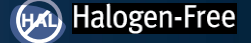


EPC2034C – Enhancement Mode Power Transistor

 V_{DS} , 200 V $R_{DS(on)}$, 8 mΩ I_D , 48 A

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.

Application Notes:

- Easy-to-use and reliable gate, Gate Drive ON = 5 V typical, OFF = 0 V (negative voltage not needed)
- Top of FET is electrically connected to source

Questions:
EPC GaN Talk
Support Forum



Recommended dead time (half-bridge circuit) ≤ 30 ns for best efficiency

Maximum Ratings

PARAMETER		VALUE	UNIT
V_{DS}	Drain-to-Source Voltage (Continuous)	200	V
I_D	Continuous ($T_A = 25^\circ\text{C}$)	48	A
	Pulsed (25°C , $T_{PULSE} = 300 \mu\text{s}$)	213	
V_{GS}	Gate-to-Source Voltage	6	V
	Gate-to-Source Voltage	-4	
T_J	Operating Temperature	-40 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature	-40 to 150	

Thermal Characteristics

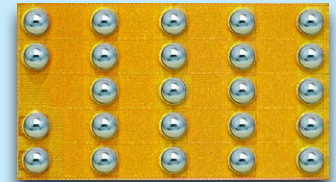
PARAMETER		TYP	UNIT
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.3	$^\circ\text{C/W}$
$R_{\theta JB}$	Thermal Resistance, Junction-to-Board	4	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1)	45	

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	$V_{GS} = 0 \text{ V}$, $I_D = 0.6 \text{ mA}$	200			V
I_{DSS}	Drain-Source Leakage	$V_{DS} = 160 \text{ V}$, $V_{GS} = 0 \text{ V}$		0.03	0.4	mA
I_{GSS}	Gate-to-Source Forward Leakage	$V_{GS} = 5 \text{ V}$		0.002	4	mA
	Gate-to-Source Forward Leakage [#]	$V_{GS} = 5 \text{ V}$, $T_J = 125^\circ\text{C}$		0.03	9	mA
	Gate-to-Source Reverse Leakage	$V_{GS} = -4 \text{ V}$		0.03	0.4	mA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 7 \text{ mA}$	0.8	1.1	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS} = 5 \text{ V}$, $I_D = 20 \text{ A}$		6	8	mΩ
V_{SD}	Source-Drain Forward Voltage [#]	$I_S = 0.5 \text{ A}$, $V_{GS} = 0 \text{ V}$		1.7		V

[#] Defined by design. Not subject to production test.



Die Size: 4.6 x 2.6 mm

EPC2034C eGaN® FETs are supplied only in passivated die form with solder bumps.

- High Frequency DC/DC Conversion
- Multi-level AC/DC Power Supplies
- Wireless Power
- Solar Micro Inverters
- Robotics
- Class-D Audio
- Low Inductance Motor Drives

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



<https://l.ead.me/EPC2034C>

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

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
C_{ISS}	Input Capacitance [#]	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$		1155	1386	pF
C_{RSS}	Reverse Transfer Capacitance			3.1		
C_{OSS}	Output Capacitance [#]			641	962	
$C_{OSS(ER)}$	Effective Output Capacitance, Energy Related (Note 2)	$V_{DS} = 0\text{ to }100\text{ V}, V_{GS} = 0\text{ V}$		755		
$C_{OSS(TR)}$	Effective Output Capacitance, Time Related (Note 3)			969		
R_G	Gate Resistance			0.5		Ω
Q_G	Total Gate Charge [#]	$V_{DS} = 100\text{ V}, V_{GS} = 5\text{ V}, I_D = 20\text{ A}$		11.1	13.8	nC
Q_{GS}	Gate to Source Charge	$V_{DS} = 100\text{ V}, I_D = 20\text{ A}$		3.8		
Q_{GD}	Gate to Drain Charge			2.0		
$Q_{G(TH)}$	Gate Charge at Threshold			2.1		
Q_{OSS}	Output Charge [#]	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$		96	144	
Q_{RR}	Source-Drain Recovery Charge			0		

[#] Defined by design. Not subject to production test.

