



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

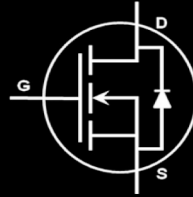
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# EPC2035 – Enhancement Mode Power Transistor

 $V_{DSS}, 60\text{ V}$ 

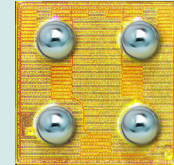
NEW PRODUCT

 $R_{DS(on)}, 45\text{ m}\Omega$ 
 $I_D, 1\text{ A}$ 


Gallium Nitride is grown on Silicon Wafers and processed using standard CMOS equipment leveraging the infrastructure that has been developed over the last 55 years. GaN's exceptionally high electron mobility and low temperature coefficient allows very low  $R_{DS(on)}$ , while its lateral device structure and majority carrier diode provide exceptionally low  $Q_G$  and zero  $Q_{RR}$ . The end result is a device that can handle tasks where very high switching frequency, and low on-time are beneficial as well as those where on-state losses dominate.

## Maximum Ratings

|           |  |            |    |
|-----------|--|------------|----|
| $V_{DS}$  | Drain-to-Source Voltage (Continuous)   | 60         | V  |
|           | Drain-to-Source Voltage (up to 10,000 5ms pulses at 125°C)                       | 72         |    |
| $I_D$     | Continuous ( $T_A = 25^\circ\text{C}$ , $R_{\theta JA} = 1600^\circ\text{C/W}$ ) | 1          | A  |
|           | Pulsed ( $25^\circ\text{C}$ , $T_{PULSE} = 300\ \mu\text{s}$ )                   | 24         |    |
| $V_{GS}$  | Gate-to-Source Voltage   | 6          | V  |
|           | Gate-to-Source Voltage   | -4         |    |
| $T_J$     | Operating Temperature  | -40 to 150 | °C |
| $T_{STG}$ | Storage Temperature  | -40 to 150 |    |



EPC2035 eGaN® FETs are supplied only in passivated die form with solder bumps  
Die Size: 0.9 mm x 0.9 mm

## Applications

- High Speed DC-DC conversion
- Wireless Power Transfer
- High Frequency Hard-Switching and Soft-Switching Circuits
- LiDAR/Pulsed Power Applications

## Benefits

- Ultra High Efficiency
- Ultra Low  $R_{DS(on)}$
- Ultra low  $Q_G$
- Ultra small footprint

[www.epc-co.com/epc/Products/eGaNfets/EPC2035.aspx](http://www.epc-co.com/epc/Products/eGaNfets/EPC2035.aspx)

## Static Characteristics ( $T_J = 25^\circ\text{C}$ unless otherwise stated)

| PARAMETER    | TEST CONDITIONS                | MIN  | TYP | MAX | UNIT          |   |
|--------------|--------------------------------|--|-----|-----|---------------|---|
| $BV_{DSS}$   | Drain-to-Source Voltage        | $V_{GS} = 0\text{ V}$ , $I_D = 300\ \mu\text{A}$ | 60  |     | V             |   |
| $I_{DSS}$    | Drain Source Leakage           | $V_{DS} = 48\text{ V}$ , $V_{GS} = 0\text{ V}$   | 20  | 250 | $\mu\text{A}$ |   |
| $I_{GSS}$    | Gate-to-Source Forward Leakage | $V_{GS} = 5\text{ V}$                            | 0.1 | 1   | mA            |   |
|              | Gate-to-Source Reverse Leakage | $V_{GS} = -4\text{ V}$                           | 20  | 250 | $\mu\text{A}$ |   |
| $V_{GS(TH)}$ | Gate Threshold Voltage         | $V_{DS} = V_{GS}$ , $I_D = 0.8\text{ mA}$        | 0.8 | 1.4 | 2.5           | V |
| $R_{DS(on)}$ | Drain-Source On Resistance     | $V_{GS} = 5\text{ V}$ , $I_D = 1\text{ A}$       | 35  | 45  | m $\Omega$    |   |
| $V_{SD}$     | Source-Drain Forward Voltage   | $I_S = 0.5\text{ A}$ , $V_{GS} = 0\text{ V}$     | 2   |     | V             |   |

All measurements were done with substrate shorted to source.

