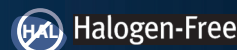
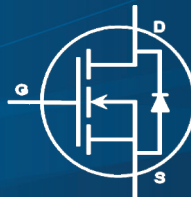
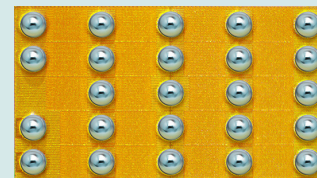


EPC2034 – Enhancement Mode Power Transistor

 $V_{DS}, 200\text{ V}$
 $R_{DS(on)}, 10\text{ m}\Omega$
 $I_D, 48\text{ A}$


Gallium Nitride is grown on Silicon Wafers and processed using standard CMOS equipment leveraging the infrastructure that has been developed over the last 60 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)	200	V
I_D	Continuous ($T_A = 25^\circ\text{C}$, $R_{\theta JA} = 3^\circ\text{C/W}$)	48	A
	Pulsed (25°C , $T_{PULSE} = 300\text{ }\mu\text{s}$)	200	
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	



EPC2034 eGaN® FETs are supplied only in passivated die form with solder bumps.
Die Size: 4.6 mm x 2.6 mm

- High Frequency DC-DC Conversion
- Motor Drive
- Industrial Automation
- Class-D Audio

www.epc-co.com/epc/Products/eGaNfets/EPC2034.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	$V_{GS} = 0\text{ V}$, $I_D = 0.6\text{ mA}$	200		V	
I_{DSS}	Drain Source Leakage	$V_{DS} = 160\text{ V}$, $V_{GS} = 0\text{ V}$	0.1	0.4	mA	
I_{GSS}	Gate-to-Source Forward Leakage	$V_{GS} = 5\text{ V}$	1	7	mA	
	Gate-to-Source Reverse Leakage	$V_{GS} = -4\text{ V}$	0.1	0.4	mA	
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 7\text{ mA}$	0.8	1.4	2.5	V
$R_{DS(on)}$	Drain-to-Source On Resistance	$V_{GS} = 5\text{ V}$, $I_D = 20\text{ A}$	7	10	$\text{m}\Omega$	
V_{SD}	Source-to-Drain Forward Voltage	$I_S = 0.5\text{ A}$, $V_{GS} = 0\text{ V}$	1.8		V	

All measurements were done with substrate shorted to source.

Thermal Characteristics			
		TYP	UNIT
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.45	$^\circ\text{C/W}$
$R_{\theta JB}$	Thermal Resistance, Junction to Board	3.9	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1)	45	$^\circ\text{C/W}$

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 for details.

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

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
C_{ISS}	Input Capacitance		950	1140	pF
C_{RSS}	Reverse Transfer Capacitance		2.3		
C_{OSS}	Output Capacitance		450	680	
$C_{OSS(ER)}$	Effective Output Capacitance, Energy Related (Note 2)		550		
$C_{OSS(TR)}$	Effective Output Capacitance, Time Related (Note 3)		750		
R_G	Gate Resistance		0.5		
Q_G	Total Gate Charge	$V_{DS} = 100\text{ V}, V_{GS} = 5\text{ V}, I_D = 20\text{ A}$	8.8	11	nC
Q_{GS}	Gate-to-Source Charge	$V_{DS} = 100\text{ V}, I_D = 20\text{ A}$	3		
Q_{GD}	Gate-to-Drain Charge		1.8		
$Q_{G(TH)}$	Gate Charge at Threshold		2.2		
Q_{OSS}	Output Charge	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$	75	113	
Q_{RR}	Source-to-Drain Recovery Charge		0		

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} .

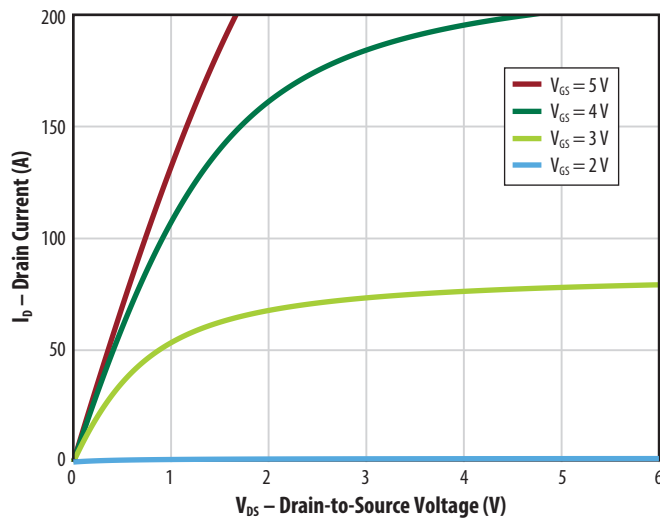
Figure 1: Typical Output Characteristics at 25°C 