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} .

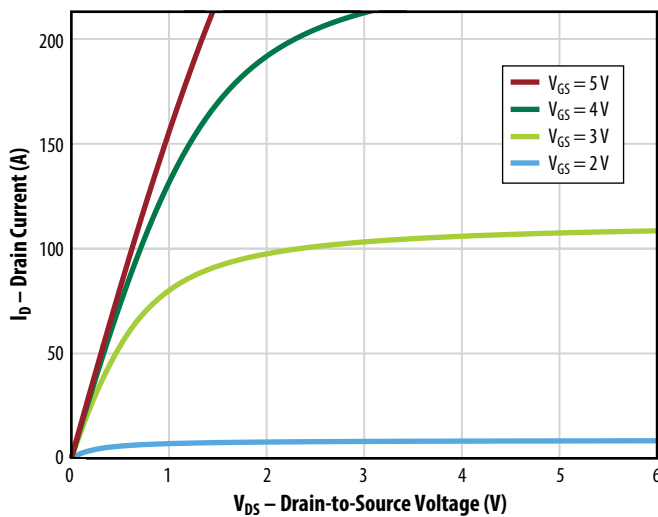
Figure 1: Typical Output Characteristics at 25°C 

Figure 2: Typical Transfer Characteristics

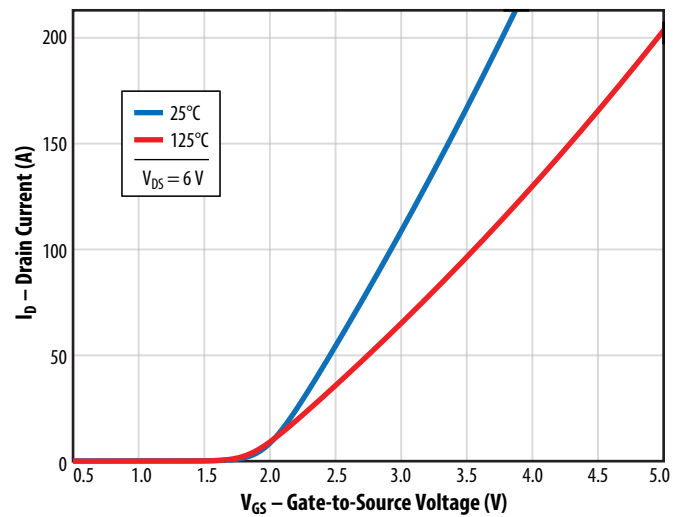
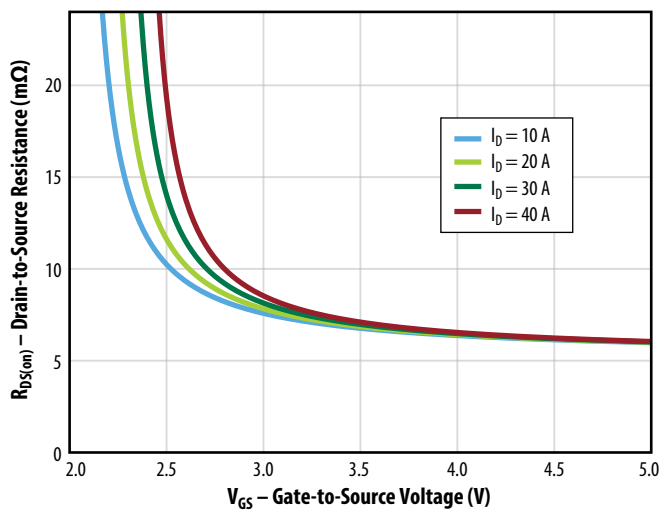
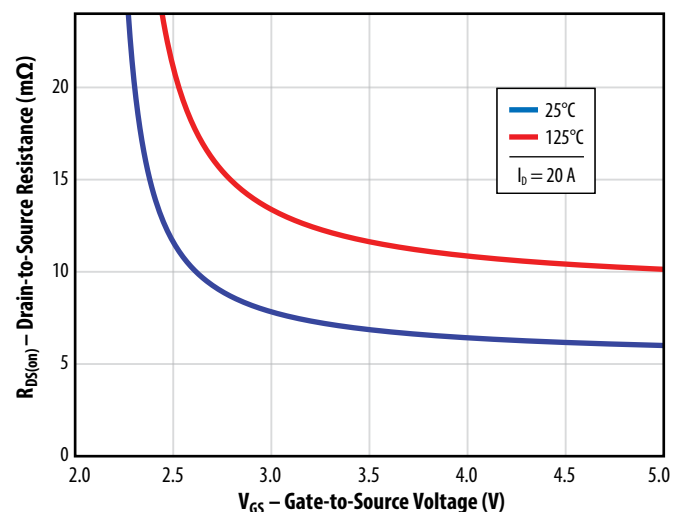
Figure 3: $R_{DS(on)}$ vs. V_{GS} for Various Drain CurrentsFigure 4: $R_{DS(on)}$ vs. V_{GS} for Various Temperatures

