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.

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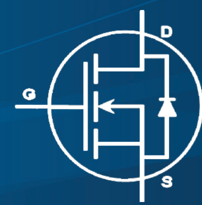
EPC2021 – Enhancement Mode Power Transistor

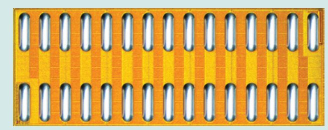
V_{DSS} , 80 V
$R_{DS(on)}$, 2.5 mΩ
I_D , 90 A



EFFICIENT POWER CONVERSION

RoHS Halogen-Free

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.



EPC2021 eGaN® FETs are supplied only in passivated die form with solder bumps.
Die Size: 6.05 mm x 2.3 mm

- High Speed DC-DC Conversion
- Motor Drive
- Industrial Automation
- Synchronous Rectification
- Inrush Protection
- Class-D Audio

www.epc-co.com/epc/Products/eGaNFETs/EPC2021.aspx

Maximum Ratings			
V_{DS}	Drain-to-Source Voltage (Continuous)	80	V
	Drain-to-Source Voltage (up to 10,000 5ms pulses at 150˚C)	96	
I_D	Continuous (T_A = 25˚C, $R_{θJA}$= 3.5˚C/W)	90	A
	Pulsed (25˚C, T_{PULSE} = 300 µs)	420	
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	

Static Characteristics (T_J= 25˚C unless otherwise stated)						
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-to-Source Voltage	V_{GS} = 0 V, I_D = 1 mA	80			V
I_{DSS}	Drain Source Leakage	V_{DS} = 64 V, V_{GS} = 0 V		0.1	0.7	mA
I_{GSS}	Gate-to-Source Forward Leakage	V_{GS} = 5 V		1	9	mA
	Gate-to-Source Reverse Leakage	V_{GS} = -4 V		0.1	0.7	mA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 14 mA	0.8	1.4	2.5	V
$R_{DS(on)}$	Drain-to-Source On Resistance	V_{GS} = 5 V, I_D = 29 A		1.8	2.5	mΩ
V_{SD}	Source-to-Drain Forward Voltage	I_S = 0.5 A, V_{GS} = 0 V		1.6		V

All measurements were done with substrate shorted to source.

Thermal Characteristics			
		TYP	UNIT
$R_{θJC}$	Thermal Resistance, Junction to Case	0.4	˚C/W
$R_{θJB}$	Thermal Resistance, Junction to Board	1.1	˚C/W
$R_{θJA}$	Thermal Resistance, Junction to Ambient (Note 1)	42	˚C/W

Note 1: $R_{θJA}$ 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˚C unless otherwise stated)						
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
C_{ISS}	Input Capacitance	V_{DS} = 40 V, V_{GS} = 0 V		1650	1980	pF
C_{RSS}	Reverse Transfer Capacitance			20		
C_{OSS}	Output Capacitance			970	1460	
$C_{OSS(ER)}$	Effective Output Capacitance, Enegy Related (Note 2)	V_{DS} = 0 to 40 V, V_{GS} = 0 V		1090		
$C_{OSS(TR)}$	Effective Output Capacitance, Time Related (Note 3)			1310		
R_G	Gate Resistance			0.3		Ω
Q_G	Total Gate Charge	V_{DS} = 40 V, V_{GS} = 5 V, I_D= 29 A		15	19	nC
Q_{GS}	Gate-to-Source Charge	V_{DS} = 40 V, I_D = 29 A		3.4		
Q_{GD}	Gate-to-Drain Charge			2.3		
$Q_{G(TH)}$	Gate Charge at Threshold			2.5		
Q_{OSS}	Output Charge	V_{DS} = 40 V, V_{GS} = 0 V		63	95	
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

