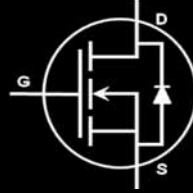


EPC1012 – Enhancement Mode Power Transistor

 $V_{DSS}, 200\text{ V}$
 $R_{DS(ON)}, 100\text{ m}\Omega$
 $I_D, 3\text{ A}$


Gallium Nitride is grown on Silicon Wafers and processed using standard CMOS equipment leveraging the infrastructure that has been developed over the last 55 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.



EPC Power Transistors are supplied only in passivated die form with solder bumps

Applications

- High Speed DC-DC conversion
- Class D Audio
- Hard Switched and High Frequency Circuits

Benefits

- Ultra High Efficiency
- Ultra Low $R_{DS(on)}$
- Ultra low Q_G
- Ultra small footprint

Maximum Ratings			
V_{DS}	Drain-to-Source Voltage	200	V
I_D	Continuous ($T_A = 25^\circ\text{C}, \theta_{JA} = 100$)	3	A
	Pulsed ($25^\circ\text{C}, T_{\text{pulse}} = 300\ \mu\text{s}$)	12	
V_{GS}	Gate-to-Source Voltage	6	V
	Gate-to-Source Voltage	-5	
T_J	Operating Temperature	-40 to 125	$^\circ\text{C}$
T_{STG}	Storage Temperature	-40 to 150	

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Static Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise stated)					
BV_{DSS}	Drain-to-Source Voltage	$V_{GS} = 0\text{ V}, I_D = 50\ \mu\text{A}$	200		V
I_{DSS}	Drain Source Leakage	$V_{DS} = 160\text{ V}, V_{GS} = 0\text{ V}$	10	40	μA
I_{GSS}	Gate-Source Forward Leakage	$V_{GS} = 5\text{ V}$	0.2	1	mA
	Gate-Source Reverse Leakage	$V_{GS} = -5\text{ V}$	0.1	0.5	
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 1\text{ mA}$	0.7	1.4	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS} = 5\text{ V}, I_D = 5\text{ A}$	70	100	$\text{m}\Omega$
Dynamic Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise stated)					
C_{ISS}	Input Capacitance	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$	110		pF
C_{OSS}	Output Capacitance		80		
C_{RSS}	Reverse Transfer Capacitance		7.5		
Q_G	Total Gate Charge ($V_{GS} = 5\text{ V}$)	$V_{DS} = 100\text{ V}, I_D = 3\text{ A}$	1.9		nC
Q_{GD}	Gate to Drain Charge		0.9		
Q_{GS}	Gate to Source Charge		0.37		
Q_{OSS}	Output Charge		10		
Q_{RR}	Source-Drain Recovery Charge		0		
Source-Drain Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise stated)					
V_{SD}	Source-Drain Forward Voltage	$I_S = 0.5\text{ A}, V_{GS} = 0\text{ V}, T = 25^\circ\text{C}$	1.8		V
		$I_S = 0.5\text{ A}, V_{GS} = 0\text{ V}, T = 125^\circ\text{C}$	1.75		

