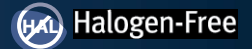


EPC29215_55 – Enhancement Mode Power Transistor

 V_{DS} , 200 V $R_{DS(on)}$, 8 m Ω I_D , 32 A

95% Pb/5% Sn Solder



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.

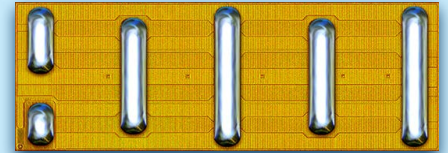
Maximum Ratings

PARAMETER		VALUE	UNIT
V_{DS}	Drain-to-Source Voltage (Continuous)	200	V
I_D	Continuous ($T_A = 25^\circ\text{C}$)	32	A
	Pulsed (25°C , $T_{PULSE} = 300 \mu\text{s}$)	162	
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	-55 to 150	

Thermal Characteristics

PARAMETER		TYP	UNIT
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.5	$^\circ\text{C}/\text{W}$
$R_{\theta JB}$	Thermal Resistance, Junction-to-Board	2.5	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1)	52	

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.



EPC29215_55 eGaN® FETs
Die Size: 4.6 x 1.6 mm

Applications

- DC-DC Converters
- BLDC Motor Drives
- Sync Rectification for AC/DC and DC-DC
- Multi-level AC/DC Power Supplies

Benefits

- Ultra High Efficiency
- No Reverse Recovery
- Ultra Low Q_G
- Small Footprint

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	$V_{GS} = 0 \text{ V}$, $V_{DS} = 160 \text{ V}$		0.15	0.48	mA
		$V_{GS} = 0 \text{ V}$, $V_{DS} = 160 \text{ V}$, $T_J = -55^\circ\text{C}$		0.008	0.048	
I_{GSS}	Gate-to-Source Forward Leakage	$V_{GS} = 5 \text{ V}$		0.006	1	mA
		$V_{GS} = 5 \text{ V}$, $T_J = -55^\circ\text{C}$		0.0002	0.1	
		Gate-to-Source Forward Leakage#	$V_{GS} = 5 \text{ V}$, $T_J = 125^\circ\text{C}$		0.14	
	Gate-to-Source Reverse Leakage	$V_{GS} = -4 \text{ V}$		0.05	0.48	
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 6 \text{ mA}$	0.8	1.2	2.5	V
		$V_{DS} = V_{GS}$, $I_D = 6 \text{ mA}$, $T_J = -55^\circ\text{C}$		1.3	2.7	
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS} = 5 \text{ V}$, $I_D = 20 \text{ A}$		6.3	8	m Ω
		$V_{GS} = 5 \text{ V}$, $I_D = 20 \text{ A}$, $T_J = -55^\circ\text{C}$		4.2	7.5	
V_{SD}	Source-Drain Forward Voltage#	$I_S = 0.5 \text{ A}$, $V_{GS} = 0 \text{ V}$		1.6		V

Defined by design. Not subject to production test.

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

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
C_{ISS}	Input Capacitance	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$		1356	1790	pF
C_{RSS}	Reverse Transfer Capacitance			2.0		
C_{OSS}	Output Capacitance			390	585	
$C_{OSS(ER)}$	Effective Output Capacitance, Energy Related (Note 2)	$V_{DS} = 0\text{ to }100\text{ V}, V_{GS} = 0\text{ V}$		556		
$C_{OSS(TR)}$	Effective Output Capacitance, Time Related (Note 3)			699		
R_G	Gate Resistance			0.4		Ω
Q_G	Total Gate Charge	$V_{DS} = 100\text{ V}, V_{GS} = 5\text{ V}, I_D = 20\text{ A}$		13.6	17.7	nC
Q_{GS}	Gate-to-Source Charge	$V_{DS} = 100\text{ V}, I_D = 20\text{ A}$		3.3		
Q_{GD}	Gate-to-Drain Charge			2.1		
$Q_{G(TH)}$	Gate Charge at Threshold			2.4		
Q_{OSS}	Output Charge	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$		69	104	
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