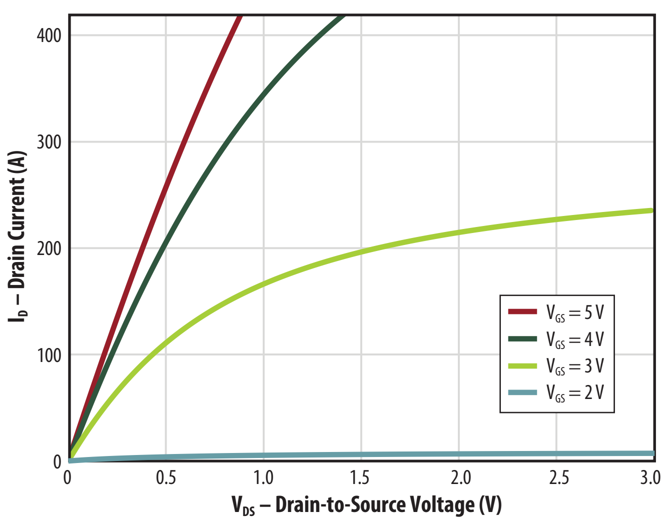


Figure 2: Transfer Characteristics

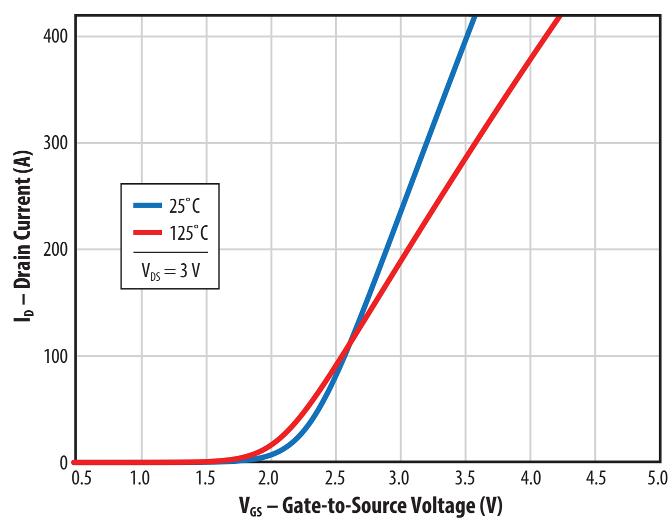


Figure 3: $R_{DS(on)}$ vs. V_{GS} for Various Drain Currents

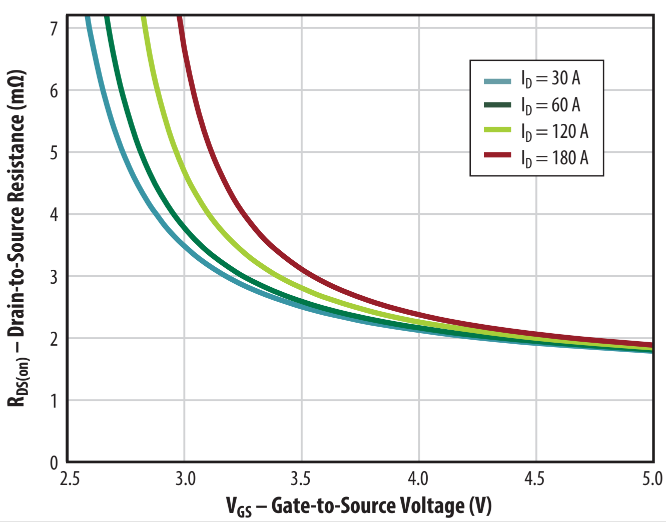


Figure 4: $R_{DS(on)}$ vs. V_{GS} for Various Temperatures

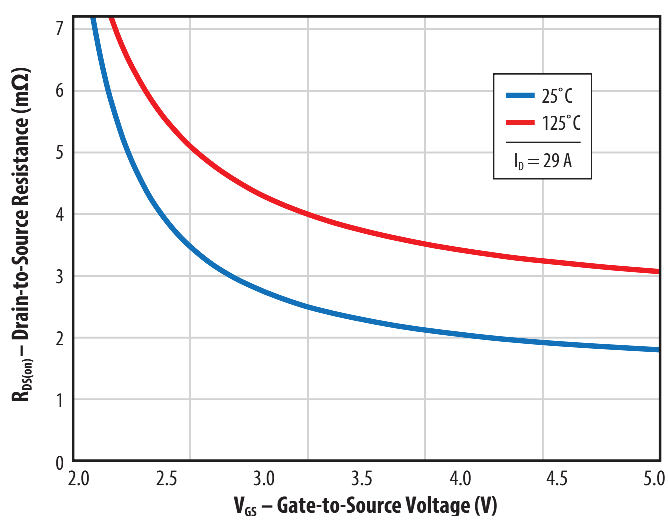


Figure 5a: Capacitance (Linear Scale)

