

# TOLL – TO Leadless

**Infineon's latest PowerMOS Package  
for High Current Automotive Electronics**

IFX ATV HP



# TOLL - Infineon's latest PowerMOS Package for High Current Automotive Electronics



- Highest Current Capability - up to 300A
- Lowest Package Resistance for lowest  $R_{DSon}$
- Minimized Footprint Area and Height
- Reduced Package Inductances & Package Parasitics
- Improved Electro Migration / Solder Contact Area

# TOLL - Infineon's latest PowerMOS Package 40V Lead Product: **IPLU300N04S4-R8**



## **IPLU300N04S4-R8 Features:**

- $V_{BRDSS} = 40V$
- $R_{DSon (max)} = 0.77m\Omega$
- $I_D = 300A$
- $R_{thJC} = 0.35K/W$
- Package Footprint Area =  $115mm^2$
- AOI capability included
- 100% lead-free
- AEC qualified
- TOLL Package = JEDEC registered





# TOLL - Infineon's latest PowerMOS Package

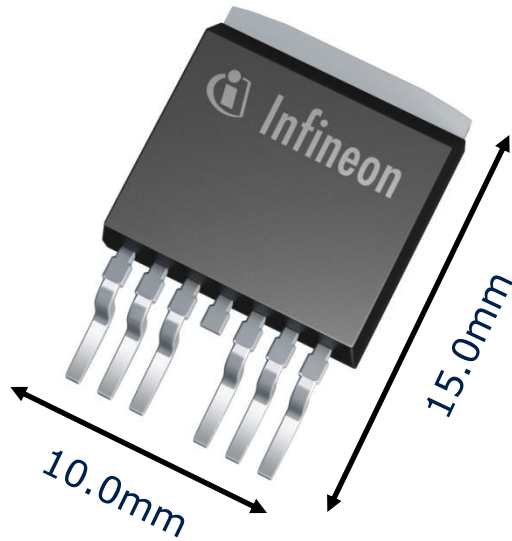
## Comparison of TOLL versus D<sup>2</sup>PAK



|                   | <b>IPLU300N04S4-R8</b> | <b>IPB180N04S4-00</b>    |
|-------------------|------------------------|--------------------------|
| Package           | TOLL                   | D <sup>2</sup> PAK-7 pin |
| Chip              | SFET4 40V              | SFET4 40V same chip size |
| R <sub>DSon</sub> | 0.77mOhm               | 0.98mOhm                 |
| I <sub>D</sub>    | 300A                   | 180A                     |
| R <sub>thJC</sub> | 0.35K/W                | 0.5K/W                   |
| Footprint         | 115mm <sup>2</sup>     | 150mm <sup>2</sup>       |

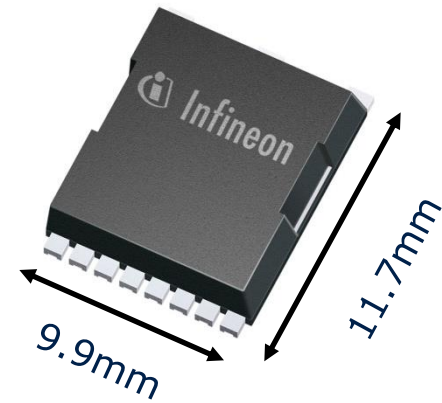
# TOLL - Infineon's latest PowerMOS Package