Figure 5a: Capacitance (Linear Scale)

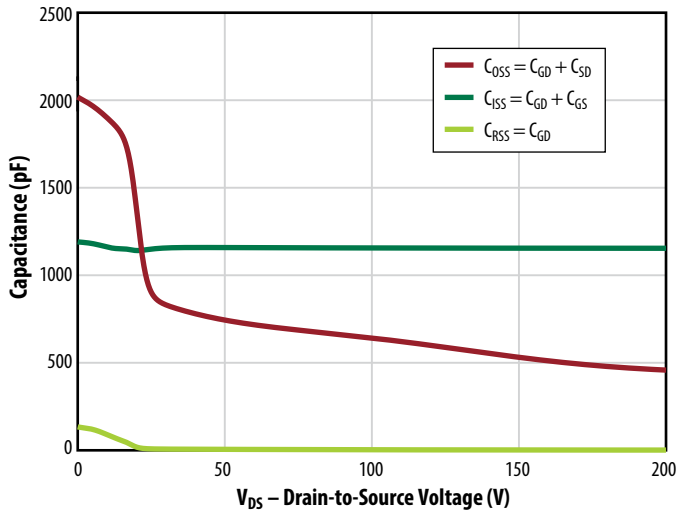


Figure 5b: Capacitance (Log Scale)