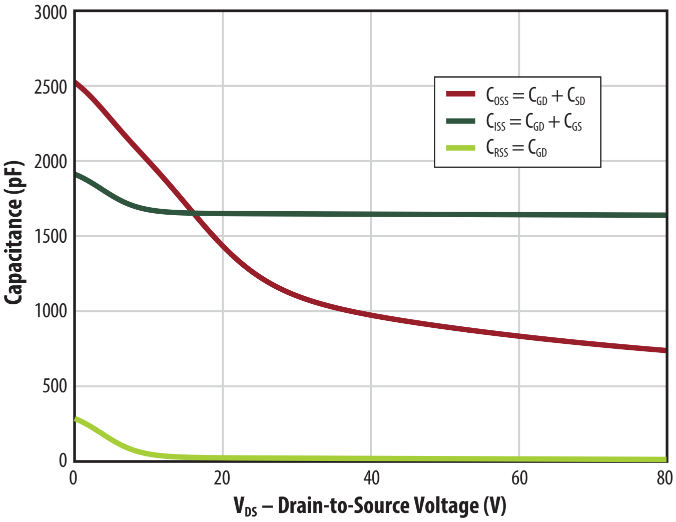


Figure 5b: Capacitance (Log Scale)

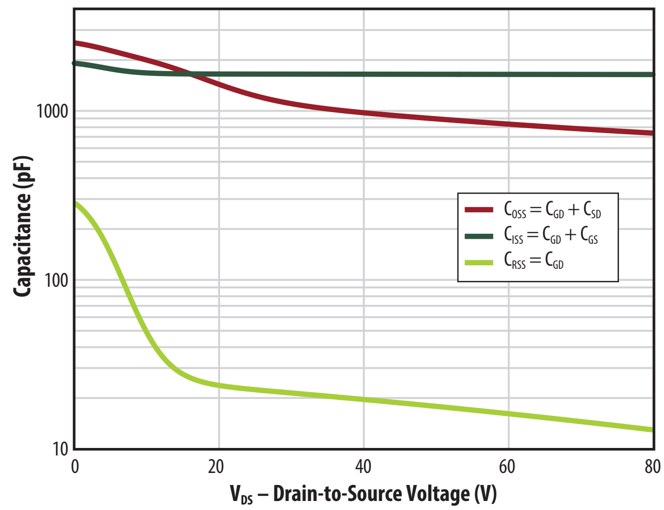


Figure 6: Gate Charge

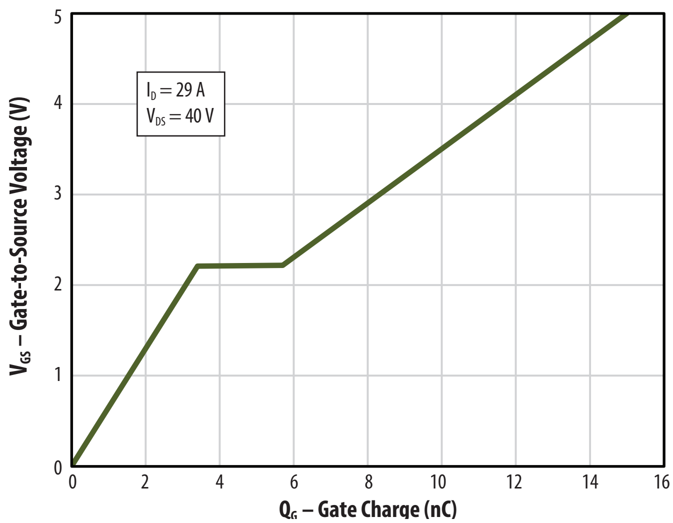


Figure 7: Reverse Drain-Source Characteristics

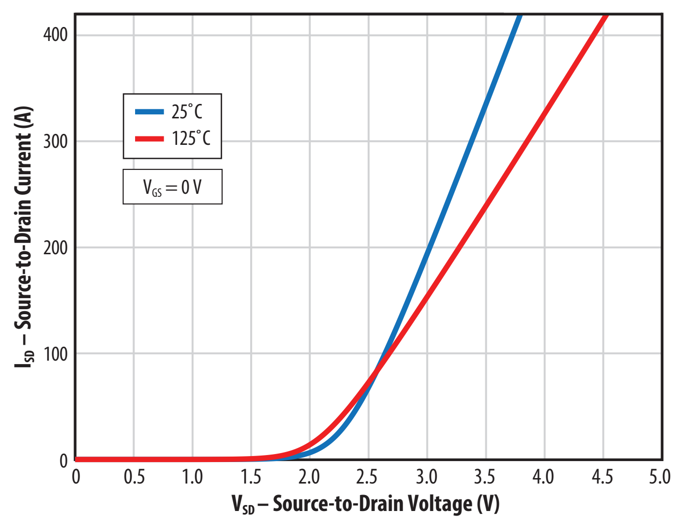