Figure 1: Typical Output Characteristics

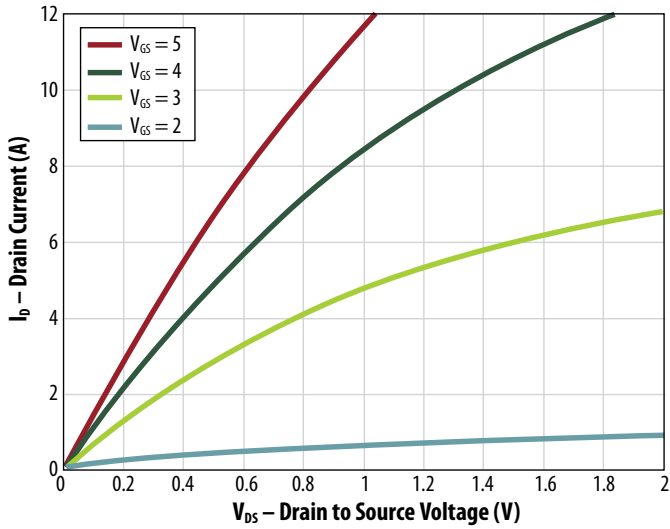


Figure 2: Transfer Characteristics

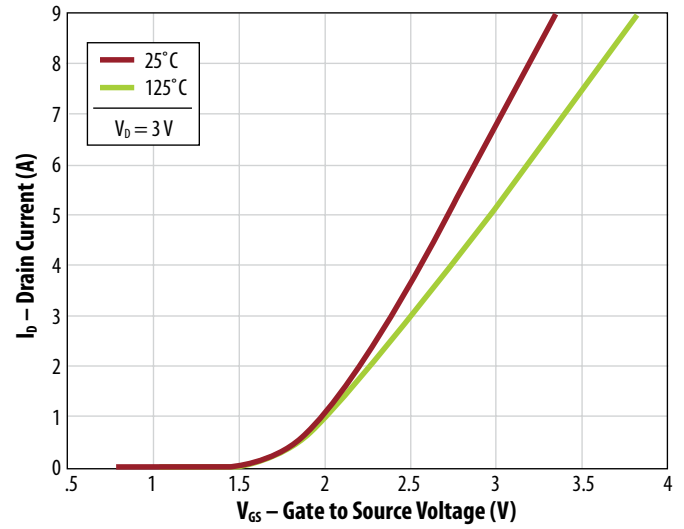


Figure 3: $R_{DS(ON)}$ vs V_G for Various Current

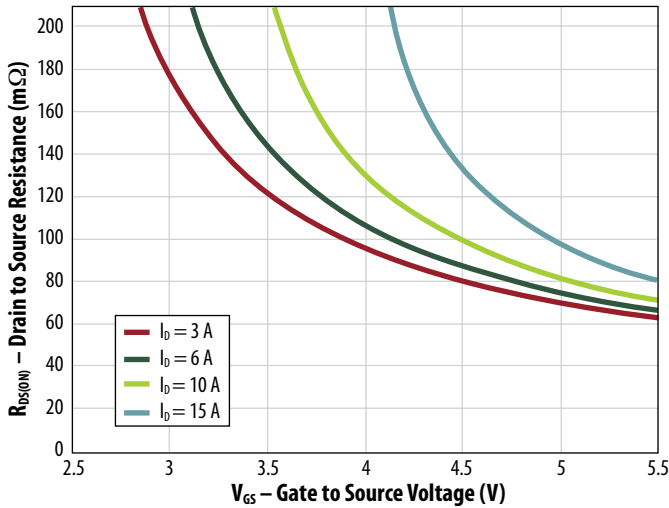