## Thermal Characteristics

|                 |  | TYP | UNIT |
|-----------------|--|-----|------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case             | 6.5 | °C/W |
| $R_{\theta JB}$ | Thermal Resistance, Junction to Board            | 65  | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient (Note 1) | 100 | °C/W |

Note 1:  $R_{\theta JA}$  is determined with the device mounted on one square inch of copper pad, single layer 2 oz copper on FR4 board.  
See [http://epc-co.com/epc/documents/product-training/Appnote\\_Thermal\\_Performance\\_of\\_eGaN\\_FETs.pdf](http://epc-co.com/epc/documents/product-training/Appnote_Thermal_Performance_of_eGaN_FETs.pdf) for details.

Dynamic Characteristics ( $T_J = 25^\circ\text{C}$  unless otherwise stated)

| PARAMETER   |                              | TEST CONDITIONS   | MIN | TYP  | MAX  | UNIT     |
|-------------|------------------------------|---|-----|------|------|----------|
| $C_{ISS}$   | Input Capacitance            | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$                   |     | 95   | 115  | pF       |
| $C_{OSS}$   | Output Capacitance           |   |     | 60   | 90   |          |
| $C_{RSS}$   | Reverse Transfer Capacitance |   |     | 2    | 3    |          |
| $R_G$       | Gate Resistance              |   |     | 0.5  |      | $\Omega$ |
| $Q_G$       | Total Gate Charge            | $V_{DS} = 30\text{ V}, V_{GS} = 5\text{ V}, I_D = 1\text{ A}$ |     | 880  | 1150 | pC       |
| $Q_{GS}$    | Gate-to-Source Charge        | $V_{DS} = 30\text{ V}, I_D = 1\text{ A}$                      |     | 250  |      |          |
| $Q_{GD}$    | Gate-to-Drain Charge         |   |     | 160  | 270  |          |
| $Q_{G(TH)}$ | Gate Charge at Threshold     |   |     | 170  |      |          |
| $Q_{OSS}$   | Output Charge                | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$                   |     | 2600 | 3900 |          |
| $Q_{RR}$    | Source-Drain Recovery Charge |   |     | 0    |      |          |

All measurements were done with substrate shorted to source.