Figure 8: Normalized On-State Resistance vs. Temperature

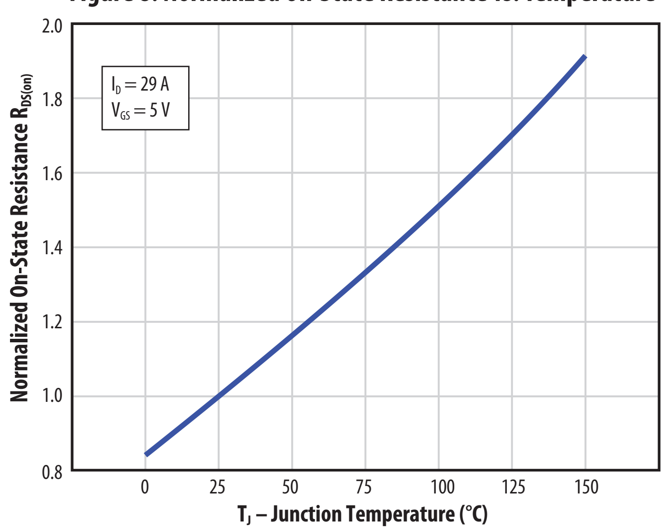
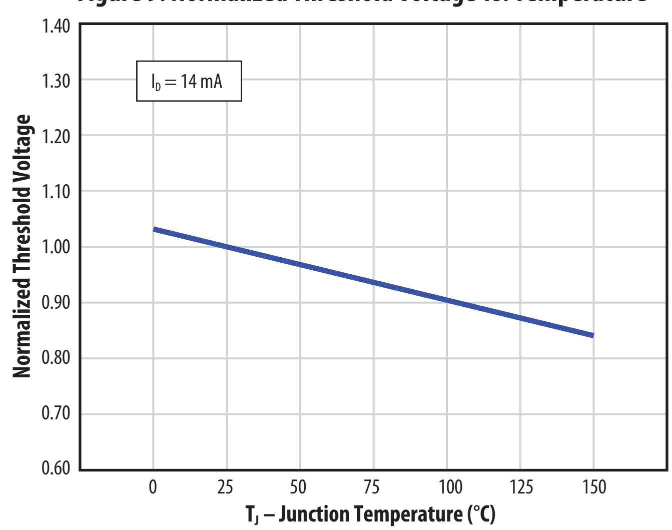


Figure 9: Normalized Threshold Voltage vs. Temperature



All measurements were done with substrate shortened to source.