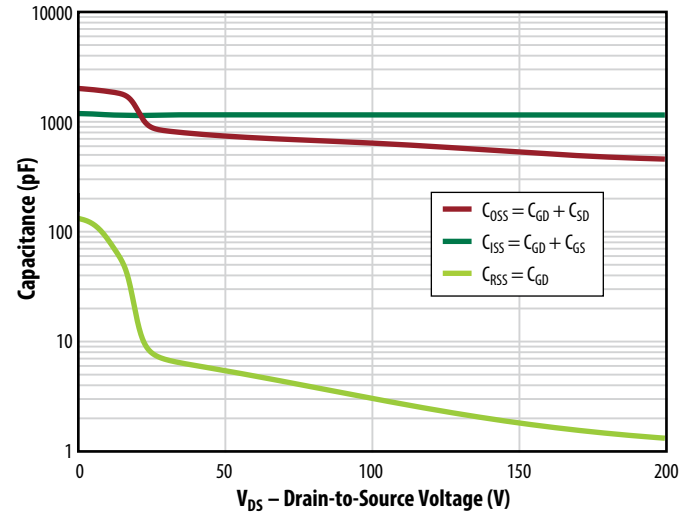
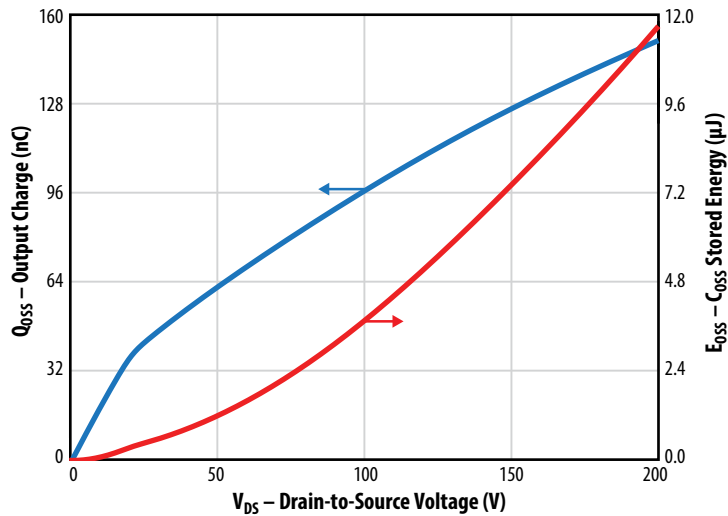
Figure 6: Typical Output Charge and C_{OSS} Stored Energy

Figure 7: Typical Gate Charge

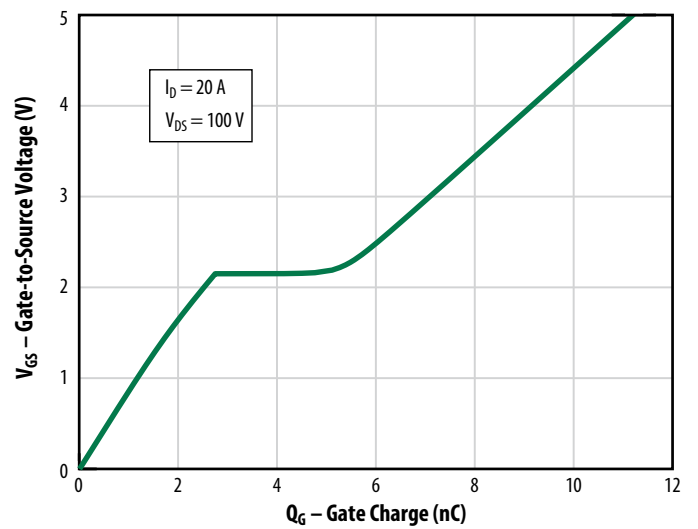


Figure 8: Reverse Drain-Source Characteristics

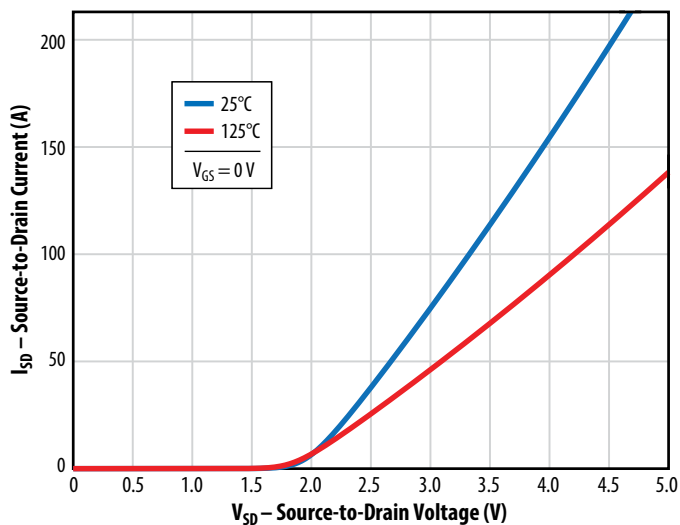
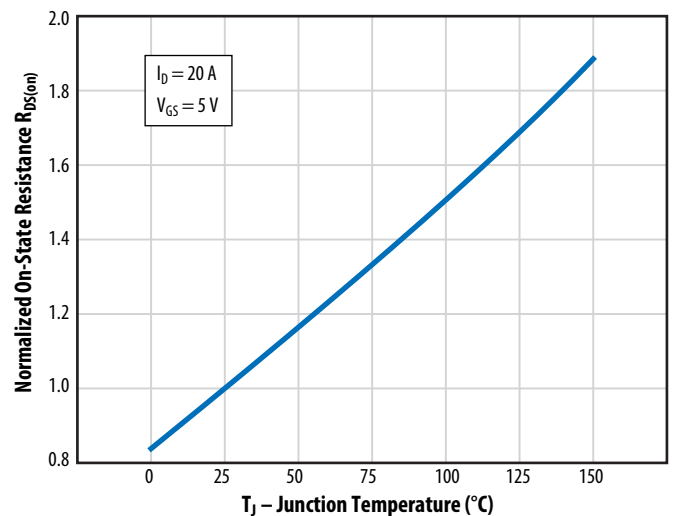