Figure 2: Transfer Characteristics

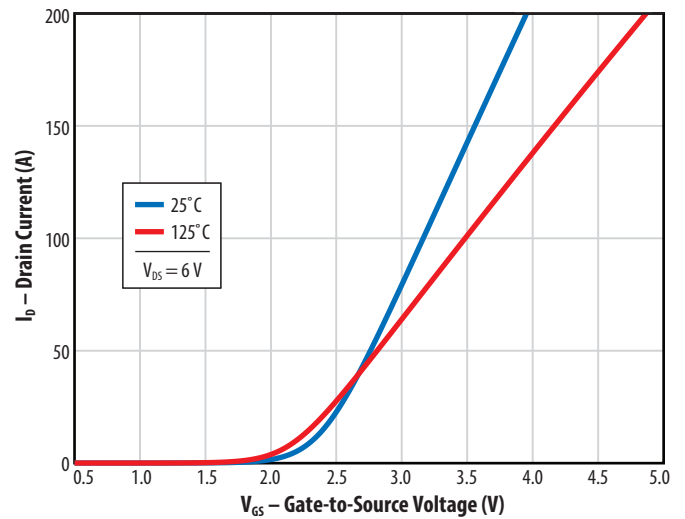
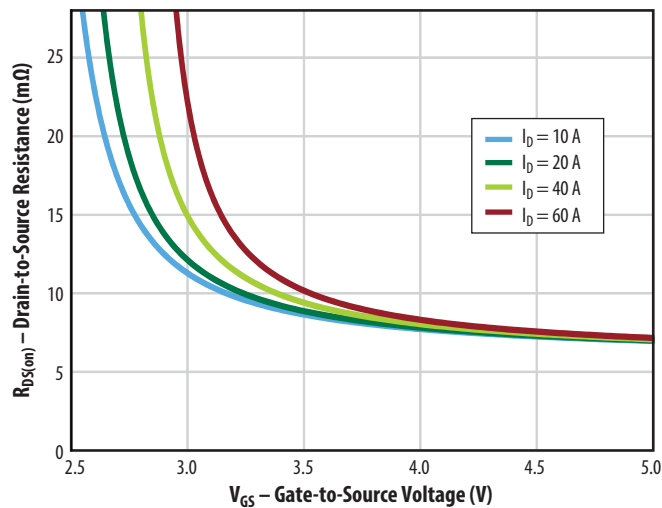
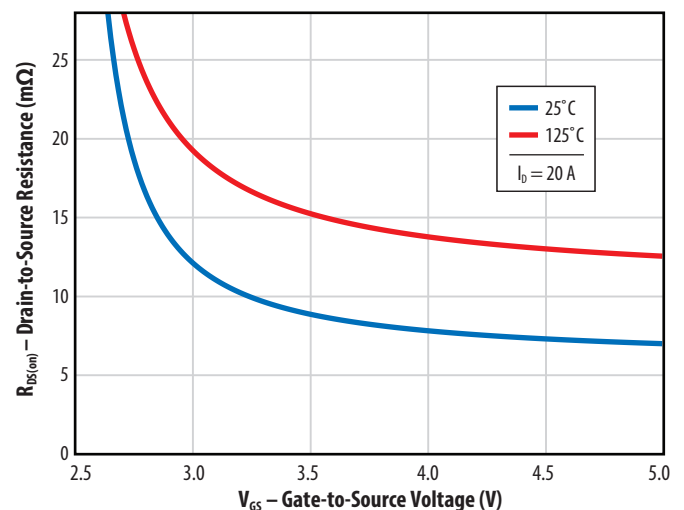
Figure 3: $R_{DS(on)}$ vs. V_{GS} for Various Drain CurrentsFigure 4: $R_{DS(on)}$ vs. V_{GS} for Various Temperatures

