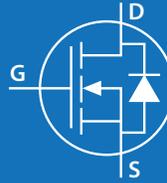


EPC2203 – Automotive 80 V (D-S) Enhancement Mode Power Transistor

 $V_{DS}, 80\text{ V}$
 $R_{DS(on)}, 80\text{ m}\Omega$
 $I_D, 1.7\text{ A}$

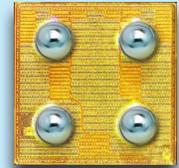
AEC-Q101



Revised August 28, 2025

Gallium Nitride'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.

Questions:
Ask a GaN
Expert



Die size: 0.9 x 0.9 mm

EPC2203 eGaN® FETs are supplied only in passivated die form with solder bumps.

Applications

- Lidar/pulsed power applications
- High power density DC-DC converters
- Wireless power
- Class-D audio

Benefits

- Ultra high efficiency
- Ultra low $R_{DS(on)}$
- Ultra low Q_G
- Ultra small footprint

Maximum Ratings			
PARAMETER		VALUE	UNIT
V_{DS}	Drain-to-Source Voltage (Continuous)	80	V
I_D	Continuous ($T_A = 25^\circ\text{C}$, $R_{\theta JA} = 314^\circ\text{C/W}$)	1.7	A
	Pulsed (25°C , $T_{PULSE} = 10\ \mu\text{s}$)	23	
	Pulsed (125°C , $T_{PULSE} = 10\ \mu\text{s}$)	18	
V_{GS}	Gate-to-Source Voltage	5.75	V
	Gate-to-Source Voltage	-4	
T_J	Operating Temperature	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature	-55 to 150	

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

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 https://epc-co.com/epc/documents/product-training/Appnote_Thermal_Performance_of_eGaN_FETs.pdf for details.

Static Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise stated)						
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-to-Source Voltage	$V_{GS} = 0\text{ V}$, $I_D = 300\ \mu\text{A}$	80			V
I_{DSS}	Drain-Source Leakage	$V_{GS} = 0\text{ V}$, $V_{DS} = 64\text{ V}$		5	250	μA
I_{GSS}	Gate-to-Source Forward Leakage	$V_{GS} = 5\text{ V}$		0.01	0.9	mA
	Gate-to-Source Reverse Leakage	$V_{GS} = -4\text{ V}$		2	250	μA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 0.6\text{ mA}$	0.8	1.5	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS} = 5\text{ V}$, $I_D = 1\text{ A}$		53	80	$\text{m}\Omega$
V_{SD}	Source-Drain Forward Voltage [#]	$V_{GS} = 0\text{ V}$, $I_S = 0.35\text{ A}$		2.2		V

[#] Defined by design. Not subject to production test.
All measurements were done with substrate connected to source.

Scan QR code or click link below for more information including reliability reports, device models, demo boards!



<https://l.ead.me/EPC2203>

Dynamic Characteristics# (T_j = 25°C unless otherwise stated)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
C _{ISS}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 50 V		73	88	pF
C _{RSS}	Reverse Transfer Capacitance			0.5		
C _{OSS}	Output Capacitance			47	71	
C _{OSS(ER)}	Effective Output Capacitance, Energy Related (Note 2)	V _{GS} = 0 V, V _{DS} = 0 to 50 V		57		pF
C _{OSS(TR)}	Effective Output Capacitance, Time Related (Note 3)			72		
R _G	Gate Resistance			0.6		Ω
Q _G	Total Gate Charge	V _{GS} = 5 V, V _{DS} = 50 V, I _D = 1 A		670	830	pC
Q _{GS}	Gate-to-Source Charge	V _{DS} = 50 V, I _D = 1 A		220		
Q _{GD}	Gate-to-Drain Charge			120		
Q _{G(TH)}	Gate Charge at Threshold			154		
Q _{OSS}	Output Charge	V _{GS} = 0 V, V _{DS} = 50 V		3600	5400	
Q _{RR}	Source-Drain Recovery Charge			0		

Defined by design. Not subject to production test.

All measurements were done with substrate connected to source.

Note 2: C_{OSS(ER)} is a fixed capacitance that gives the same stored energy as C_{OSS} while V_{DS} is rising from 0 to 50% BV_{DSS}.

Note 3: C_{OSS(TR)} is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 50% BV_{DSS}.