Figure 1: Typical Output Characteristics 25°C

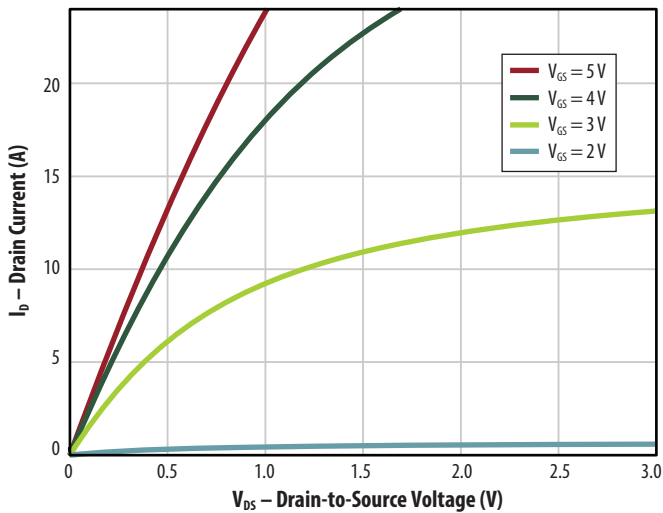


Figure 2: Transfer Characteristics

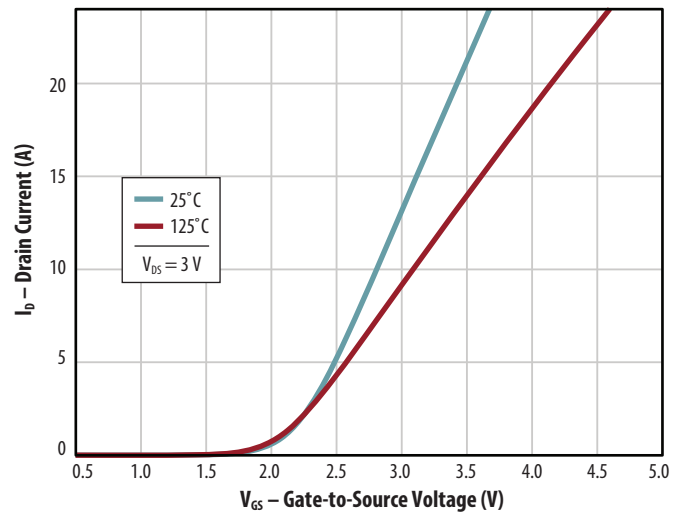


Figure 3:  $R_{DS(on)}$  vs.  $V_{GS}$  for Various Drain Currents

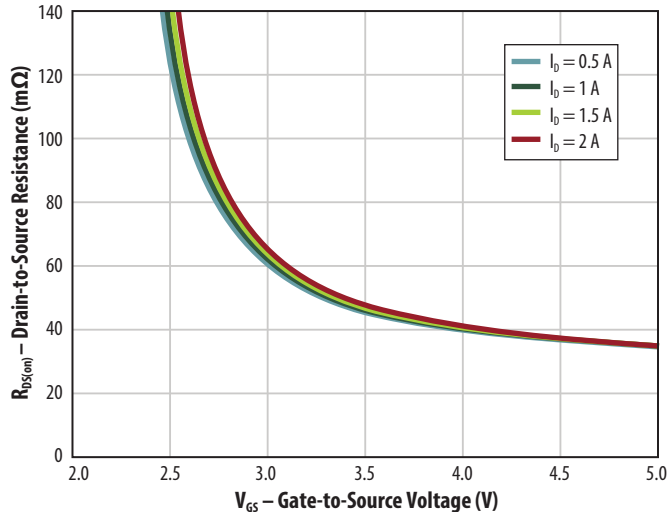


Figure 4:  $R_{DS(on)}$  vs.  $V_{GS}$  for Various Temperatures

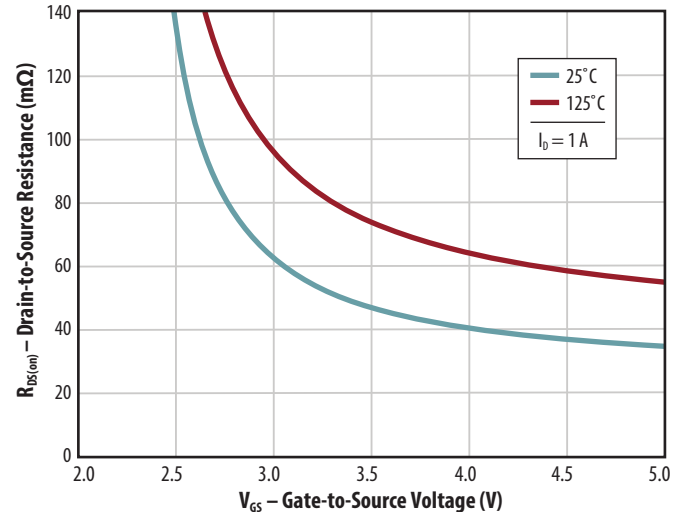


Figure 5a: Capacitance (Linear Scale)