Figure 5a: Capacitance (Linear Scale)

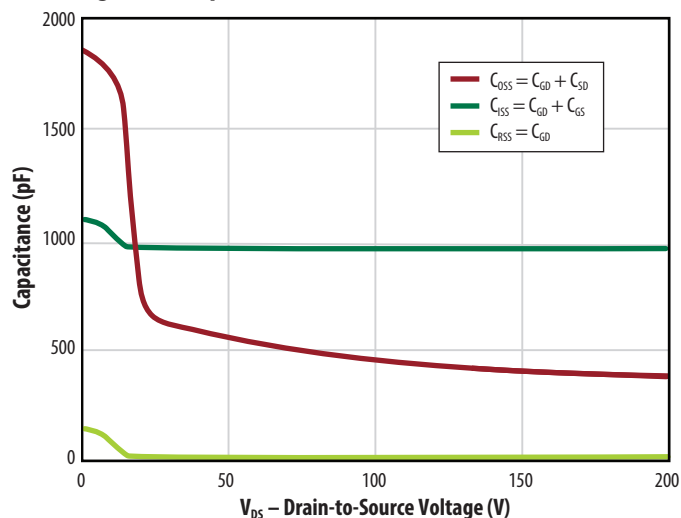


Figure 5b: Capacitance (Log Scale)