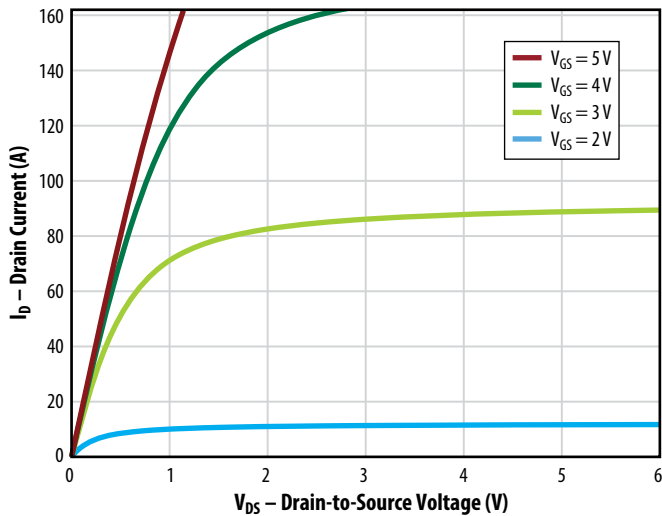


Figure 2: Transfer Characteristics

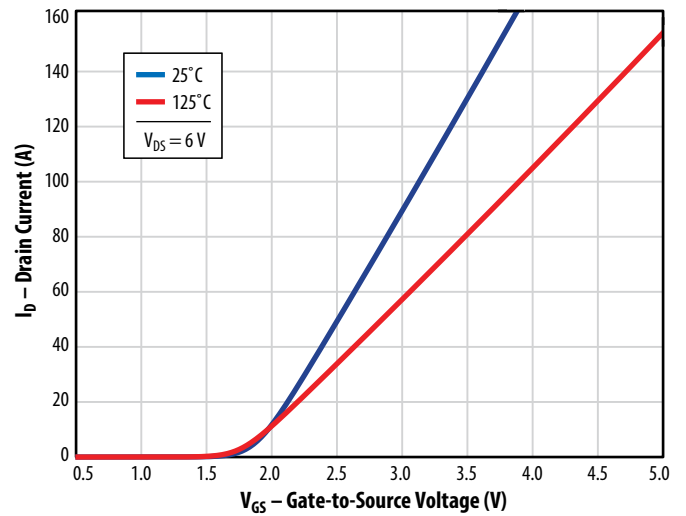


Figure 3: $R_{DS(on)}$ vs. V_{GS} for Various Drain Currents

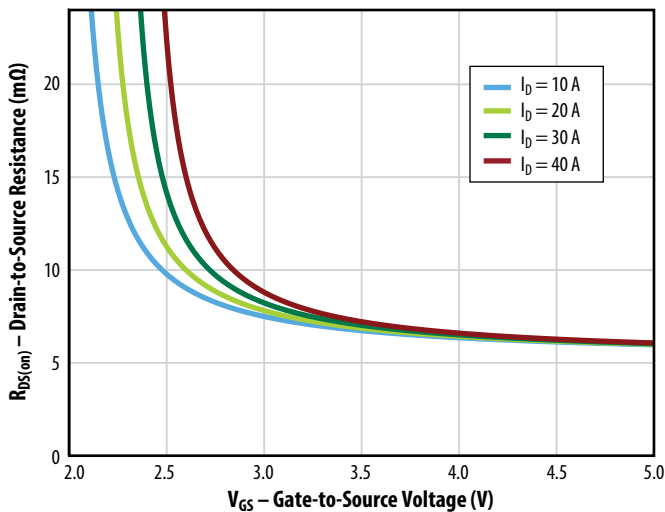