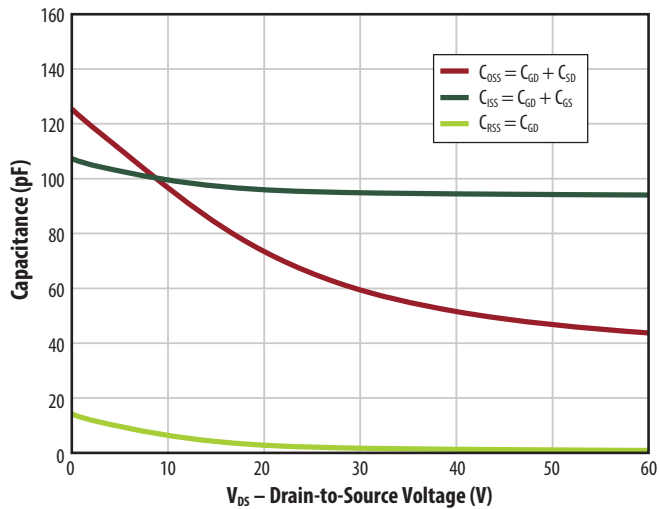


Figure 5b: Capacitance (Log Scale)

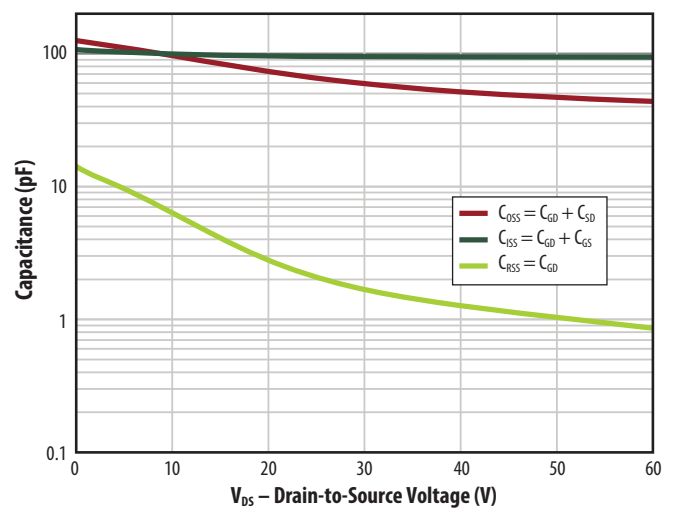


Figure 6: Gate Charge

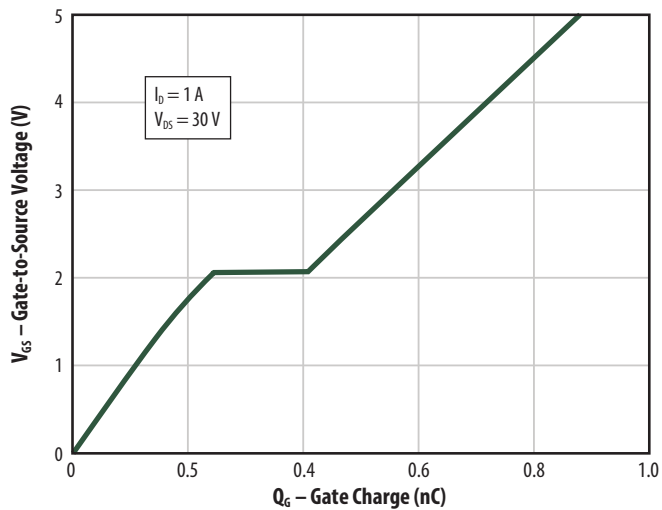


Figure 7: Reverse Drain-Source Characteristics

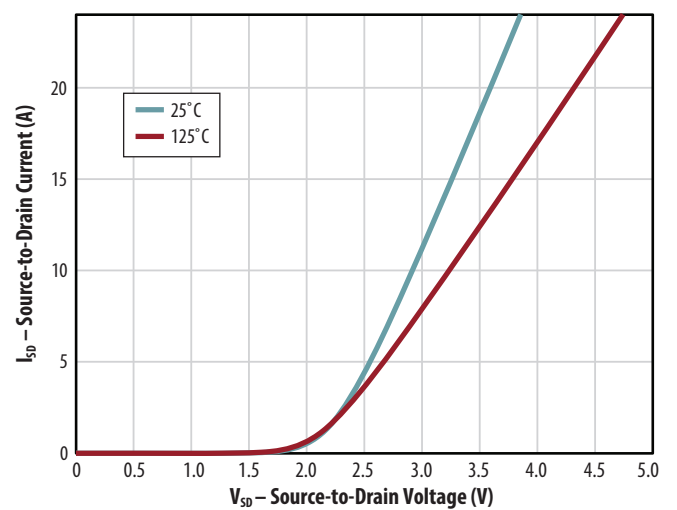