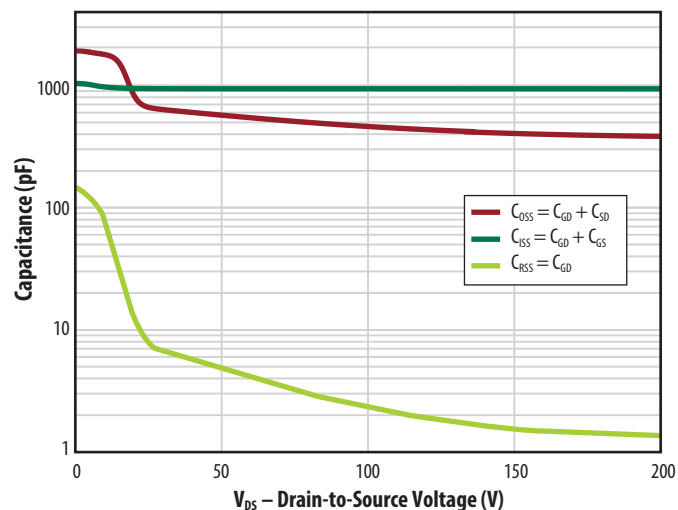


Figure 6: Gate Charge

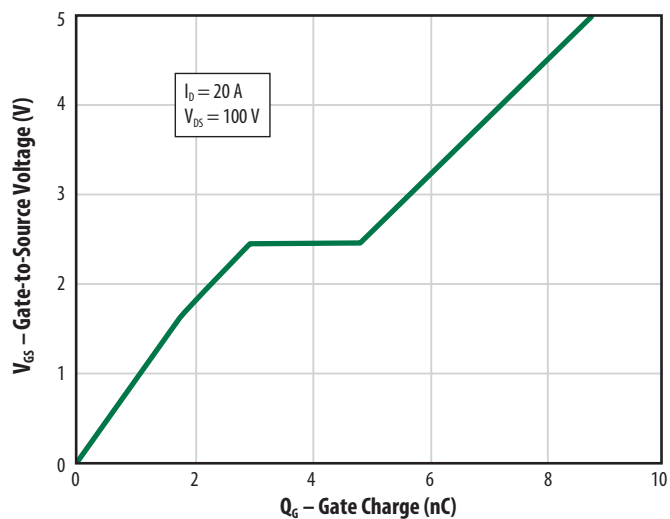


Figure 7: Reverse Drain-Source Characteristics

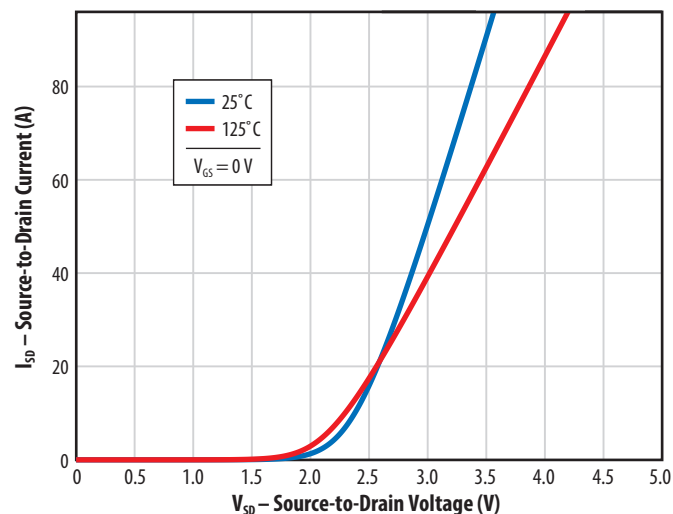


Figure 8: Normalized On-State Resistance vs. Temperature

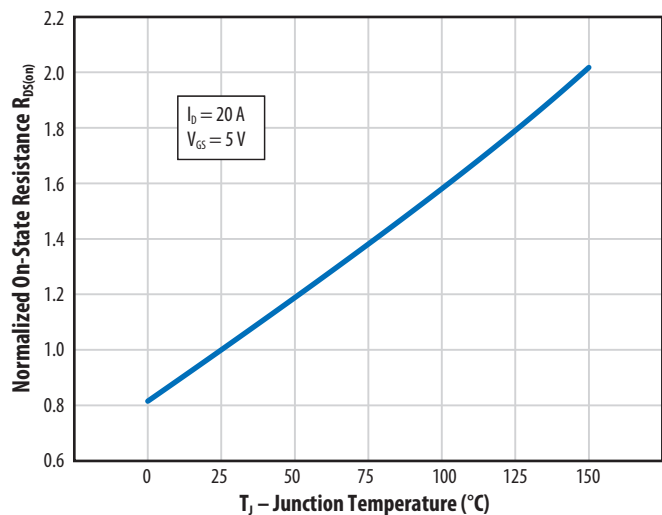
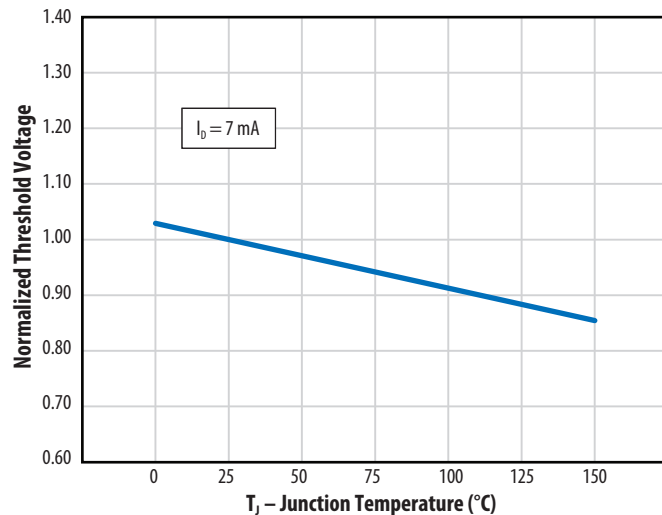


Figure 9: Normalized Threshold Voltage vs. Temperature



All measurements were done with substrate shorted to source. $T_J = 25^\circ\text{C}$ unless otherwise stated.