Figure 4: $R_{DS(ON)}$ vs V_G for Various Temperature

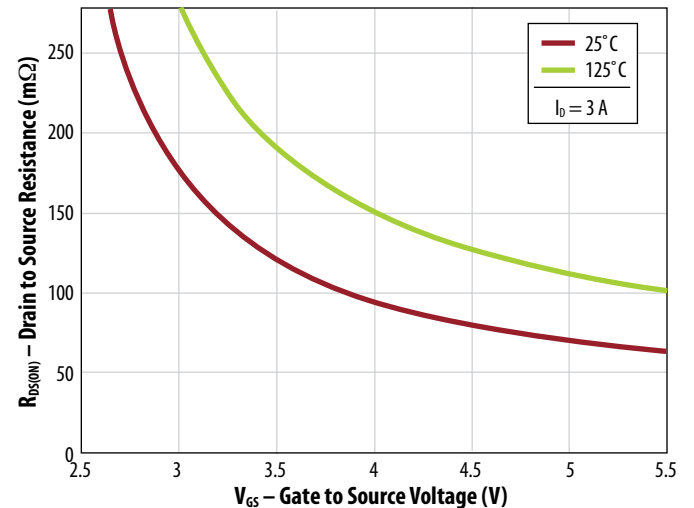


Figure 5: Capacitance

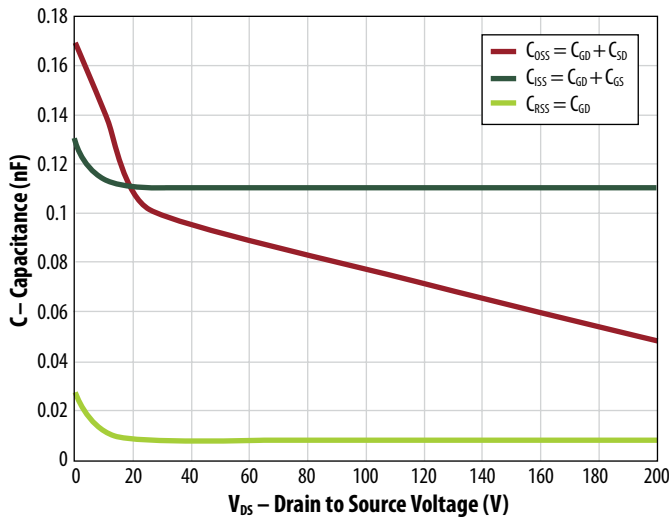


Figure 6: Gate Charge

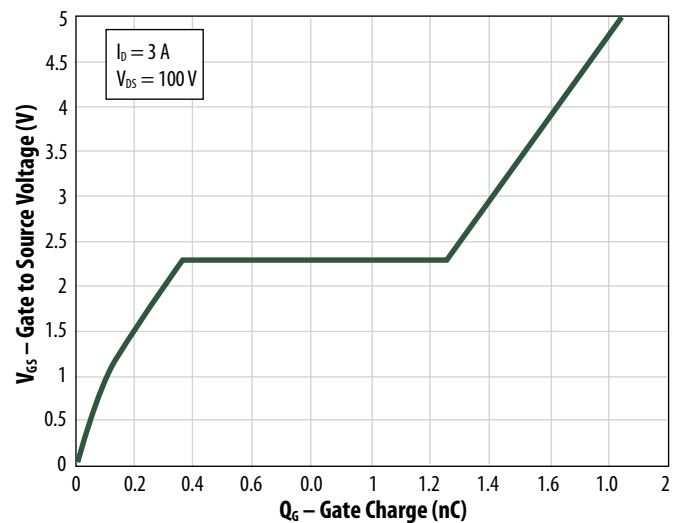


Figure 7: Reverse Drain-Source Characteristics

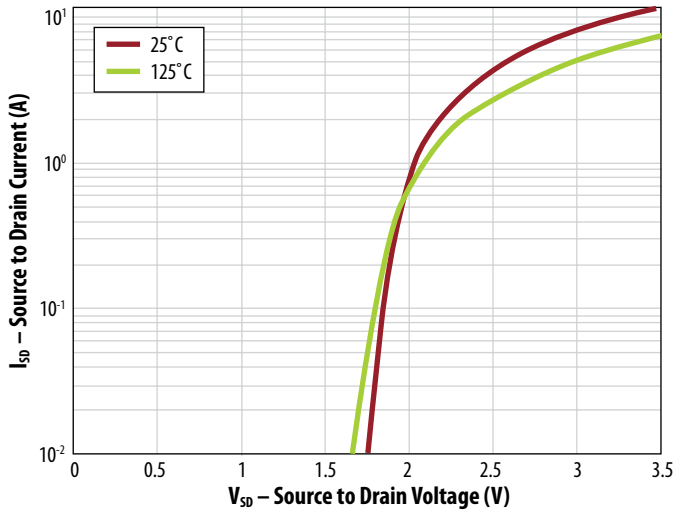


