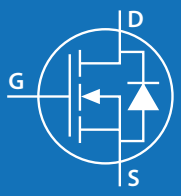
EPC2066 – Enhancement Mode Power Transistor

V_{DS} , 40 V

$R_{DS(on)}$, 1.1 mΩ max

I_D , 90 A



EFFICIENT POWER CONVERSION

RoHS Halogen-Free

Revised April 17, 2023

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

Application Notes:

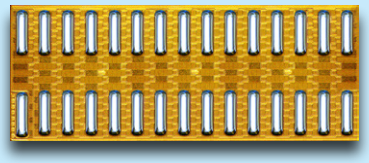
- Easy-to-use and reliable gate, Gate Drive ON = 5 V typical, OFF = 0 V (negative voltage not needed)
- Top of FET is electrically connected to source

Maximum Ratings			
PARAMETER		**VALUE**	**UNIT**
V_{DS}	Drain-to-Source Voltage (Continuous)	40	V
	Drain-to-Source Voltage (up to 10,000 5 ms pulses at 150°C)	48	
I_D	Continuous (T_A = 25°C)	90	A
	Pulsed (25°C, T_{PULSE} = 300 µs)	639	
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	

Thermal Characteristics			
PARAMETER		**TYP**	**UNIT**
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Case TOP)	0.3	°C/W
$R_{\theta JB}$	Thermal Resistance, Junction-to-Board (Case BOTTOM)	1.0	
$R_{\theta JA_JEDEC}$	Thermal Resistance, Junction-to-Ambient (using JEDEC 51-2 PCB)	51	
$R_{\theta JA_EVB}$	Thermal Resistance, Junction-to-Ambient (using EPC90122 EVB)	29	

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 = 1.2 mA	40			V
I_{DSS}	Drain-Source Leakage	V_{GS} = 0 V, V_{DS} = 32 V		0.006	1.0	mA
I_{GSS}	Gate-to-Source Forward Leakage	V_{GS} = 5 V		0.006	4.0	
	Gate-to-Source Forward Leakage#	V_{GS} = 5 V, T_J = 125°C		0.2	9.0	
	Gate-to-Source Reverse Leakage	V_{GS} = -4 V		0.007	0.3	
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 28 mA	0.7	1.2	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance	V_{GS} = 5 V, I_D = 50 A		0.8	1.1	mΩ
V_{SD}	Source-Drain Forward Voltage#	I_S = 0.5 A, V_{GS} = 0 V		1.5		V

Defined by design. Not subject to production test.



Die size: 6.05 x 2.3 mm

EPC2066 eGaN® FETs are supplied in passivated die form with solder bumps.

Applications

- High density DC-DC conversion
- Motor drive
- Industrial automation
- Synchronous rectification
- Inrush protection
- Point-of-Load (POL) converters

Benefits

- Ultra high efficiency
- Higher switching frequency
- Very low $R_{DS(on)}$, Q_G, Q_{GD}, Q_{OSS} and 0 Q_{RR}
- Small footprint

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

https://l.ead.me/EPC2066

Dynamic Characteristics# (T_J = 25°C unless otherwise stated)						
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
C_{ISS}	Input Capacitance	V_{DS} = 20 V , V_{GS} = 0 V		3539	4523	pF
C_{RSS}	Reverse Transfer Capacitance			30		
C_{OSS}	Output Capacitance			1670	1919	
$C_{OSS(ER)}$	Effective Output Capacitance, Energy Related (Note 1)	V_{DS} = 0 to 20 V, V_{GS} = 0 V		2431		
$C_{OSS(TR)}$	Effective Output Capacitance, Time Related (Note 2)			2970		
R_G	Gate Resistance			0.4		Ω
Q_G	Total Gate Charge	V_{DS} = 20 V, V_{GS} = 5 V, I_D = 50 A		25	33	nC
Q_{GS}	Gate to Source Charge	V_{DS} = 20 V, I_D = 50 A		8.9		
Q_{GD}	Gate to Drain Charge			3.2		
$Q_{G(TH)}$	Gate Charge at Threshold			6.7		
Q_{OSS}	Output Charge	V_{GS} = 0 V, V_{DS} = 20 V		59	78	
Q_{RR}	Source-Drain Recovery Charge			0		