Figure 4: $R_{DS(on)}$ vs. V_{GS} for Various Temperatures

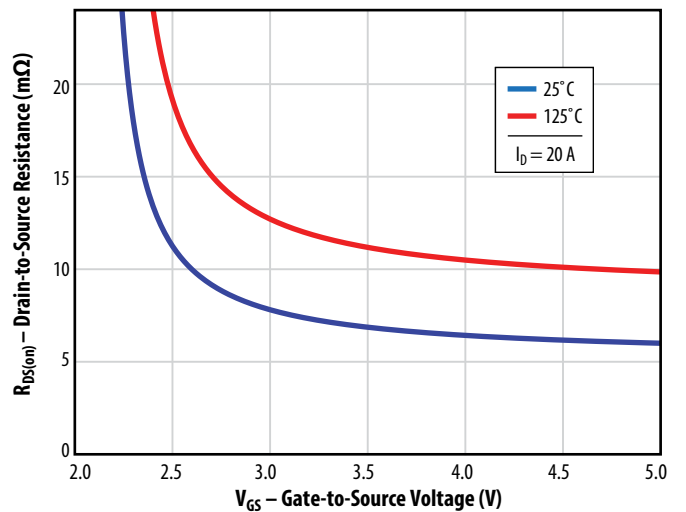


Figure 5a: Capacitance (Linear Scale)

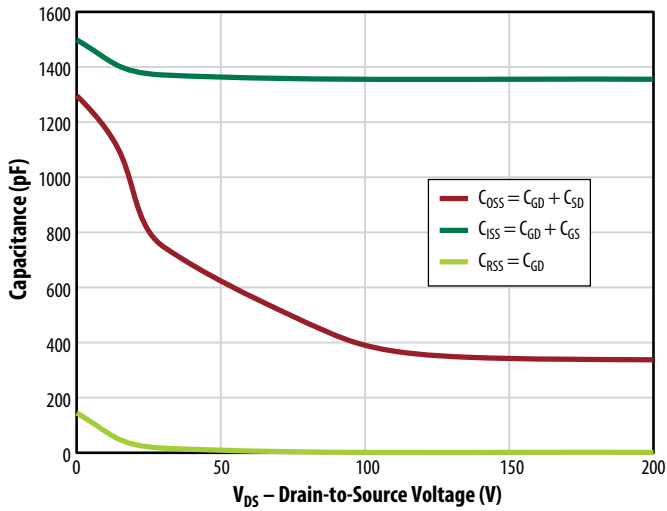


Figure 5b: Capacitance (Log Scale)