Figure 10: Gate Leakage Current

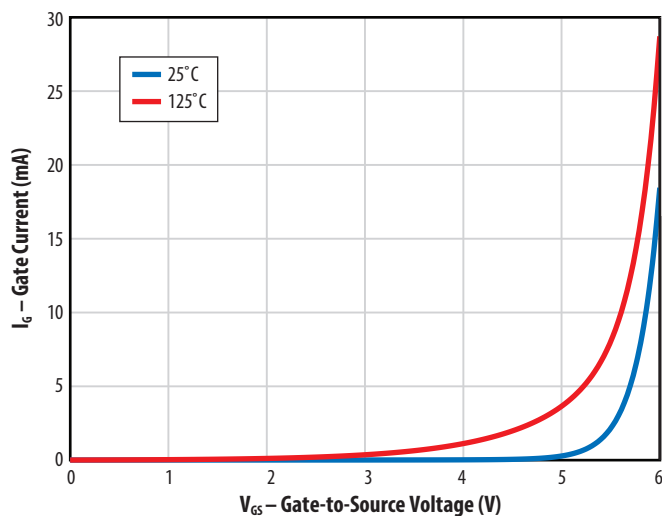


Figure 11: Safe Operating Area

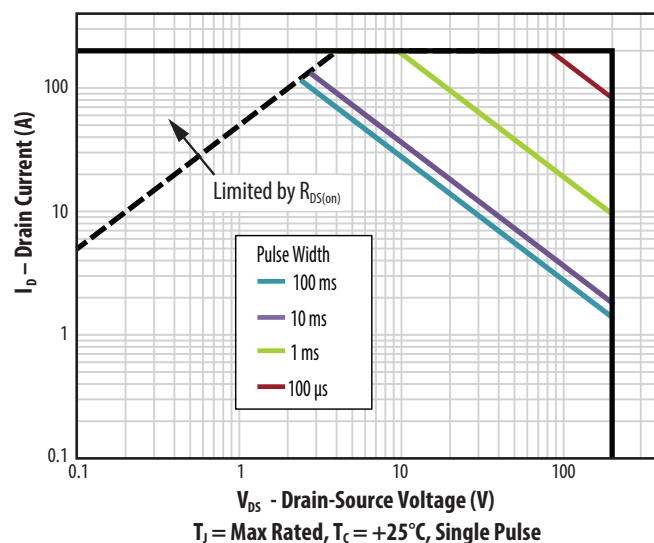
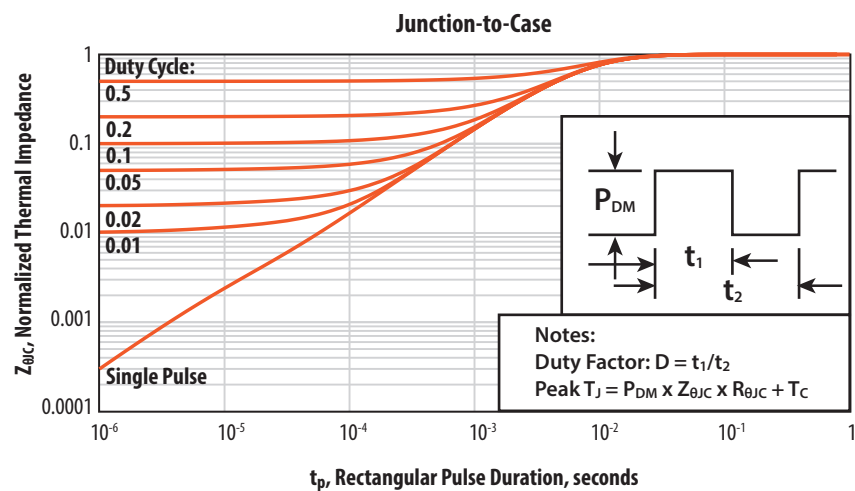
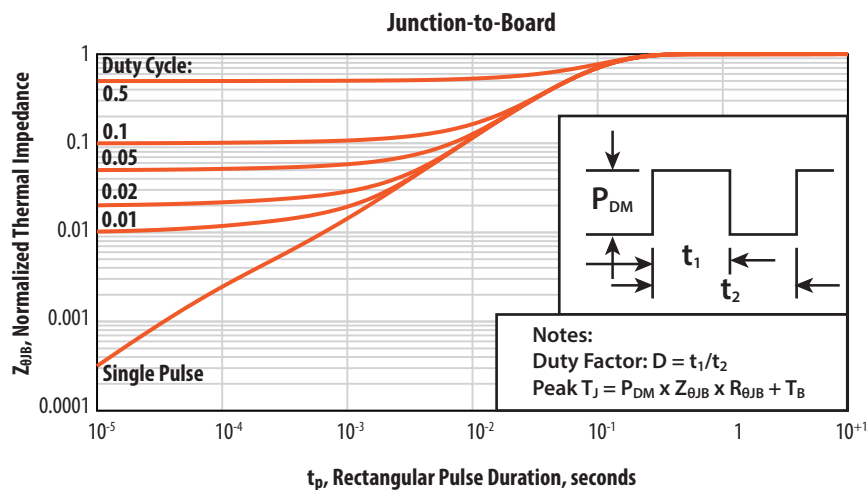
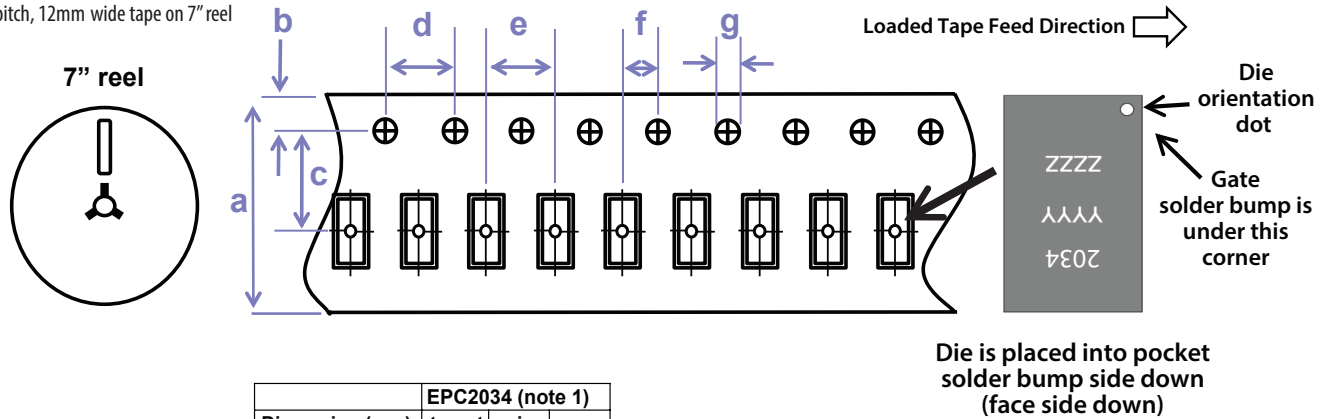