Defined by design. Not subject to production test.
All measurements were done with substrate shorted to source.
Note 1: $C_{OSS(ER)}$ 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 2: $C_{OSS(TR)}$ 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

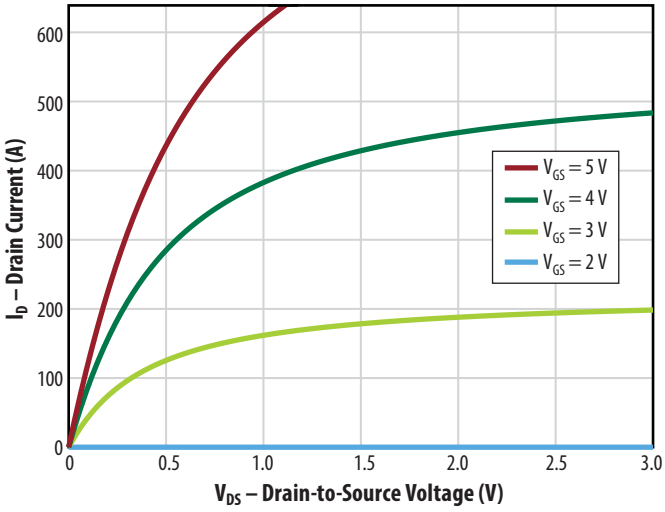


Figure 2: Typical Transfer Characteristics

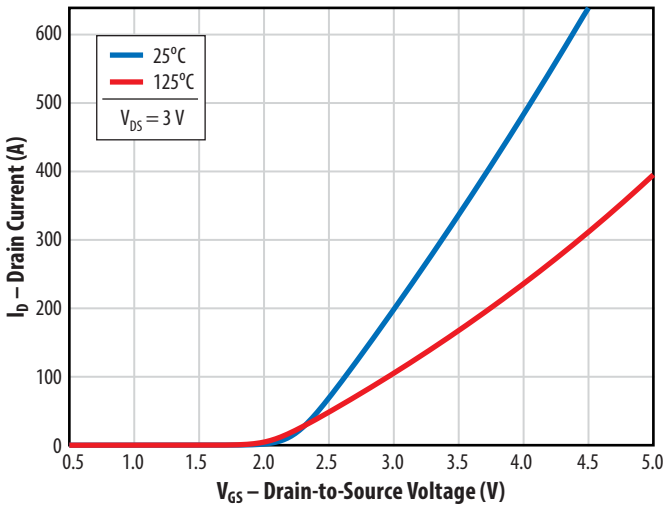