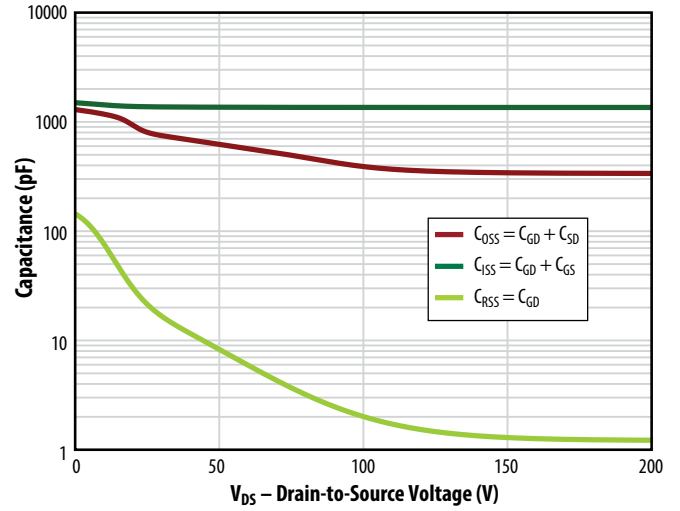


Figure 6: Output Charge and C_{OSS} Stored Energy

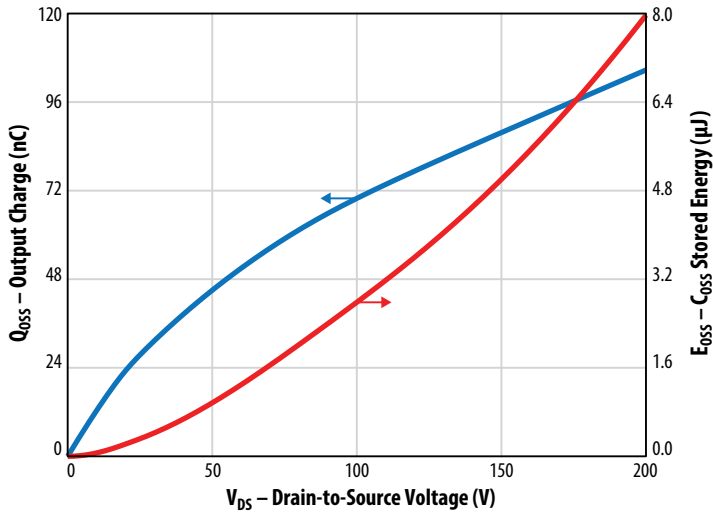


Figure 7: Gate Charge

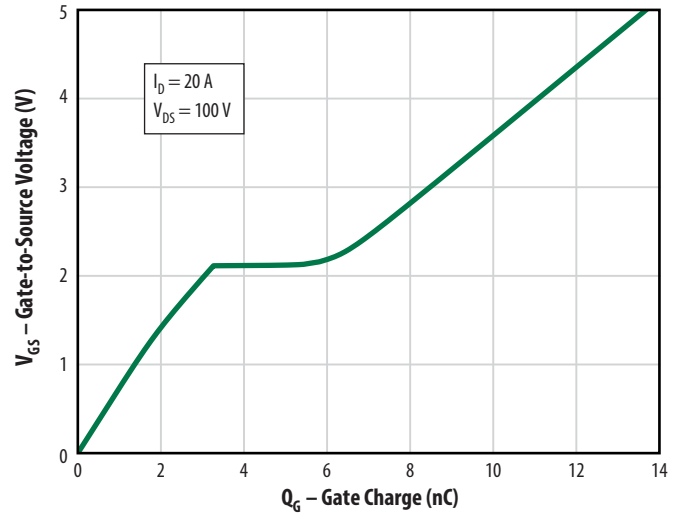


Figure 8: Reverse Drain-Source Characteristics

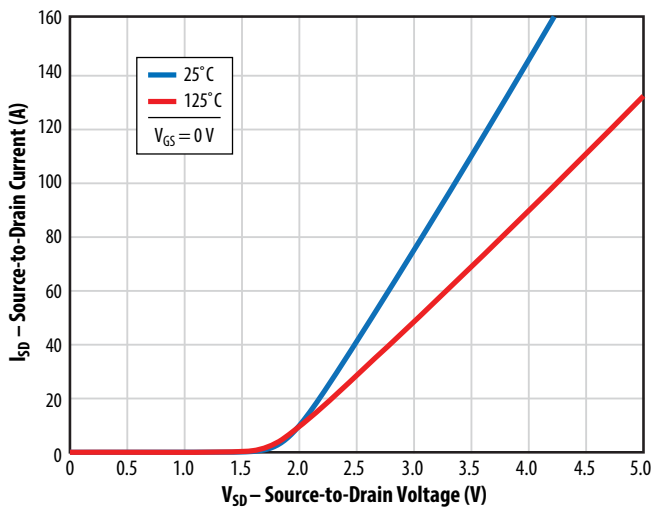