Figure 10: Gate Leakage Current

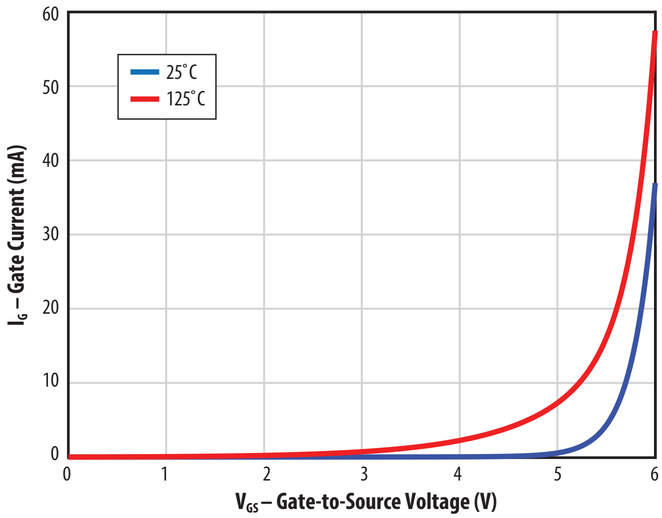
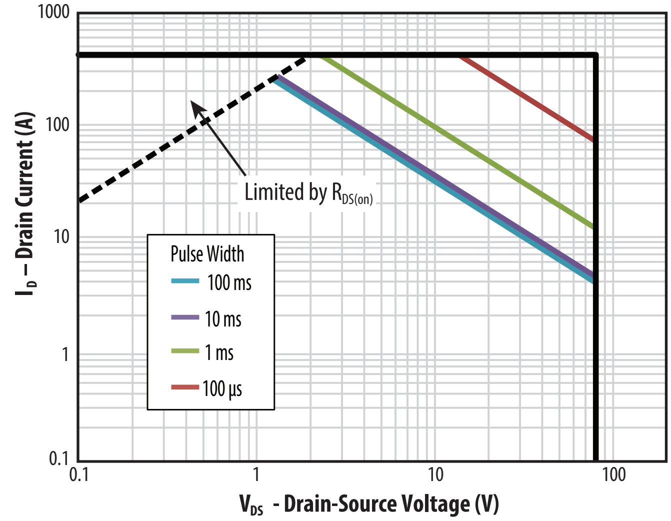
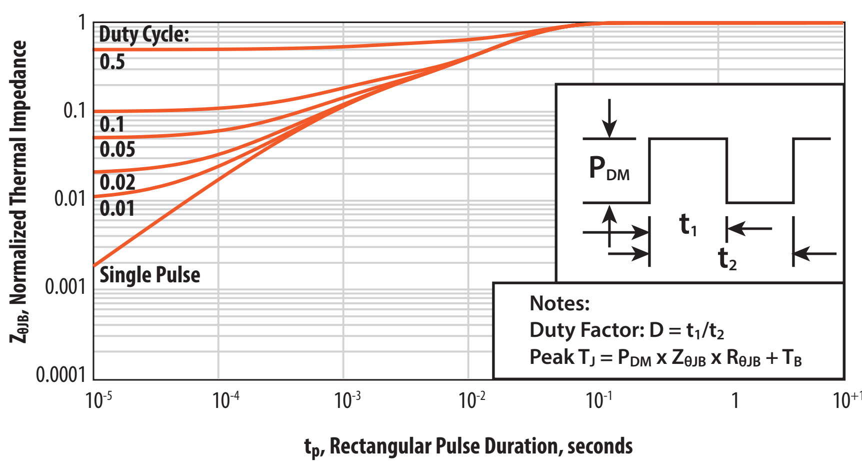