Figure 3: Typical $R_{DS(on)}$ vs. V_{GS} for Various Currents

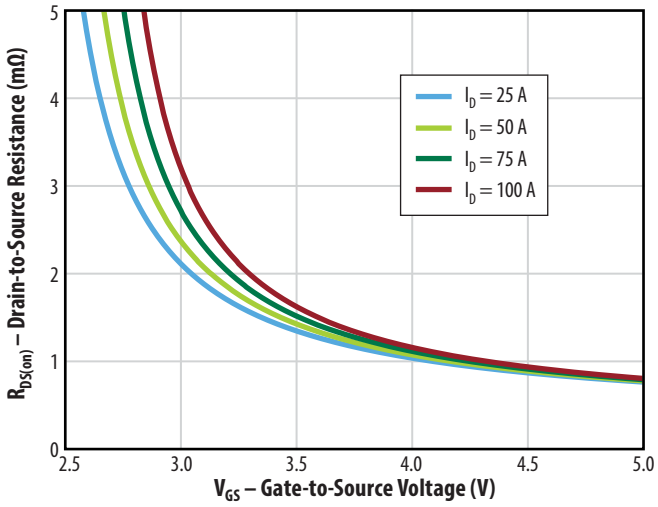


Figure 4: Typical $R_{DS(on)}$ vs. V_{GS} for Various Temperatures

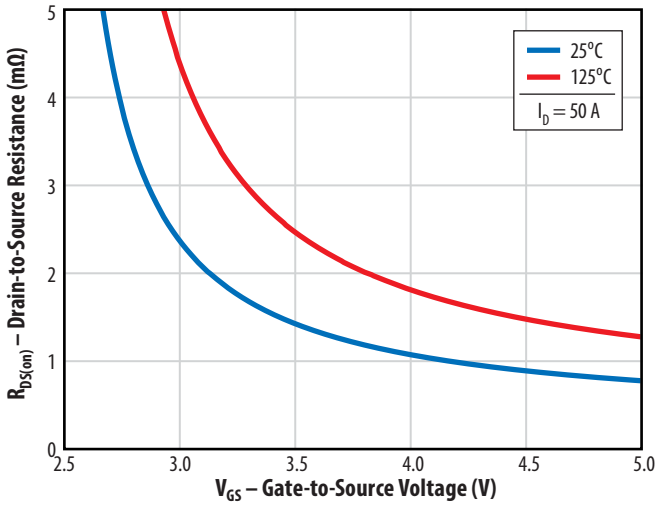


Figure 5a: Typical Capacitance (Linear Scale)

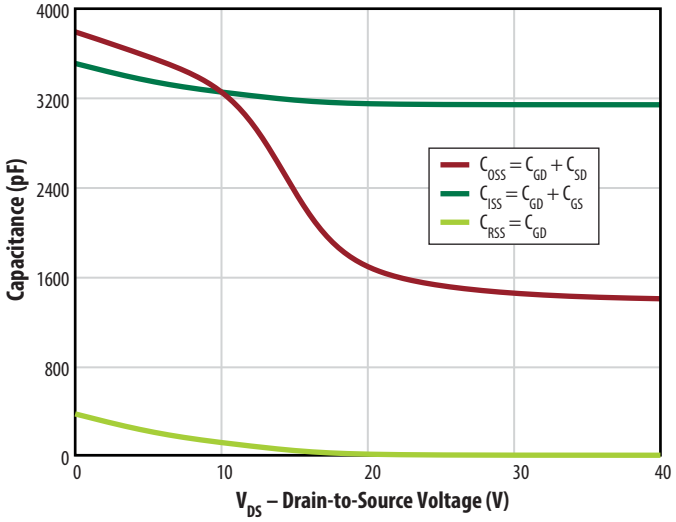


Figure 5b: Typical Capacitance (Log Scale)