Figure 12: Transient Thermal Response Curves



TAPE AND REEL CONFIGURATION

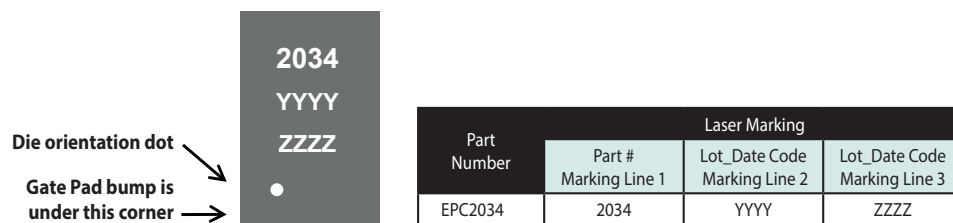
4mm pitch, 12mm wide tape on 7" reel



Dimension (mm)	EPC2034 (note 1)		
	target	min	max
a	12.00	11.70	12.30
b	1.75	1.65	1.85
c (see note)	5.50	5.45	5.55
d	4.00	3.90	4.10
e	4.00	3.90	4.10
f (see note)	2.00	1.95	2.05
g	1.50	1.50	1.60

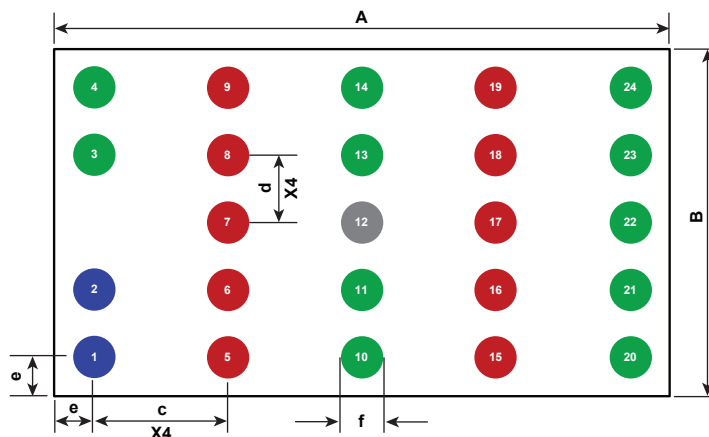
Note 1: MSL 1 (moisture sensitivity level 1) classified according to IPC/JEDEC industry standard.
 Note 2: Pocket position is relative to the sprocket hole measured as true position of the pocket, not the pocket hole.