Figure 1: Typical Output Characteristics at 25°C

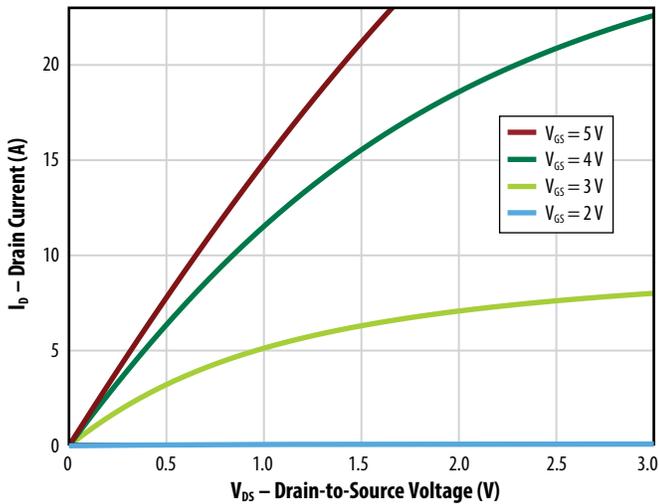


Figure 2: Typical Transfer Characteristics

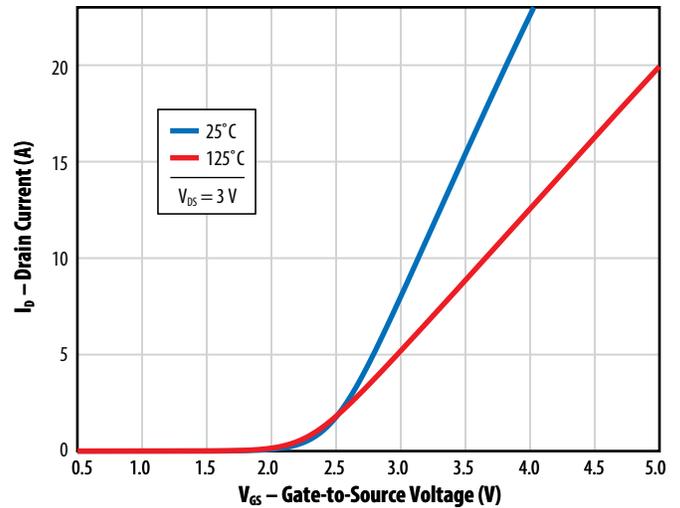


Figure 3: Typical R_{DS(on)} vs. V_{GS} for Various Drain Currents

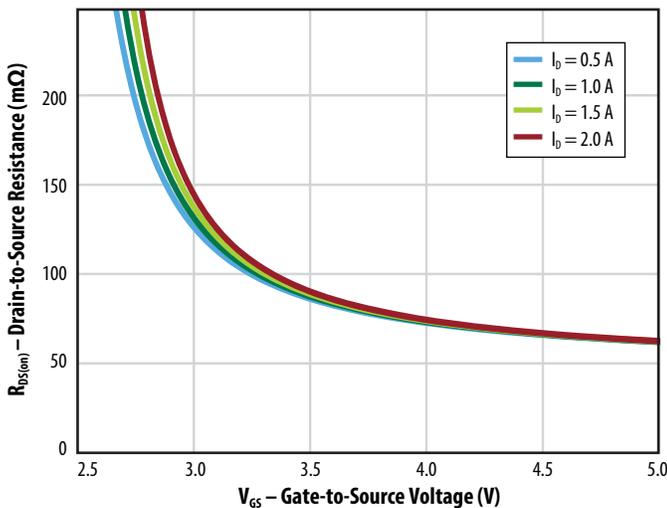


Figure 4: Typical R_{DS(on)} vs. V_{GS} for Various Temperatures

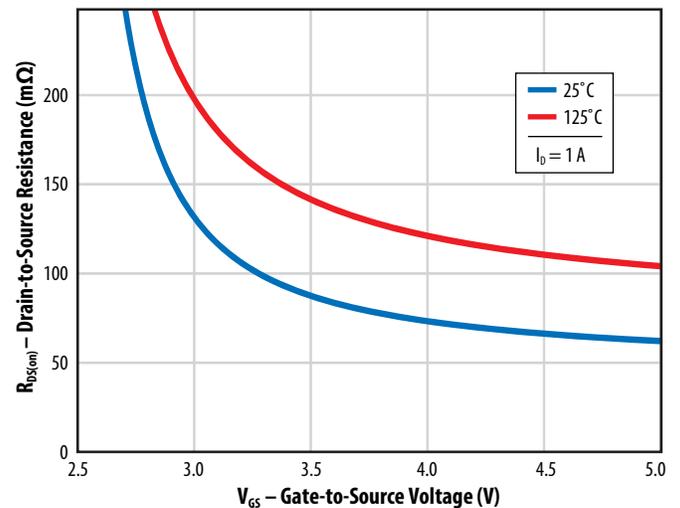


Figure 5a: Typical Capacitance (Linear Scale)

