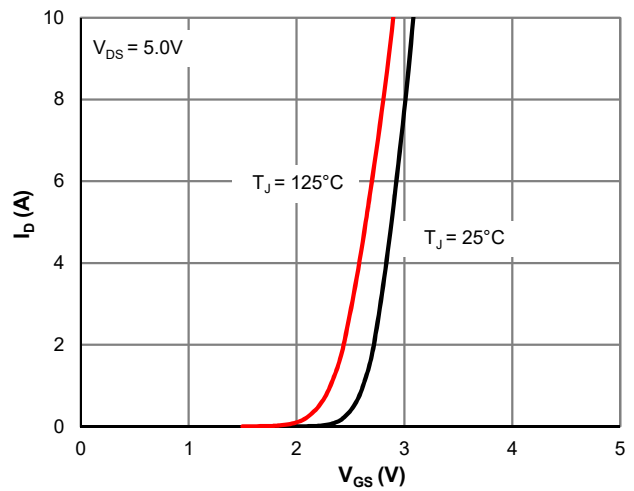
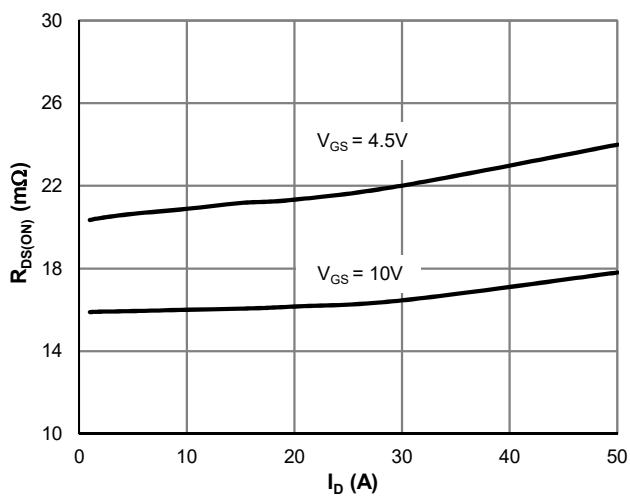
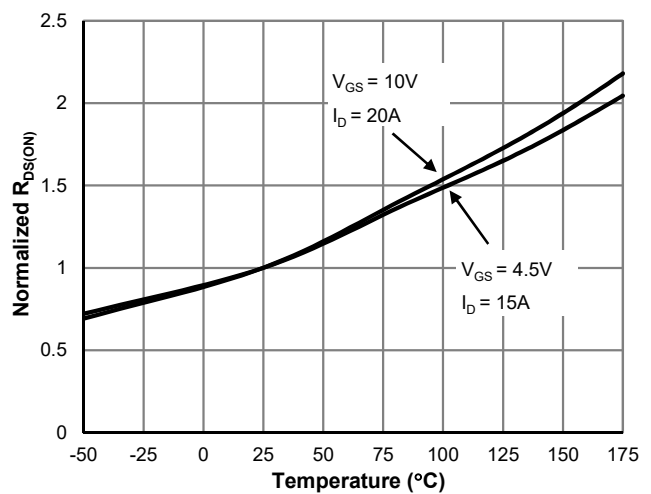
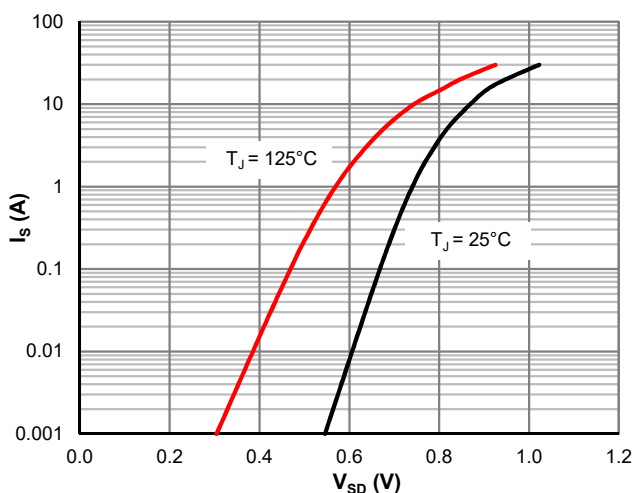
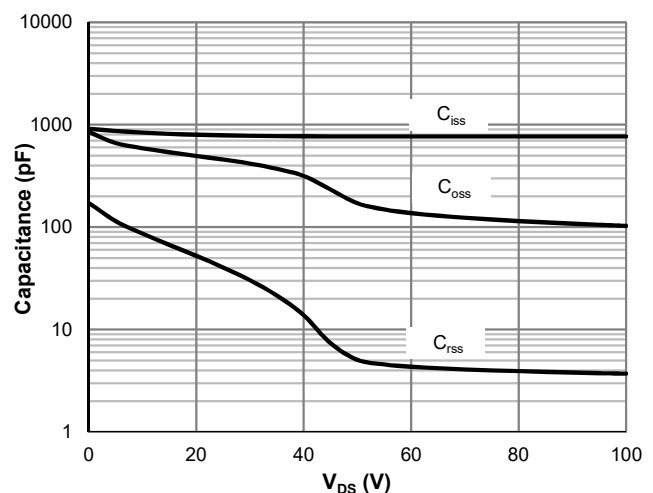
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	100			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1.0 5.0	$\mu\text{A}$
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.2	1.8	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$		16.5	20	$\text{m}\Omega$
		$V_{GS} = 4.5\text{V}, I_D = 15\text{A}$		21	27	$\text{m}\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 5\text{V}, I_D = 20\text{A}$		48		S
Diode Forward Voltage	$V_{SD}$	$I_S = 1\text{A}, V_{GS} = 0\text{V}$		0.68	1.0	V
Diode Continuous Current	$I_S$	$T_C = 25^\circ\text{C}$			31	A
<b>DYNAMIC PARAMETERS <sup>(5)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 50\text{V}, f = 1\text{MHz}$		769		pF
Output Capacitance	$C_{oss}$			171		pF
Reverse Transfer Capacitance	$C_{rss}$			5.1		pF
Gate Resistance	$R_g$	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$		1.9		$\Omega$
<b>SWITCHING PARAMETERS <sup>(5)</sup></b>						
Total Gate Charge (@ $V_{GS} = 10\text{V}$ )	$Q_g$	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 50\text{V}, I_D = 20\text{A}$		12.7		nC
Total Gate Charge (@ $V_{GS} = 4.5\text{V}$ )	$Q_g$			6.7		nC
Gate Source Charge	$Q_{gs}$			2.1		nC
Gate Drain Charge	$Q_{gd}$			3.3		nC
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 50\text{V}$ $R_L = 2.5\Omega, R_{GEN} = 6\Omega$		4.3		ns
Turn-On Rise Time	$t_r$			5.1		ns
Turn-Off DelayTime	$t_{D(off)}$			16.7		ns
Turn-Off Fall Time	$t_f$			8.7		ns
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		39		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		30		nC