Figure 8: Normalized On Resistance vs. Temperature

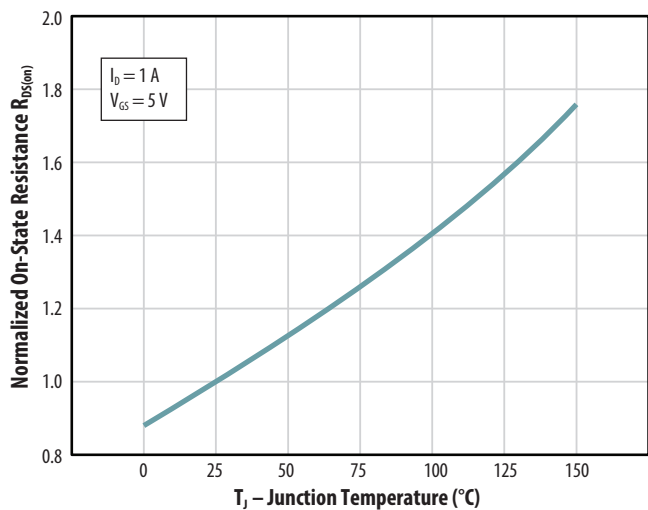
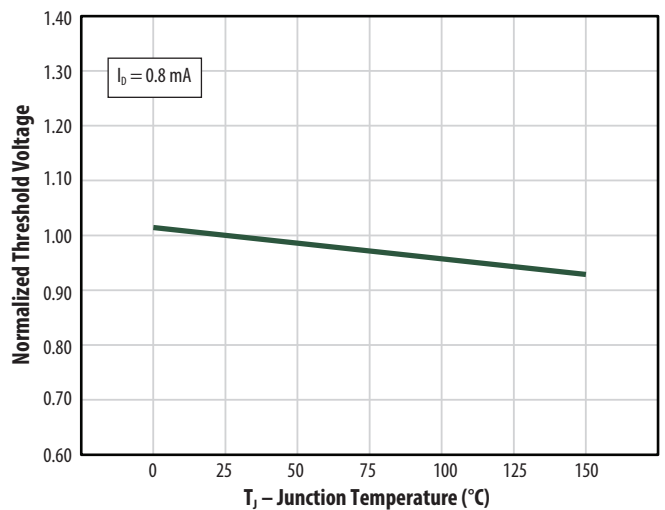


Figure 9: Normalized Threshold Voltage vs. Temperature



All measurements were done with substrate shorted to source.