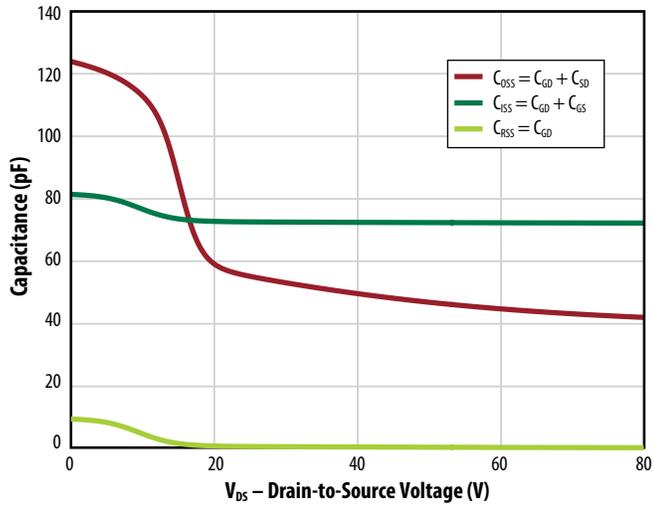


Figure 5b: Typical Capacitance (Log Scale)

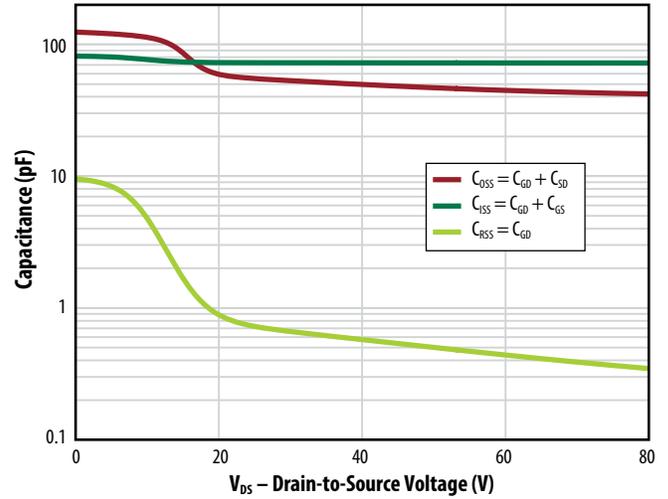


Figure 5c: Typical Output Charge and C_oss Stored Energy

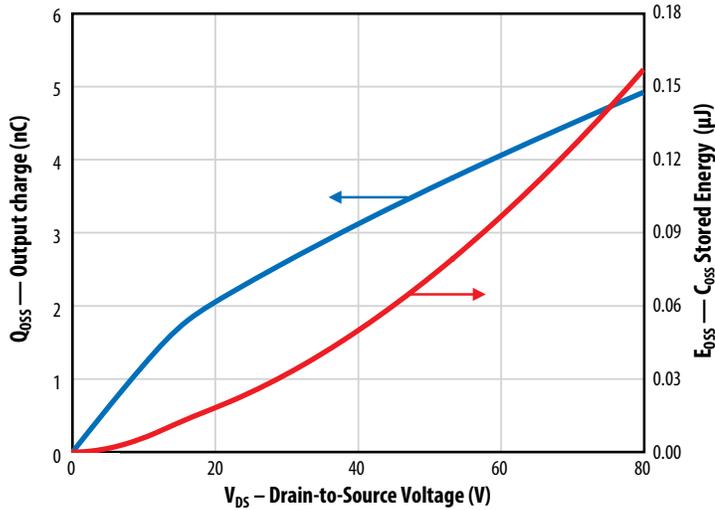


Figure 6: Typical Gate Charge

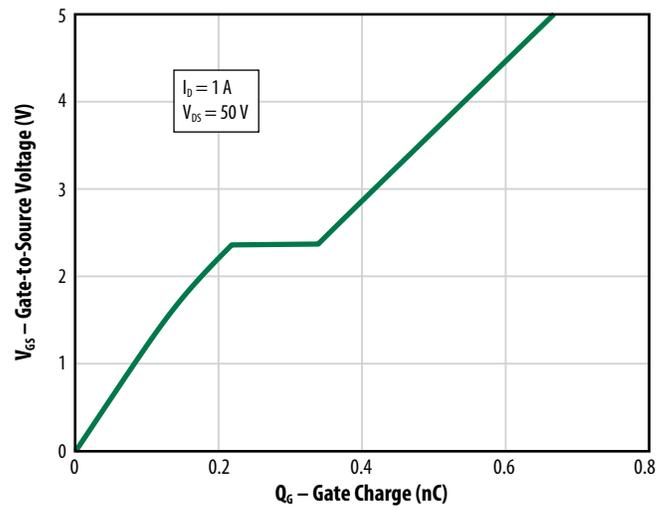