Figure 9: Normalized On-State Resistance vs. Temperature



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

Figure 10: Normalized Threshold Voltage vs. Temperature

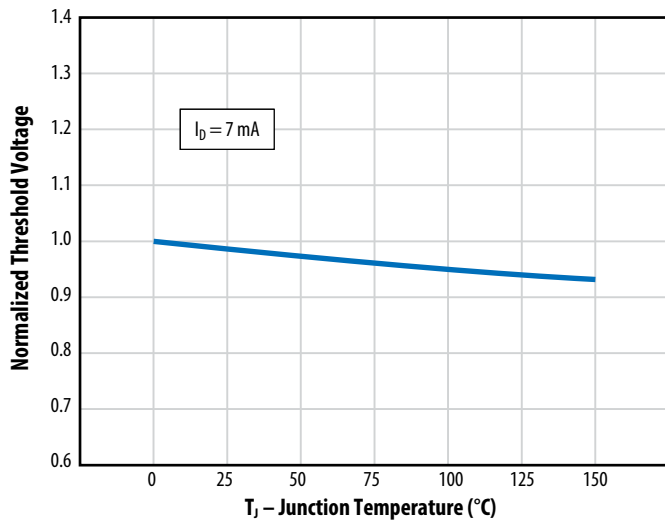


Figure 11: Safe Operating Area

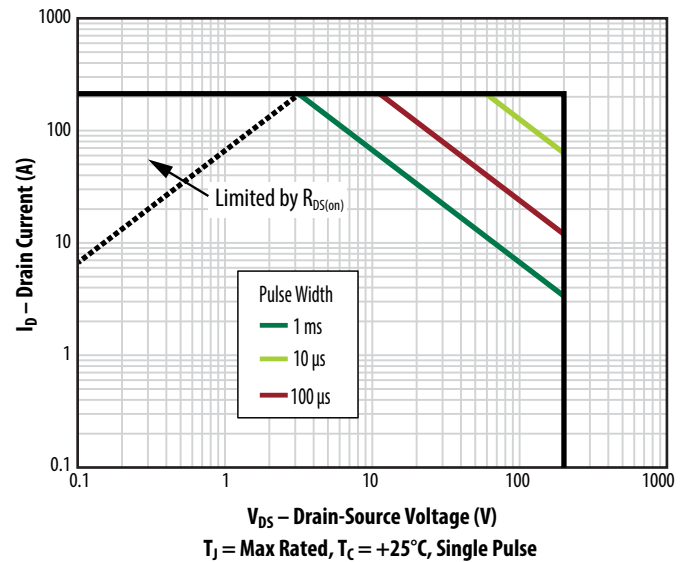
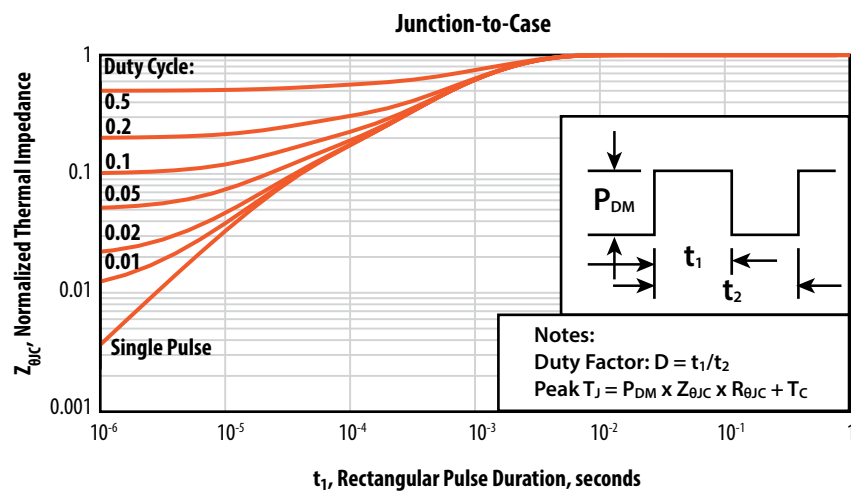
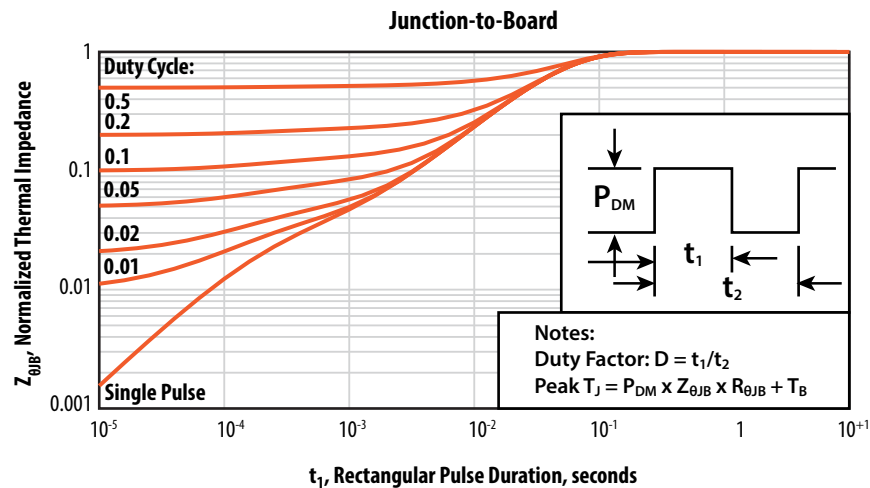
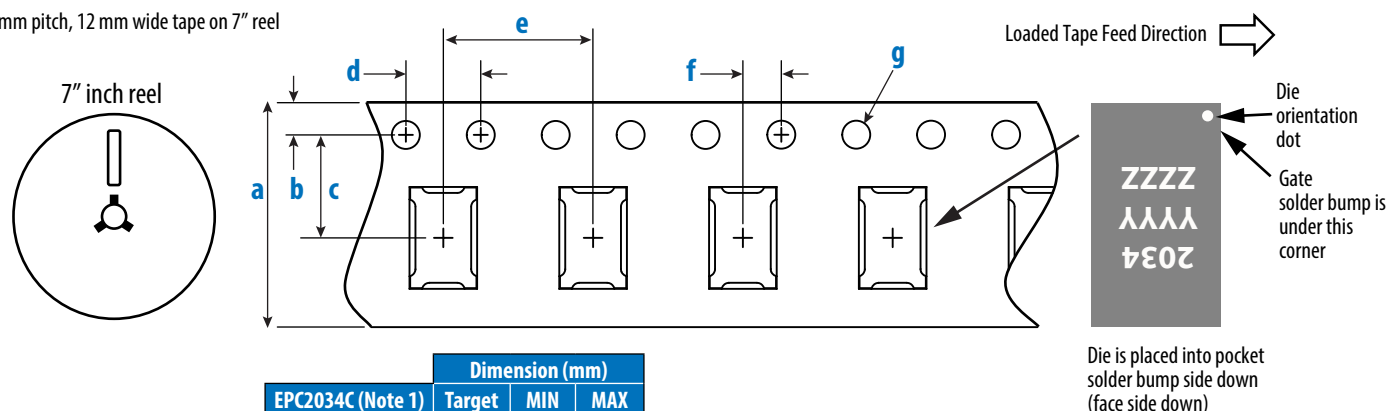