Figure 10: Gate Leakage Current

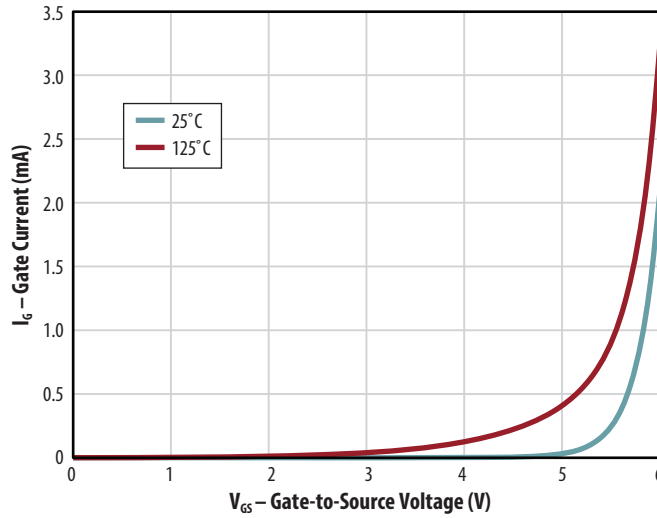


Figure 11: Transient Thermal Response Curves

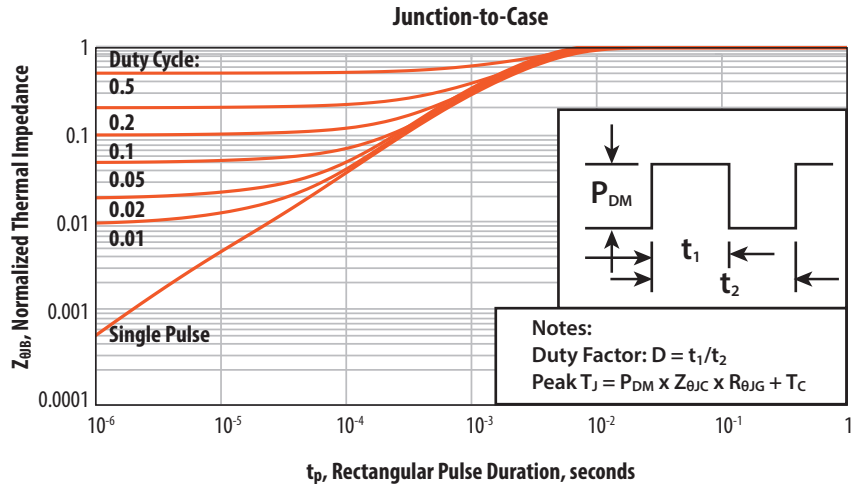
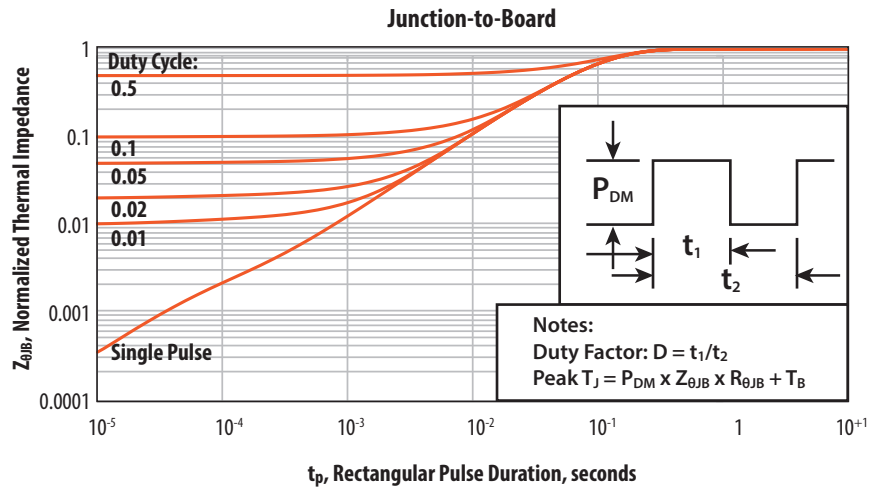
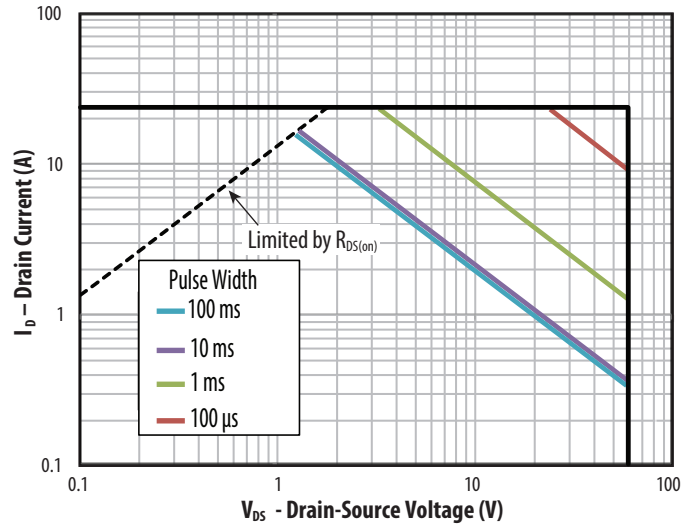
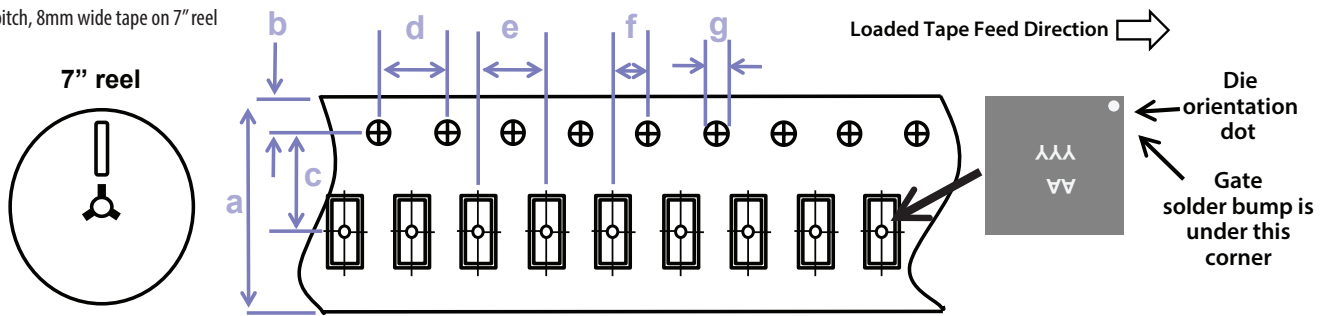