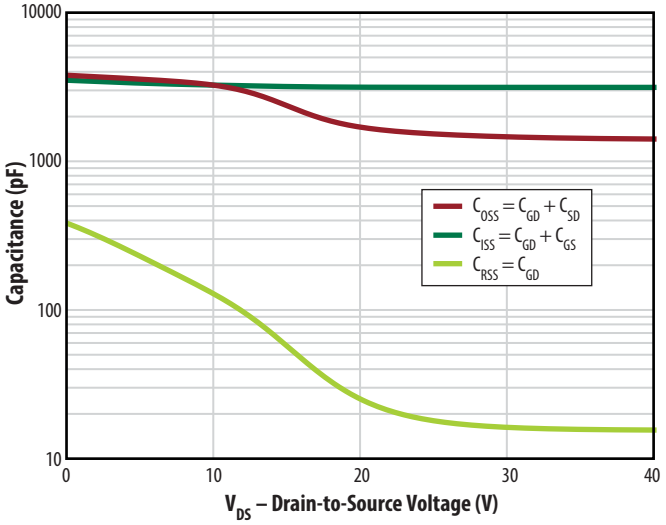


Figure 6: Typical Output Charge and C_{OSS} Stored Energy

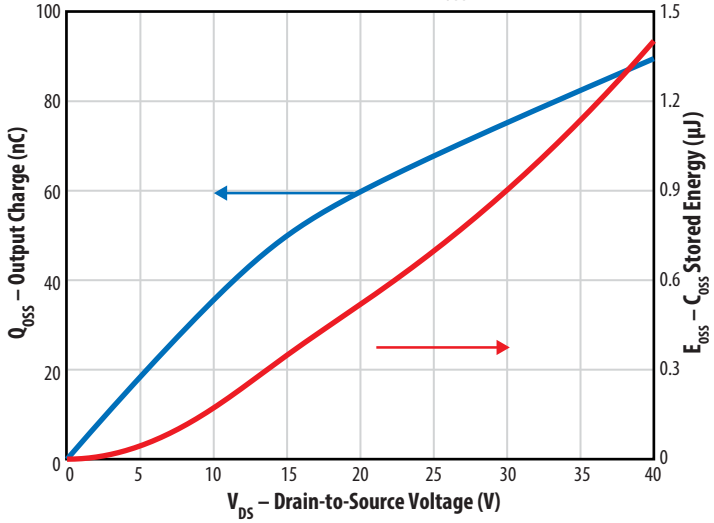


Figure 7: Typical Gate Charge

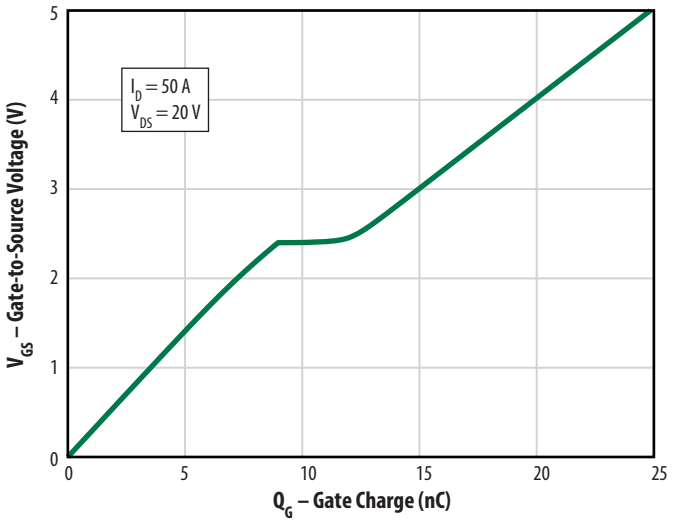


Figure 8: Typical Reverse Drain-Source Characteristics

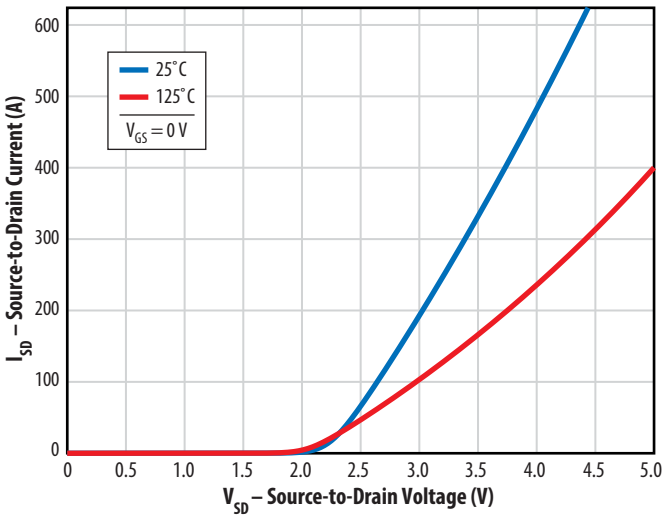
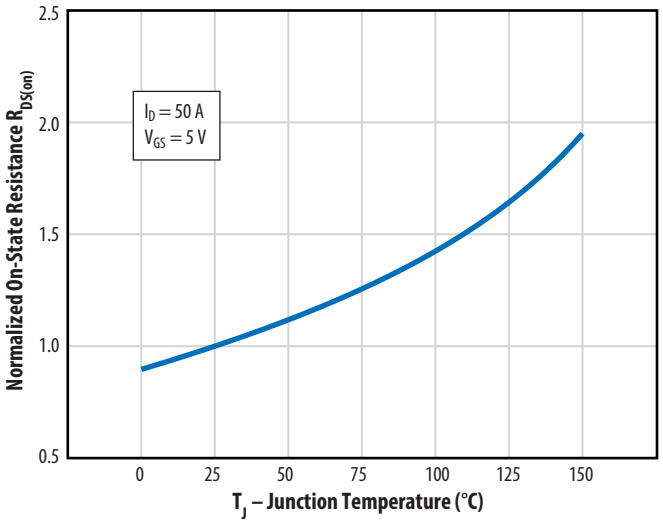


Figure 9: Typical Normalized On-State Resistance vs. Temperatu



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

Figure 10: Typical Normalized Threshold Voltage vs. Temp.