Figure 7: Typical Reverse Drain-Source Characteristics

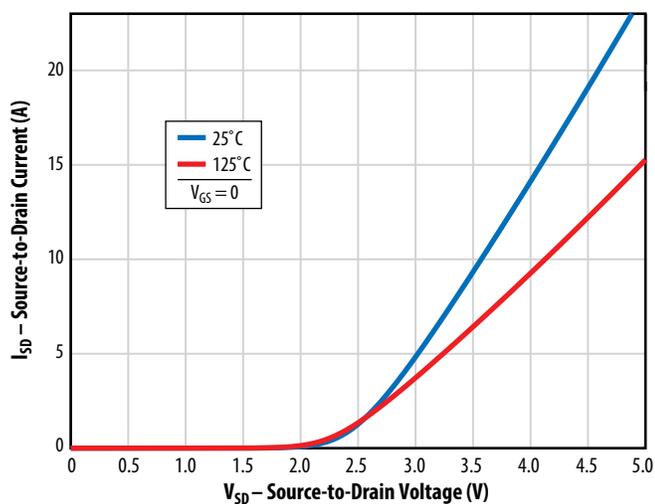
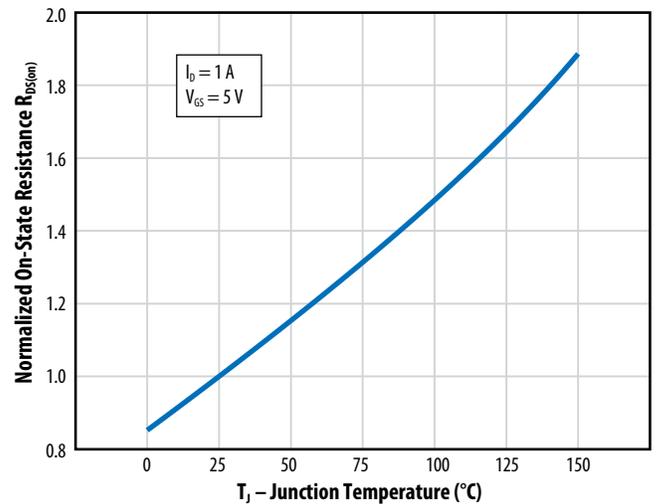


Figure 8: Typical Normalized On-State Resistance vs. Temp.



Note: Negative gate drive voltage increases the reverse drain-source voltage. EPC recommends 0V for OFF.