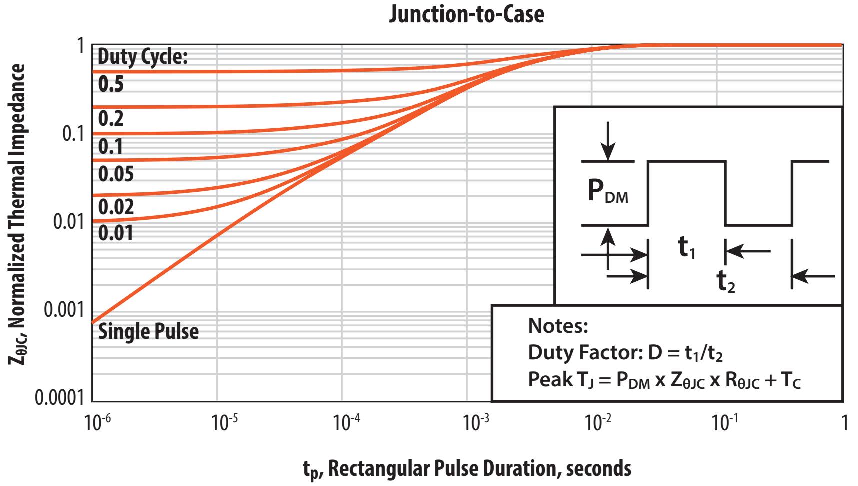
Figure 11: Safe Operating Area



T_J = Max Rated, T_C = +25°C, Single Pulse

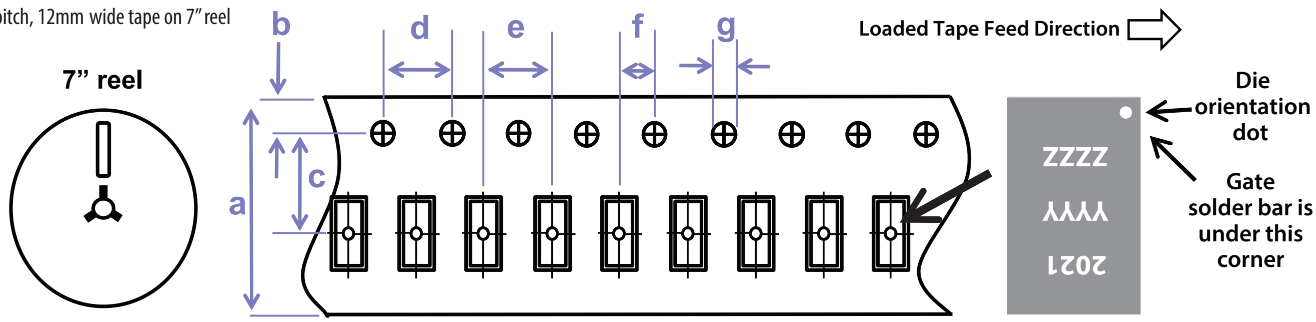
Figure 12: Transient Thermal Response Curves





TAPE AND REEL CONFIGURATION

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

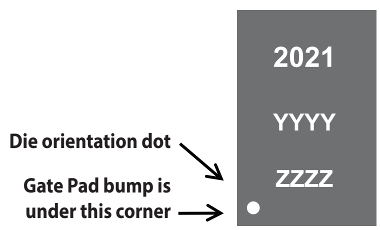


Die is placed into pocket solder bar side down (face side down)

	EPC2021 (note 1)		
Dimension (mm)	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