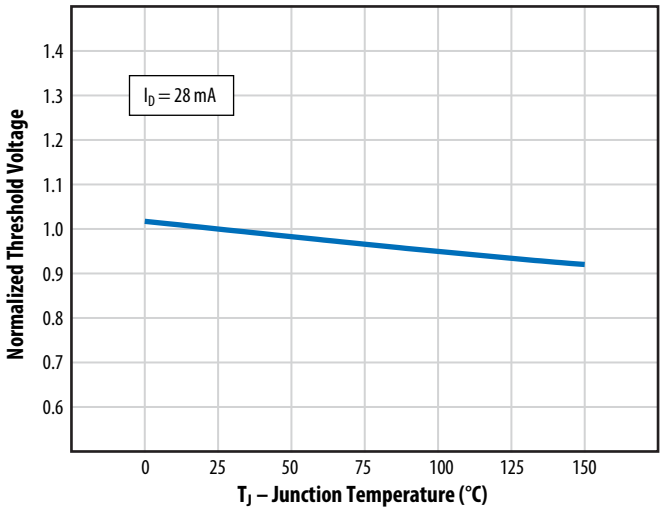
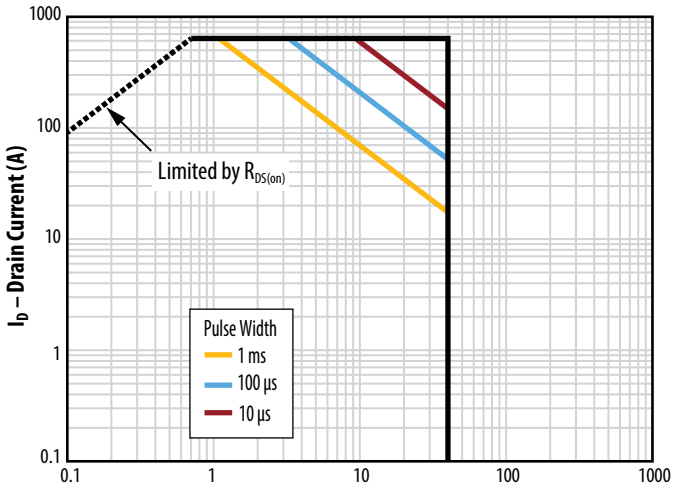


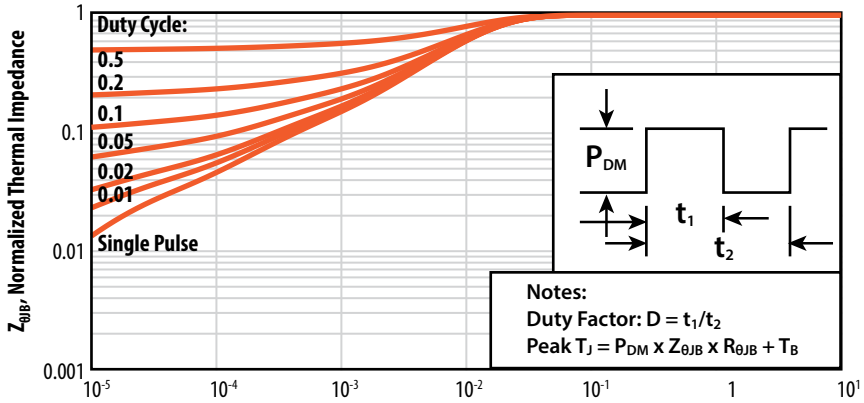
Figure 11: Safe Operating Area



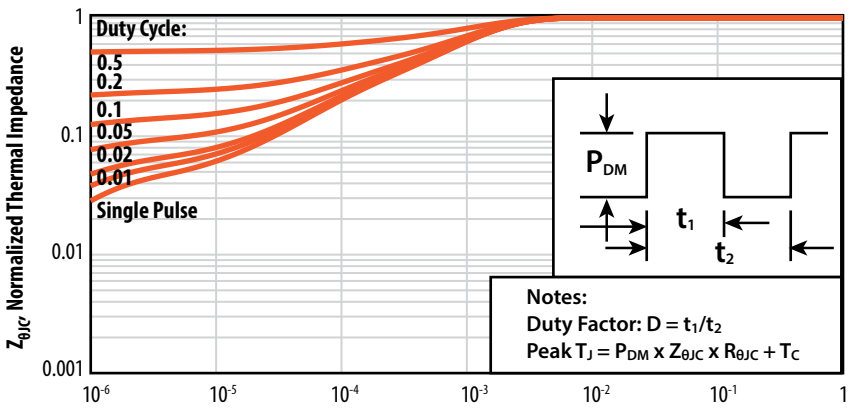
T_J = Max Rated, T_C = +25°C, Single Pulse