Figure 12: Transient Thermal Response Curves

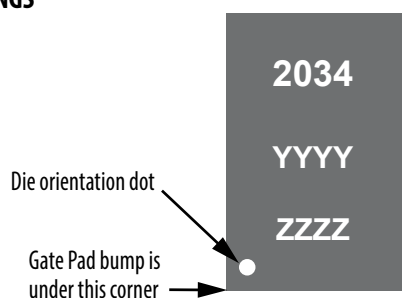


TAPE AND REEL CONFIGURATION

8 mm pitch, 12 mm wide tape on 7" reel



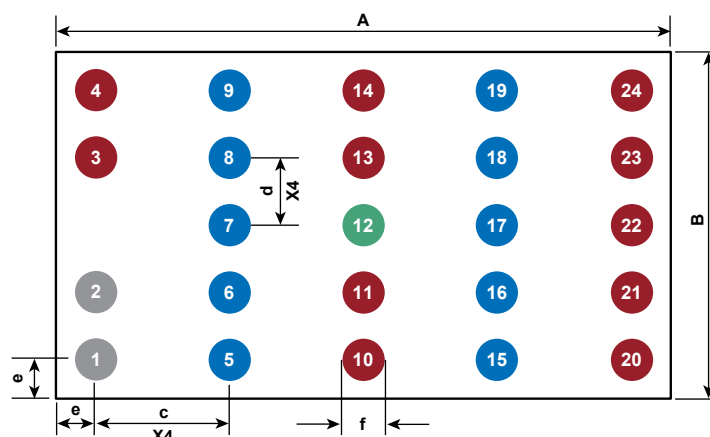
DIE MARKINGS



Part Number	Laser Markings		
	Part # Marking Line 1	Lot _ Date Code Marking Line 2	Lot _ Date Code Marking Line 3
EPC2034C	2034	YYYY	ZZZZ

DIE OUTLINE

Solder Bump View



DIM	Micrometers		
	MIN	Nominal	MAX
A	4570	4600	4630
B	2570	2600	2630
c	1000	1000	1000
d	500	500	500
e	285	300	315
f	332	369	406

Pads 1 and 2 are Gate;

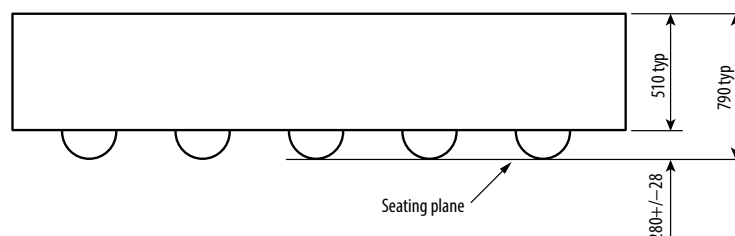
Pads 5, 6, 7, 8, 9, 15, 16, 17, 18, 19 are Drain;

Pads 3, 4, 10, 11, 13, 14, 20, 21, 22, 23, 24 are Source;