## TOLL Replacing D<sup>2</sup>PAK 7Pin



Footprint: 150mm<sup>2</sup>

Hight: 4.4mm



Footprint: 115 mm<sup>2</sup>

Hight: 2.3mm

30%  
Footprint  
Reduction

50%  
Height  
Reduction

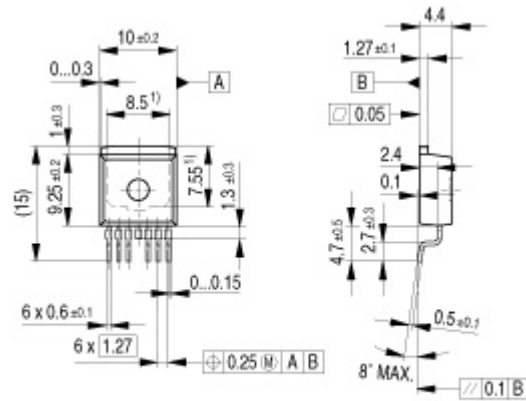


60%  
Space  
reduction

# TOLL - Infineon's latest PowerMOS Package Improved Reliability in High Current Applications



## D2PAK 7Pin



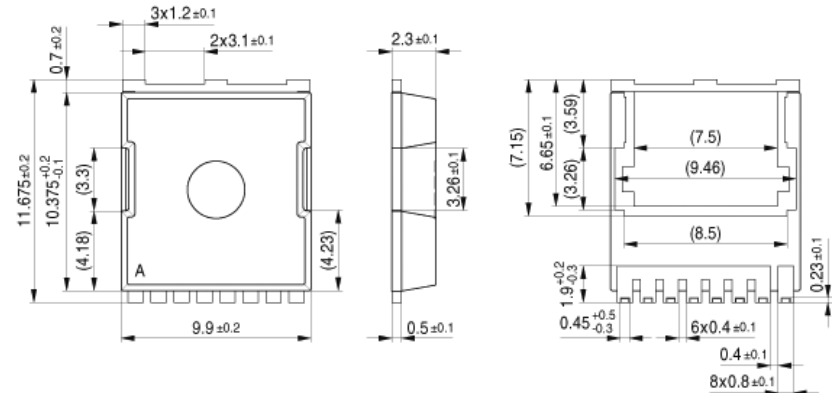
1) Typical

Metal surface min. X = 7.25, Y = 6.9

All metal surfaces tin plated, except area of cut.

GPT00063

## T0 -Leadless



PG-HSOF-8-1-PO\_V04

Contact/Solder area **D<sup>2</sup>PAK 7Pin**:  
= 2.65mm\*0.6mm\*5  
**= 7.95mm<sup>2</sup>**

Contact/Solder area **TOLL**:  
~ 1.9mm\*0.8mm\*7 + 0.7mm\*0.4mm\*6  
**= 14mm<sup>2</sup>**

**Larger Contact Area Results in Lower Current Density,  
Thus Reducing Electro-Migration at High Current and Higher Temperature**



# TOLL - Infineon's latest PowerMOS Package for Advanced Automotive Electronic Designs



- **60% Package Outline Reduction**
- **Up to 300A Current Capability**
- **Up to 30% Lower RDS(on)**
- **Automated Optical Inspection (AOI) Capability**
- **Improved EMI Behavior** due to less parasitic
- **Highest Reliability** due to improved solder contact area
- **Reduced System Costs and BOM** due to less PCB area, less #Drivers, less #MOSFETs



# TOLL - Infineon's latest PowerMOS Package Technical Performance Advantages



**TO-Leadless**

**D<sup>2</sup>PAK 7pin**

**D<sup>2</sup>PAK**



**Power Density**



**Current Capability**



**Thermal Performance**



**Height**



**Reliability**





# TOLL - Infineon's latest PowerMOS Package

## 40V TOLL Product Portfolio



| Product Name     | max $R_{DSon}$<br>[mOhm] | $I_D$<br>[A] | LL/NL | $R_{thJC}$<br>[K/W] | Status       |
|------------------|--------------------------|--------------|-------|---------------------|--------------|
| IPLU300N04S4-R8  | 0.77                     | 300          | NL    | 0.35                | Released     |
| IPLU300N04S4-1R1 | 1.1                      | 300          | NL    | 0.8                 | QS-available |
| IPLU250N04S4-1R7 | 1.7                      | 250          | NL    | 0.5                 | QS-available |



# ENERGY EFFICIENCY MOBILITY SECURITY

Innovative semiconductor solutions for energy efficiency, mobility and security.