Figure 12: Typical Transient Thermal Response Curves

Junction-to-Board

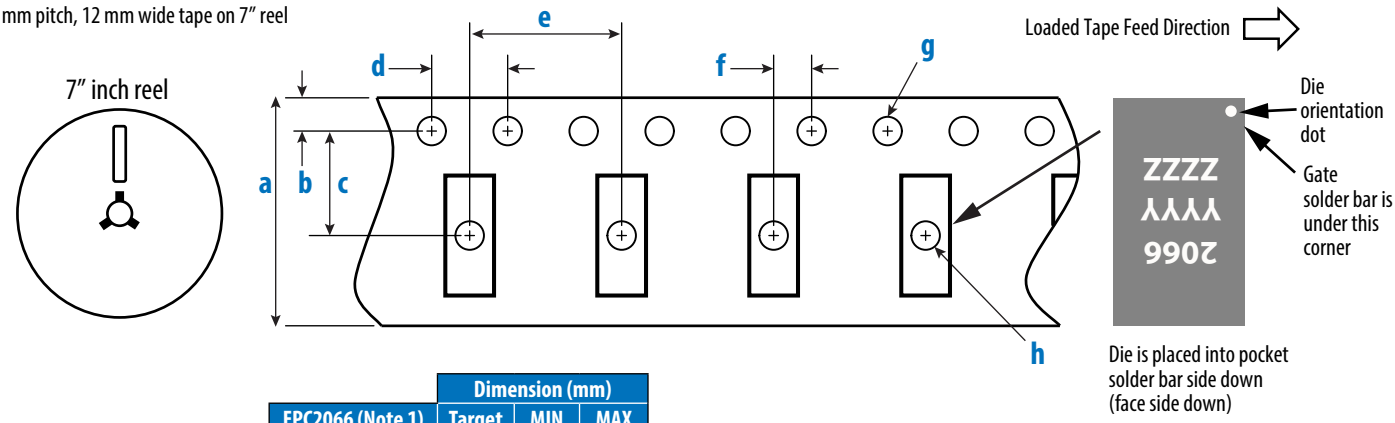


Junction-to-Case



TAPE AND REEL CONFIGURATION

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

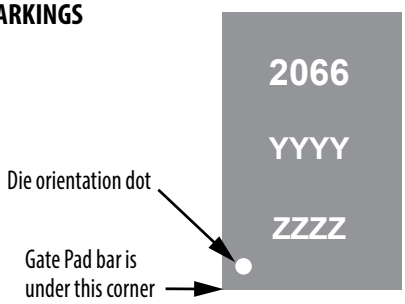


EPC2066 (Note 1)	Dimension (mm) Target	MIN	MAX
a	12.00	11.90	12.30
b	1.75	1.65	1.85
c (Note 2)	5.50	5.45	5.55
d	4.00	3.90	4.10
e	8.00	7.90	8.10
f (Note 2)	2.00	1.95	2.05
g	1.50	1.50	1.60
h	1.50	1.50	1.75

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.