Figure 12: Safe Operating Area



**TAPE AND REEL CONFIGURATION**

4mm pitch, 8mm wide tape on 7" reel

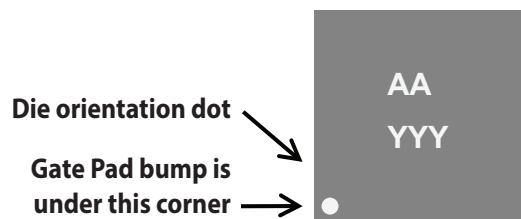


Die is placed into pocket solder bump side down (face side down)

| Dimension (mm) | EPC2035 (note 1) |      |      |
|----------------|------------------|------|------|
|                | target           | min  | max  |
| a              | 8.00             | 7.90 | 8.30 |
| b              | 1.75             | 1.65 | 1.85 |
| c (see note)   | 3.50             | 3.45 | 3.55 |
| d              | 4.00             | 3.90 | 4.10 |
| e              | 4.00             | 3.90 | 4.10 |
| f (see note)   | 2.00             | 1.95 | 2.05 |
| g              | 1.5              | 1.5  | 1.6  |

Note 1: MSL 1 (moisture sensitivity level 1) classified according to IPC/JEDEC industry standard.  
 Note 2: Pocket position is relative to the sprocket hole measured as true position of the pocket, not the pocket hole.