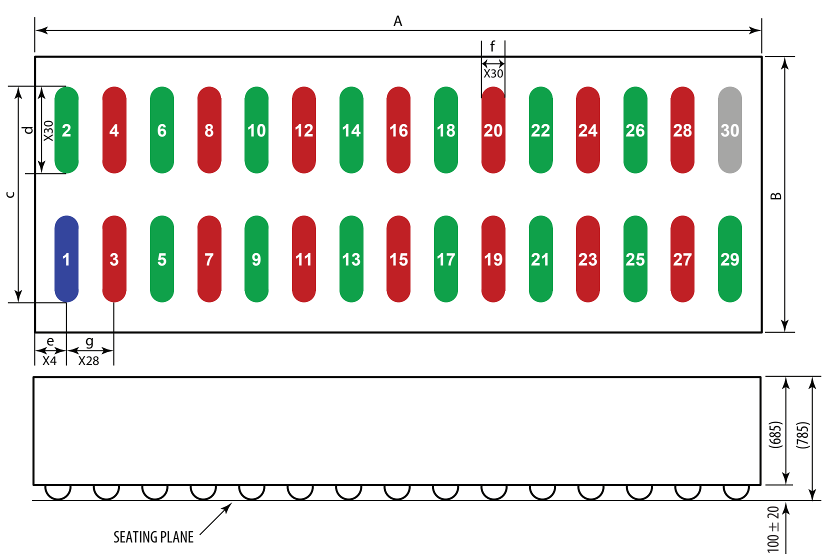


Part Number	Laser Marking		
	Part # Marking Line 1	Lot_Date Code Marking Line 2	Lot_Date Code Marking Line 3
EPC2021	2021	YYYY	ZZZZ

DIE OUTLINE

Solder Bump View

Side View



DIM	Micrometers		
	MIN	Nominal	MAX
A	6020	6050	6080
B	2270	2300	2330
c	2047	2050	2053
d	717	720	723
e	210	225	240
f	195	200	205
g	400	400	400

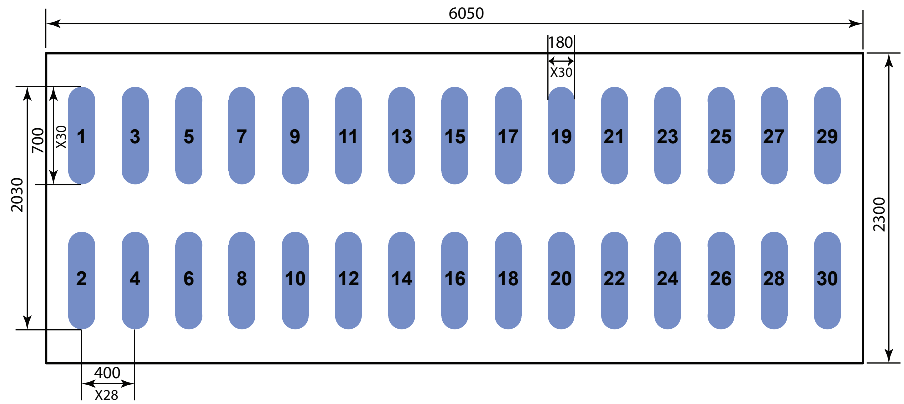
Pad 1 is Gate

Pads 2,5,6,9,10,13,14,17,18,21,22, 25,26,29 are Source

Pads 3,4,7,8,11,12,15,16,19,20,23, 24,27,28 are Drain

Pad 30 is Substrate

RECOMMENDED LAND PATTERN
(units in µm)

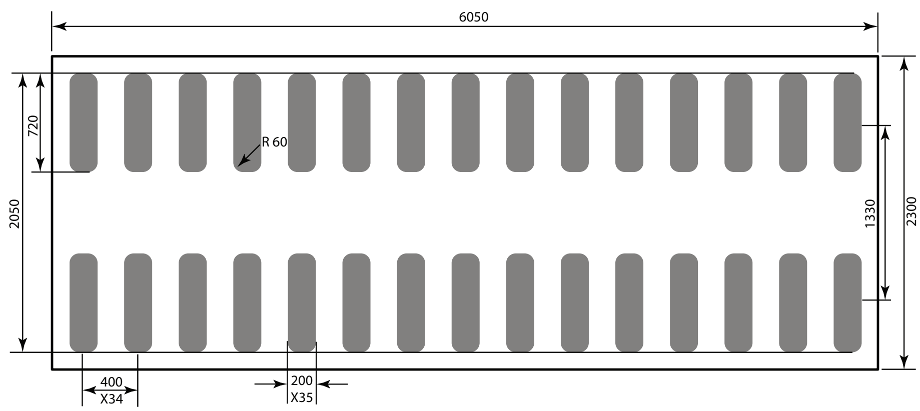


Land pattern is solder mask defined

Solder mask opening is 180 µm

It is recommended to have on-Cu trace PCB vias

RECOMMENDED STENCIL DRAWING
(units in µm)



Recommended stencil should be 4 mil (100 µm) 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