Figure 8: Normalized On Resistance Vs Temperature

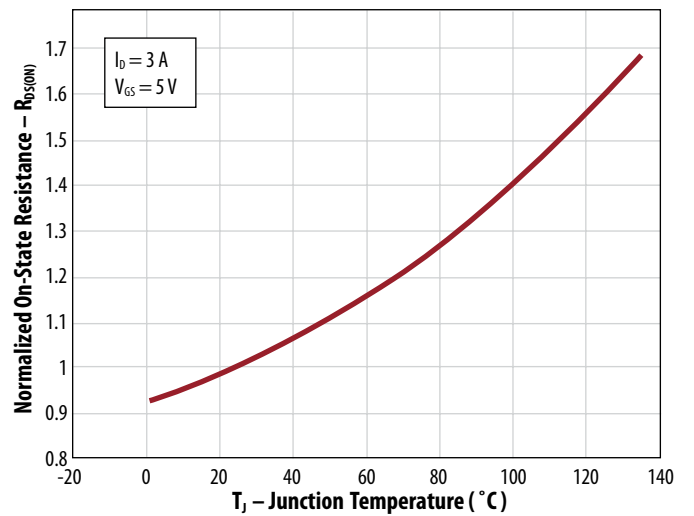


Figure 9: Normalized Threshold Voltage

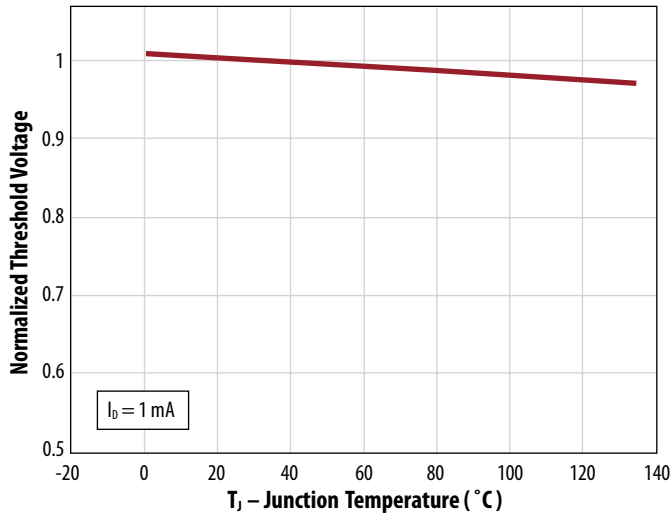
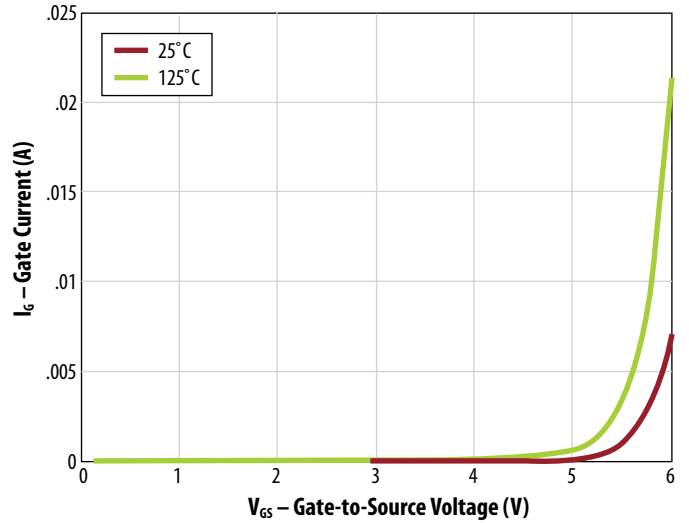
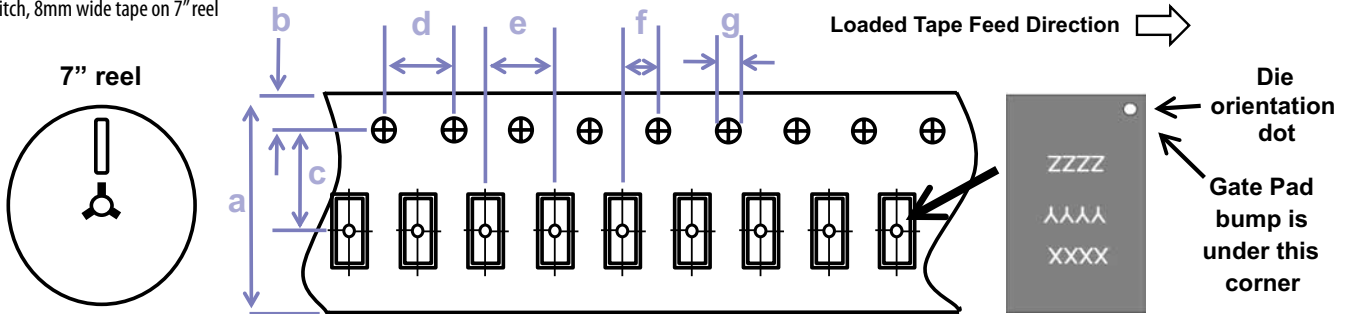