Pad 12 is Substrate*

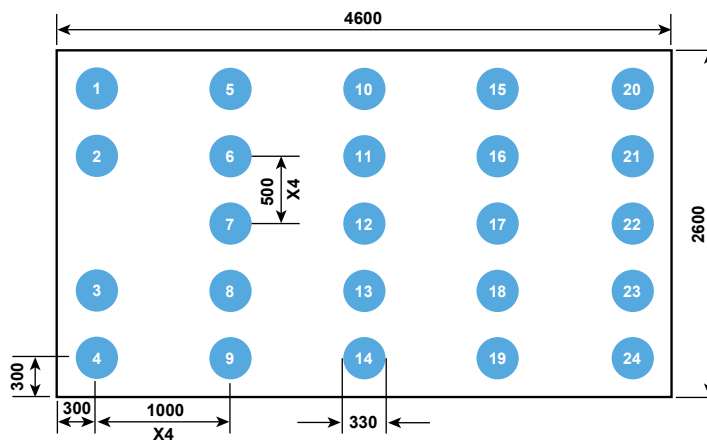
*Substrate pin should be connected to Source

Side View



RECOMMENDED LAND PATTERN

(units in μm)



Land pattern is solder mask defined

Pads 1 and 2 are Gate;

Pads 5, 6, 7, 8, 9, 15, 16, 17, 18, 19 are Drain;

Pads 3, 4, 10, 11, 13, 14, 20, 21, 22, 23, 24 are Source;

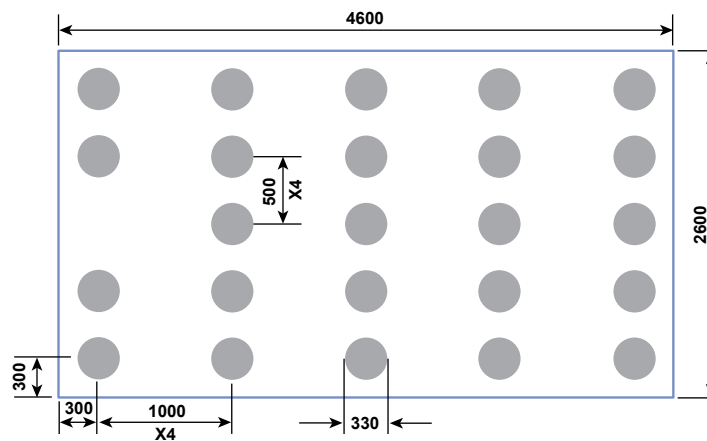
Pad 12 is Substrate*

*Substrate pin should be connected to Source

RECOMMENDED STENCIL DRAWING

(units in μm)

Option 1 : Intended for use with SAC305 Type 4 solder.



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

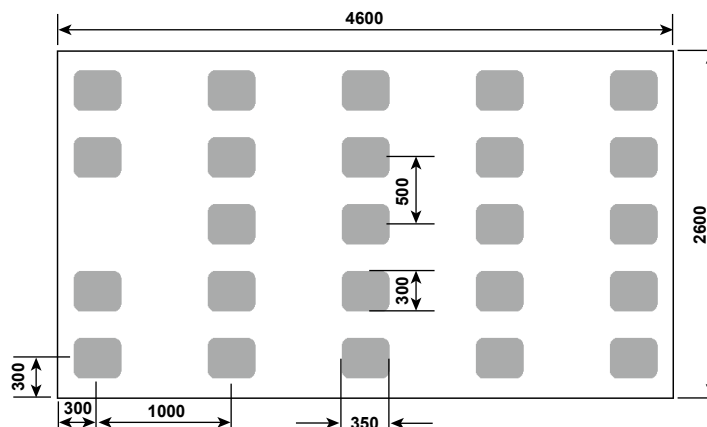
Additional assembly resources available at

<https://epc-co.com/epc/design-support/assemblybasics>

RECOMMENDED STENCIL DRAWING

(units in μm)

Option 2 : Intended for use with SAC305 Type 3 solder.



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

Additional assembly resources available at

<https://epc-co.com/epc/design-support/assemblybasics>

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