DIE MARKINGS



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

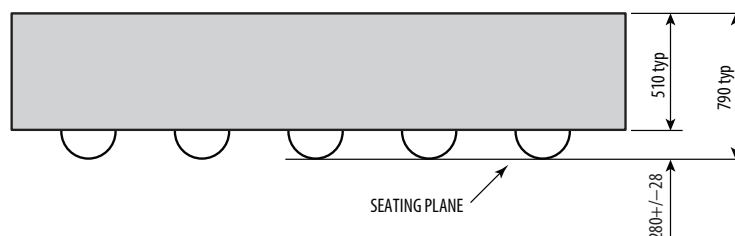
Pads 1 and 2 are Gate;

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

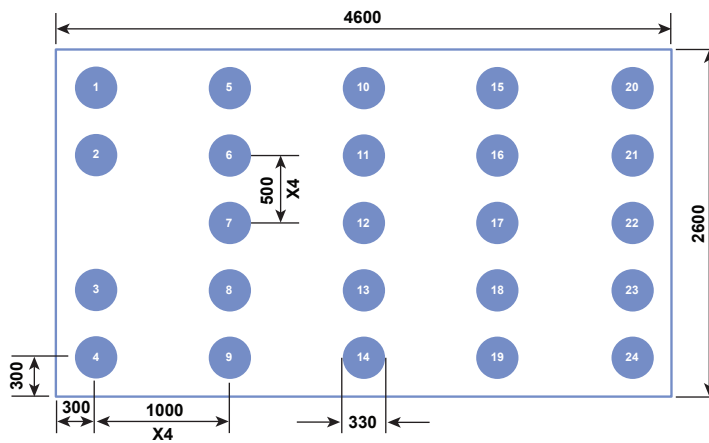
Pads 3, 4, 10, 11, 13, 14, 20, 21, 22, 23, 24 are Source;

Pad 12 is Substrate

Side View



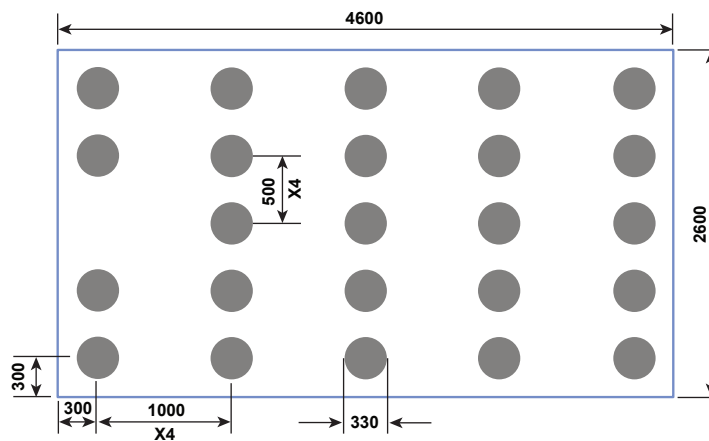
**RECOMMENDED
LAND PATTERN**
(units in μm)



Pad 12 is Substrate

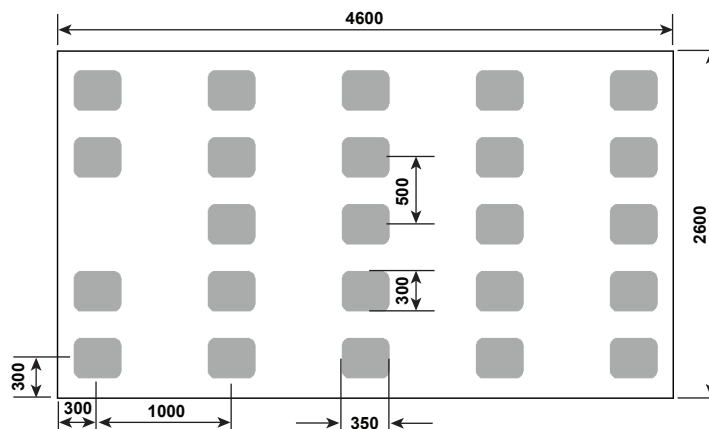
**RECOMMENDED
STENCIL DRAWING**
(units in μm)

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



**RECOMMENDED
STENCIL DRAWING**
(units in μm)

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



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