Figure 10: Gate Current



TAPE AND REEL CONFIGURATION

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

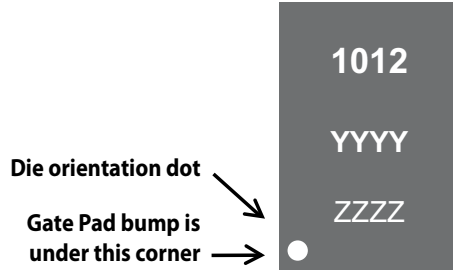


Die is placed into pocket bump side down (face side down)

Dimension (mm)	EPC1012		
	target	min	max
a	8.00	7.90	8.30
b	1.75	1.65	1.85
c (see note)	3.50	3.45	3.55
d	4.00	3.90	4.10
e	4.00	3.90	4.10
f (see note)	2.00	1.95	2.05
g	1.5	1.5	1.6

Note: Pocket position is relative to the sprocket hole measured as true position of the pocket, not the pocket hole

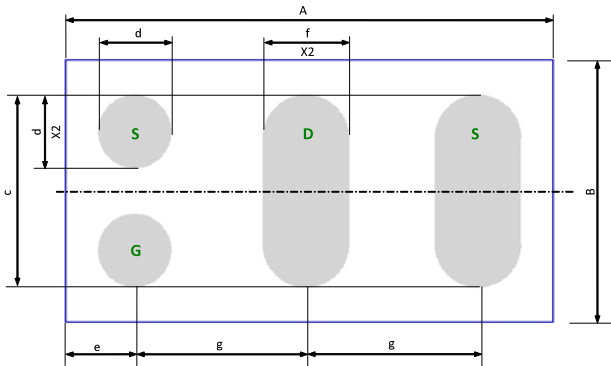
DIE MARKINGS



Part Number	Laser Markings		
	Part # Marking Line 1	Lot_Date Code Marking line 2	Lot_Date Code Marking Line 3
EPC1012	1012	YYYY	ZZZZ

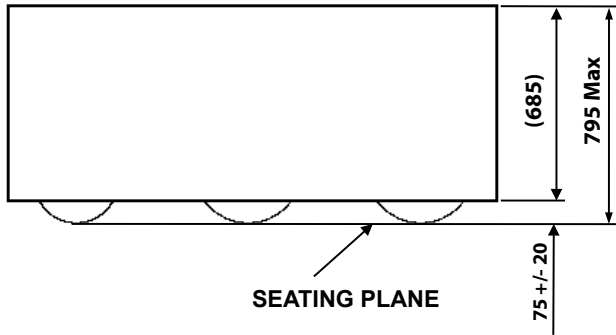
DIE OUTLINE

Bottom View



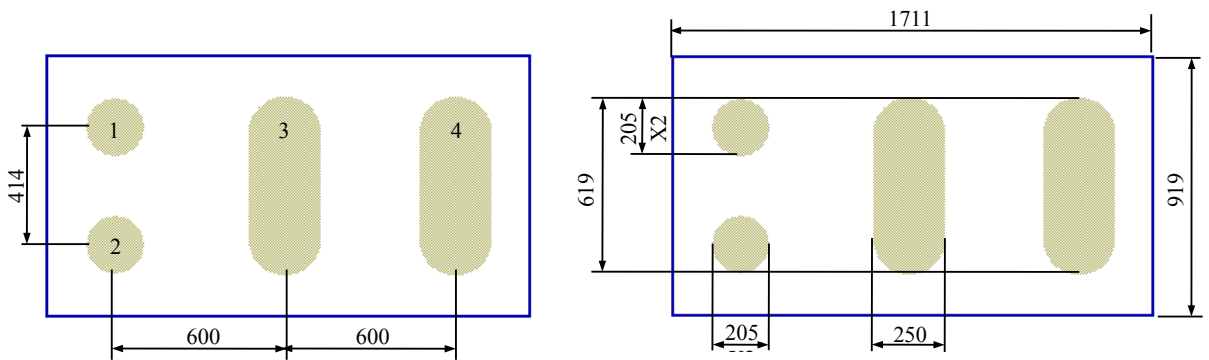
DIM	MICROMETERS		
	MIN	Nominal	MAX
A	1681	1711	1741
B	889	919	949
c	666	669	672
d	252	255	258
e	230	245	260
f	297	300	303
g	600	600	600

Side View



RECOMMENDED LAND PATTERN

(measurements in μm)



Pad no. 1 is Gate;
Pads no. 3 is Drain;
Pads no. 2 and 4 are Source.