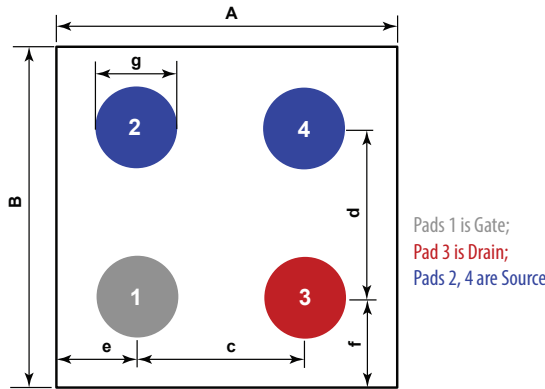
**DIE MARKINGS**



| Part Number | Laser Markings           |                                 |
|-------------|--------------------------|---------------------------------|
|             | Part #<br>Marking Line 1 | Lot_Date Code<br>Marking line 2 |
| EPC2035     | AA                       | YYY                             |

**DIE OUTLINE**

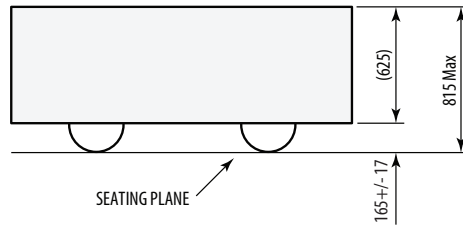
Solder Bump View



Pads 1 is Gate;  
Pad 3 is Drain;  
Pads 2, 4 are Source

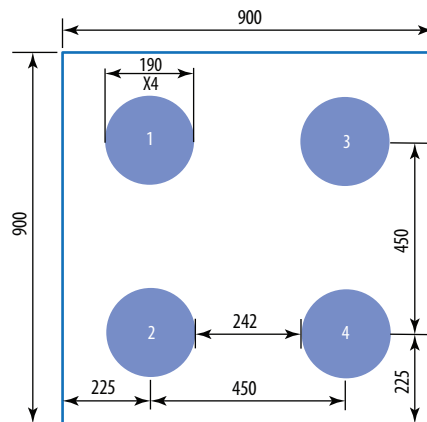
| DIM | MIN | Nominal | MAX |
|-----|-----|---------|-----|
| A   | 870 | 900     | 930 |
| B   | 870 | 900     | 930 |
| c   | 450 | 450     | 450 |
| d   | 450 | 450     | 450 |
| e   | 210 | 225     | 240 |
| f   | 210 | 225     | 240 |
| g   | 187 | 208     | 229 |

Side View



**RECOMMENDED LAND PATTERN**

(measurements in  $\mu\text{m}$ )

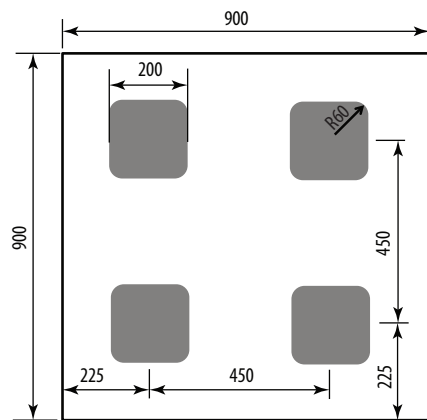


The land pattern is solder mask defined  
Solder mask is 10 $\mu\text{m}$  smaller per side than bump

Pad 1 is Gate;  
Pad 3 is Drain;  
Pads 2, 4 are Source

**RECOMMENDED STENCIL DRAWING**

(measurements in  $\mu\text{m}$ )



Recommended stencil should be 4mil (100 $\mu\text{m}$ ) thick, must be laser cut, openings per drawing.

Intended for use with SAC305 Type 3 solder, reference 88.5% metals content.

Additional assembly resources available at  
<http://epc-co.com/epc/DesignSupport/AssemblyBasics.aspx>

Efficient Power Conversion Corporation (EPC) reserves the right to make changes without further notice to any products herein to improve reliability, function or design. EPC does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

eGaN® is a registered trademark of Efficient Power Conversion Corporation.  
U.S. Patents 8,350,294; 8,404,508; 8,431,960; 8,436,398; 8,785,974; 8,890,168; 8,969,918; 8,853,749; 8,823,012

Information subject to change without notice.

Revised April, 2015