**Thermal Performance**

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	58	70	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.8	5.7	$^\circ\text{C}/\text{W}$

**Notes:**

1. Computed continuous current assumes the condition of  $T_{J\_Max}$  while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under  $T_{J\_Max} = 175^\circ\text{C}$ .
3. This single-pulse measurement was taken under the following condition [L = 100 $\mu\text{H}$ ,  $V_{GS} = 10\text{V}$ ,  $V_{DS} = 50\text{V}$ ] while its value is limited by  $T_{J\_Max} = 175^\circ\text{C}$ .
4. The power dissipation  $P_D$  is based on  $T_{J\_Max} = 175^\circ\text{C}$ .
5. This value is guaranteed by design hence it is not included in the production test.

**Typical Electrical & Thermal Characteristics**

**Figure 1: Saturation Characteristics**

**Figure 2: Transfer Characteristics**

**Figure 3:  $R_{DS(ON)}$  vs. Drain Current**

**Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature**

**Figure 5: Body-Diode Characteristics**

**Figure 6: Capacitance Characteristics**

Typical Electrical & Thermal Characteristics

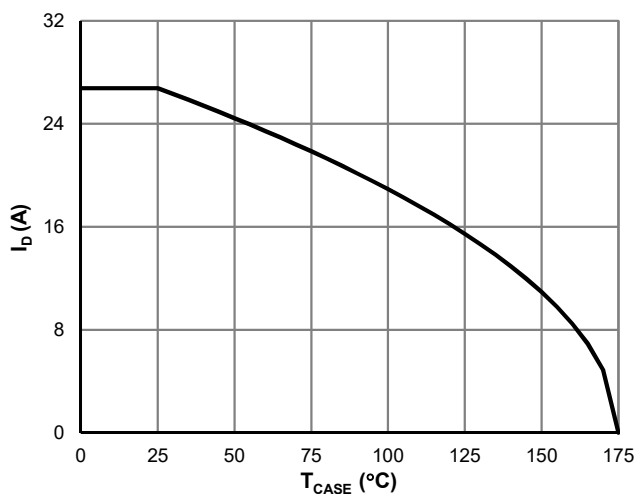


Figure 7: Current De-rating

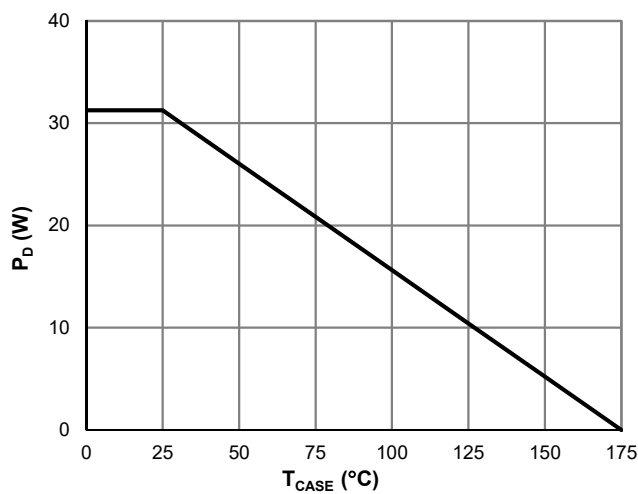


Figure 8: Power De-rating

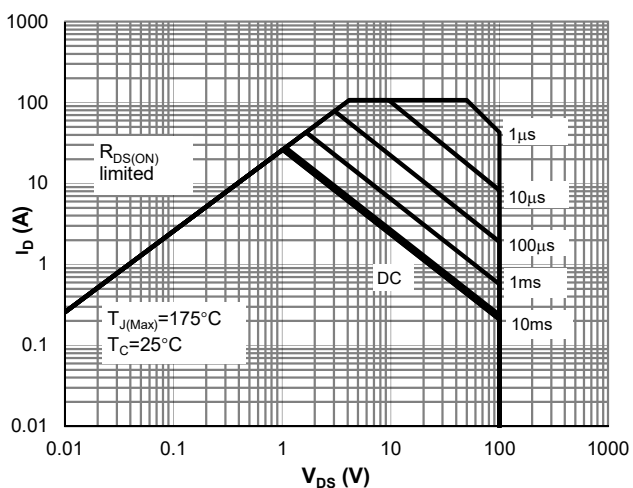


Figure 9: Maximum Safe Operating Area

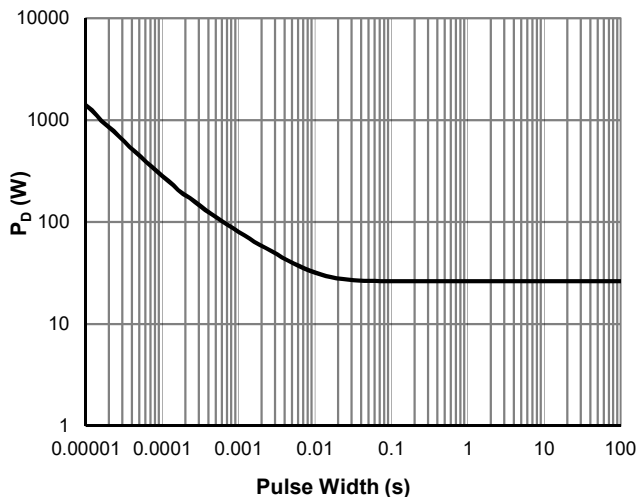


Figure 10: Single Pulse Power Rating, Junction-to-Case

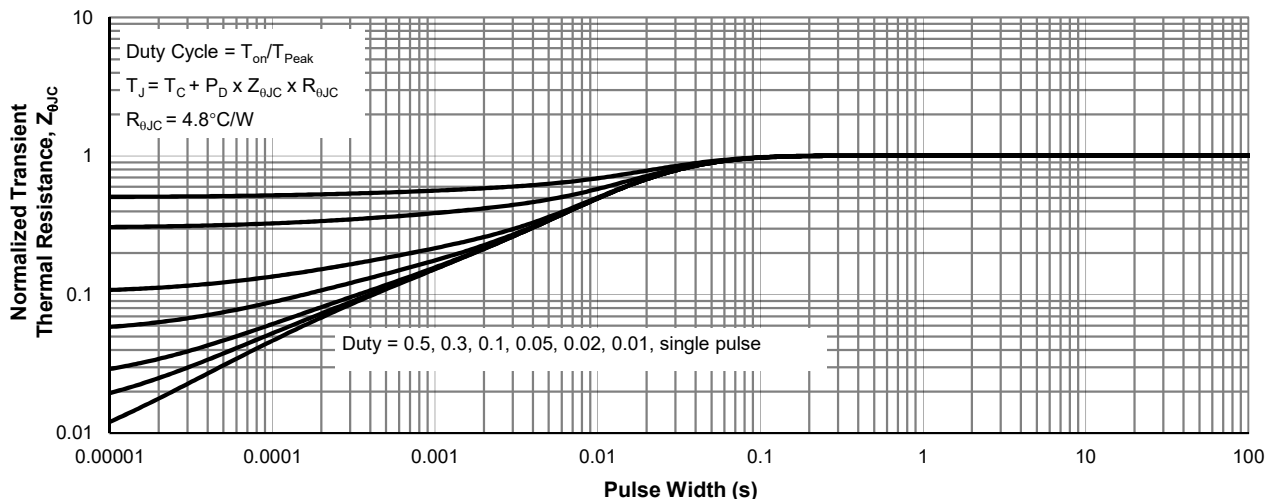
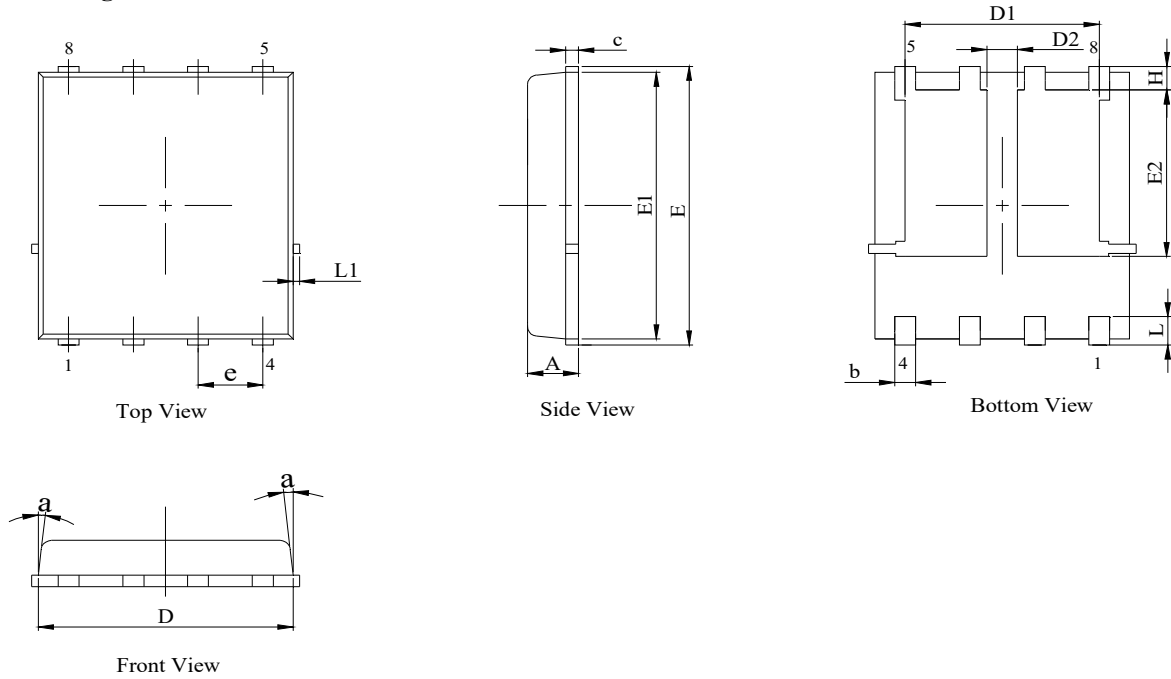
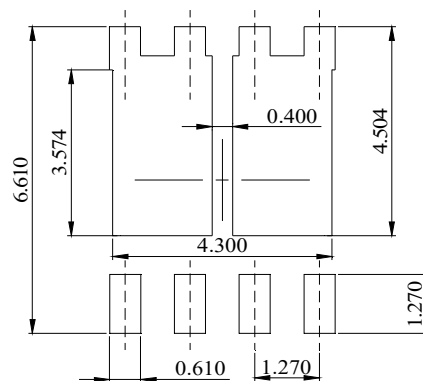


Figure 11: Normalized Maximum Transient Thermal Impedance

**PDFN5x6-8L-D Package Information**
**Package Outline**

**NOTES:**

1. Dimension and tolerance per ASME Y14.5M, 1994.
2. All dimensions in millimeter (angle in degree).
3. Dimensions  $D$  and  $E1$  do not include mold flash protrusions or gate burrs.

DIM.	MILLIMETER	
	MIN.	MAX.
A	0.90	1.10
b	0.33	0.51
c	0.23	0.33
D	4.80	5.40
D1	3.61	4.25
D2	0.50	0.70
E	5.90	6.25
E1	5.55	5.80
E2	3.35	3.78
e	1.27 BSC	
H	0.41	0.80
L	0.51	0.80
L1	-	0.15
a	0°	12°

**Recommended Soldering Footprint**


DIMENSIONS: MILLIMETERS