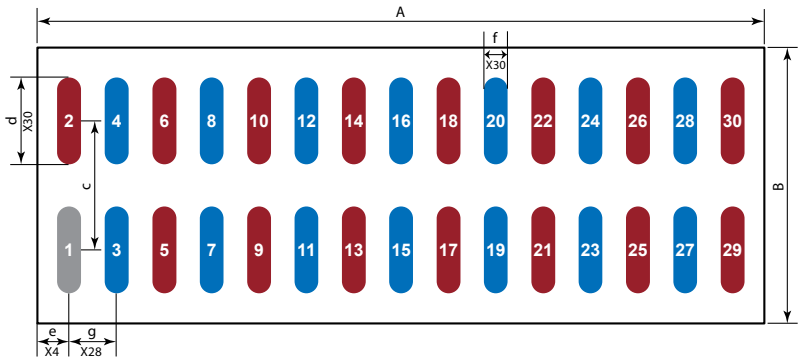
DIE MARKINGS



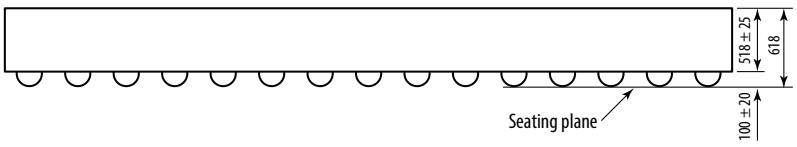
Part Number	Laser Markings Part # Marking Line 1	Lot_Date Code Marking Line 2	Lot_Date Code Marking Line 3
EPC2066	2066	YYYY	ZZZZ

DIE OUTLINE

Solder Bump View



Side View



DIM	Micrometers MIN	Nominal	MAX
A	6020	6050	6080
B	2270	2300	2330
c		1330	
d		720	
e		225	
f		200	
g		400	

Pad 1 is Gate;

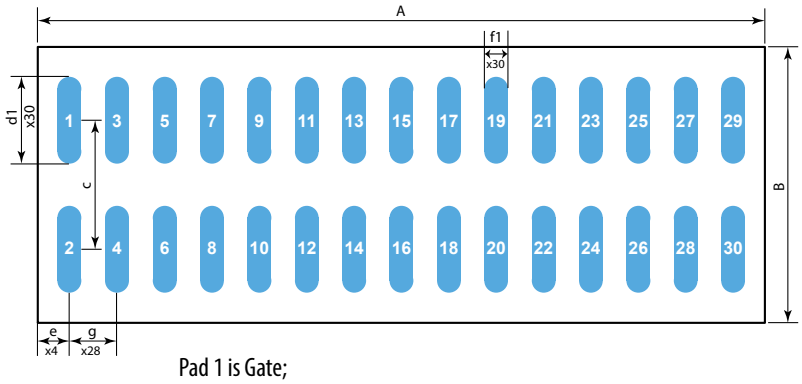
Pads 2 ,5, 6, 9, 10, 13, 14, 17, 18, 21, 22, 25, 26, 29, 30 are Source;

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

Note: Substrate (top side) connected to source

RECOMMENDED LAND PATTERN

(units in µm)



Land pattern is solder mask defined.

DIM	Micrometers
A	6050
B	2300
c	1330
d1	700
e	225
f1	180
g	400

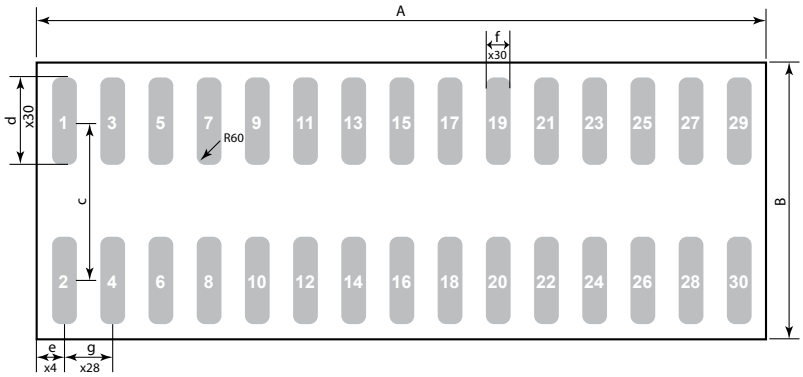
Pad 1 is Gate;

Pads 2, 5, 6, 9,10,13,14, 17, 18, 21, 22, 25, 26, 29. 30 are Source;

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

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 4 solder, reference 88.5% metals content.

DIM	Micrometers
A	6050
B	2300
c	1330
d	700
e	225
f	180
g	400

Additional Resources Available

- Assembly resources available at: https://epc-co.com/epc/design-support
- Library of Altium footprints for production FETs and ICs: https://epc-co.com/epc/documents/altium-files/EPC%20Altium%20Library.zip (for preliminary device Altium footprints, contact EPC)

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.

EPC Patent Listing: https://epc-co.com/epc/about-epc/patents

Information subject to change without notice.

ENTEGRECİ

Bu belge www.entegreci.com üzerinden sunulmaktadır.

Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.