Figure 9: Typical Normalized Threshold Voltage vs. Temperature

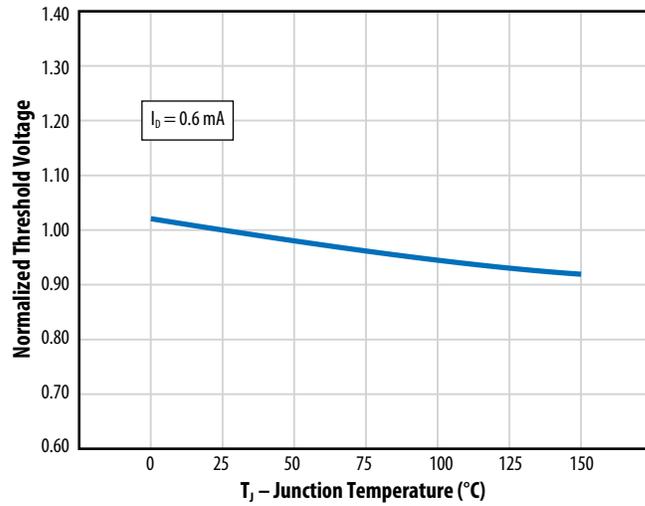


Figure 10: Typical Transient Thermal Response Curves

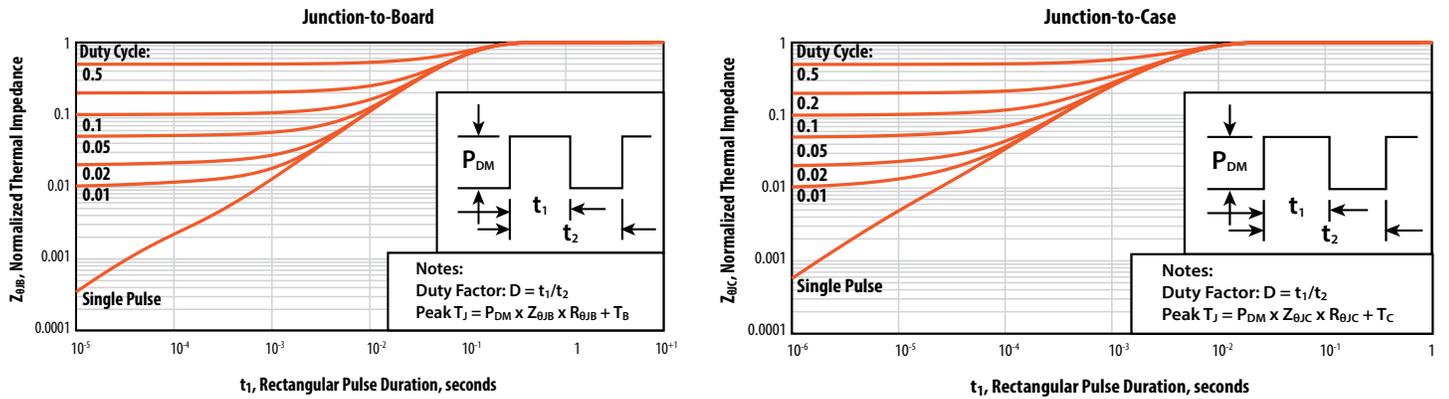
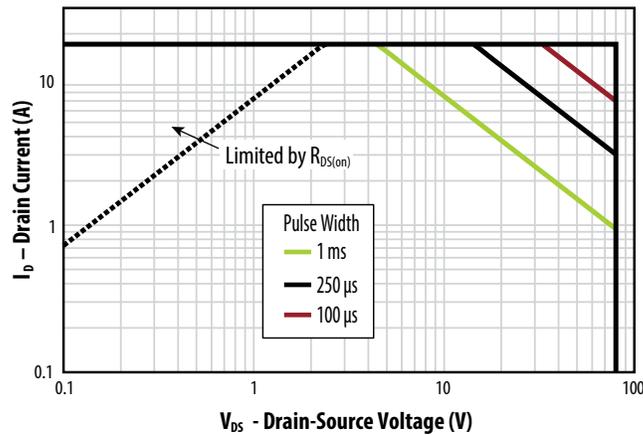
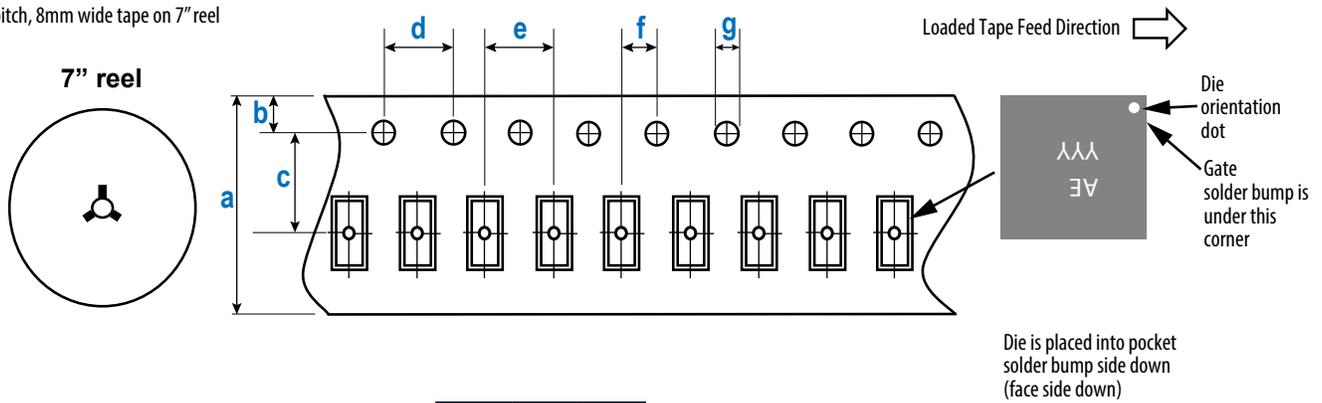


Figure 11: Safe Operating Area



TAPE AND REEL CONFIGURATION

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

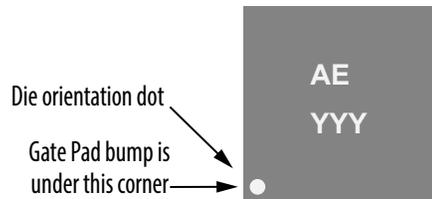


Dimension (mm)			
EPC2203 (Note 1)	Target	MIN	MAX
a	8.00	7.90	8.30
b	1.75	1.65	1.85
c (Note 2)	3.50	3.45	3.55
d	4.00	3.90	4.10
e	4.00	3.90	4.10
f (Note 2)	2.00	1.95	2.05
g	1.50	1.50	1.60

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.

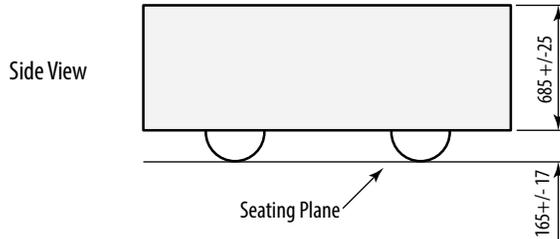
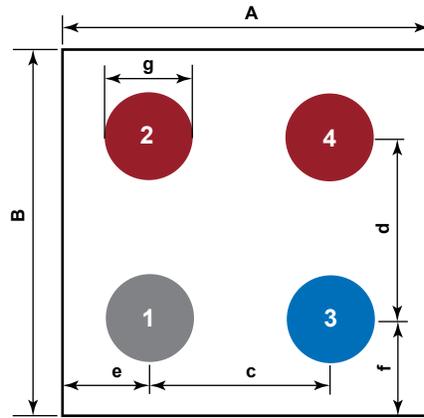
DIE MARKINGS



Part Number	Laser Markings	
	Part # Marking Line 1	Lot_Date Code Marking Line 2
EPC2203	AE	YYY

DIE OUTLINE

Solder Bump View



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

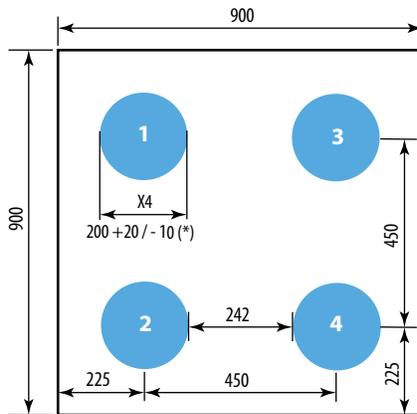
Pad 1 is Gate;

Pad 3 is Drain;

Pads 2, 4 are Source

RECOMMENDED LAND PATTERN

(measurements in μm)



* minimum 190

The land pattern is solder mask defined.

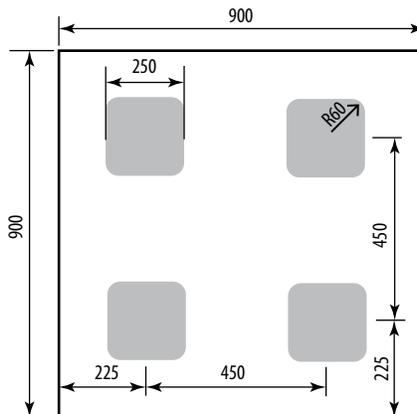
Pads 1 is Gate;

Pad 3 is Drain;

Pads 2, 4 are Source

RECOMMENDED STENCIL DRAWING

(measurements in μm)



Recommended stencil should be 4mil (100 μm) thick, must be laser cut, openings per drawing.

Intended for use with SAC305 Type 4 solder, reference 88.5% metals content.

Additional assembly resources available at <https://epc-co.com/epc/design-support>

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