Figure 9: Normalized On-State Resistance vs. Temperature

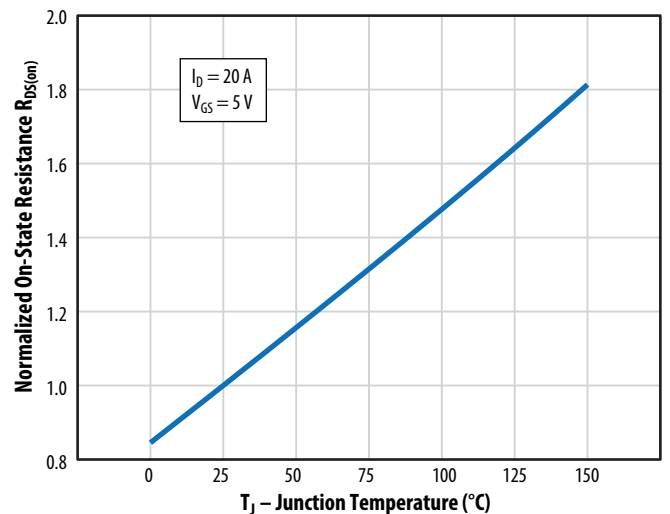


Figure 10: Normalized Threshold Voltage vs. Temperature

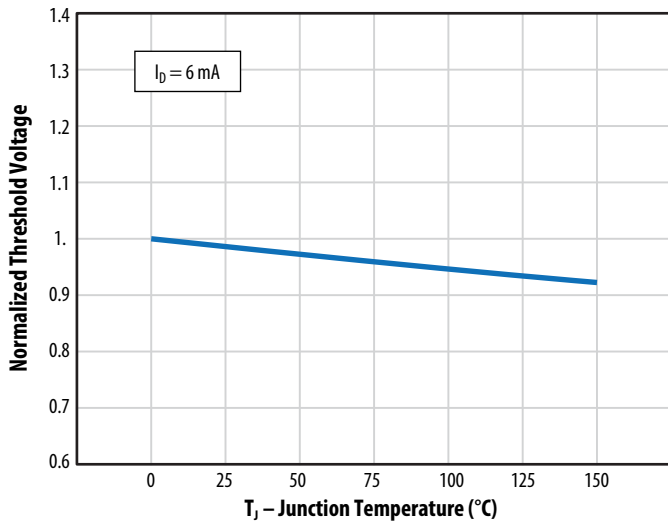


Figure 11: Safe Operating Area

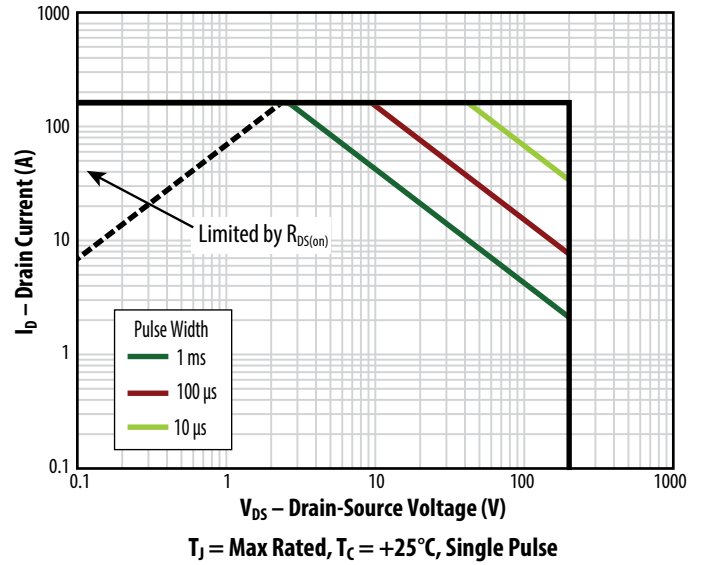
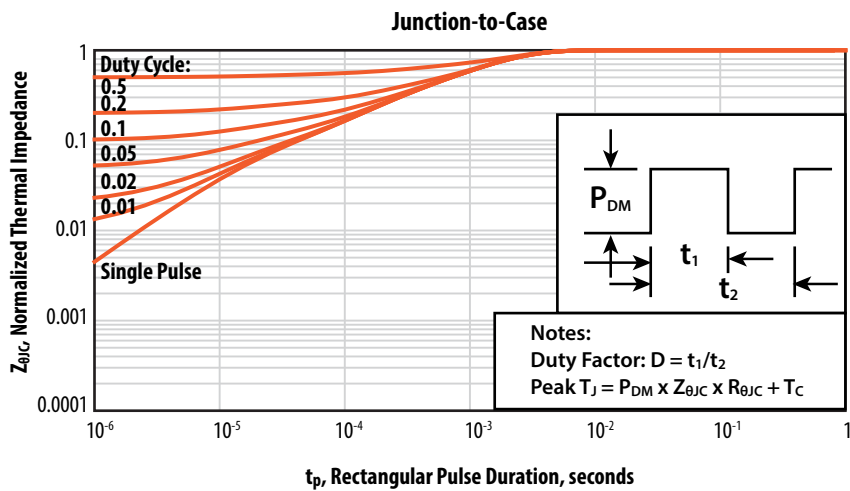
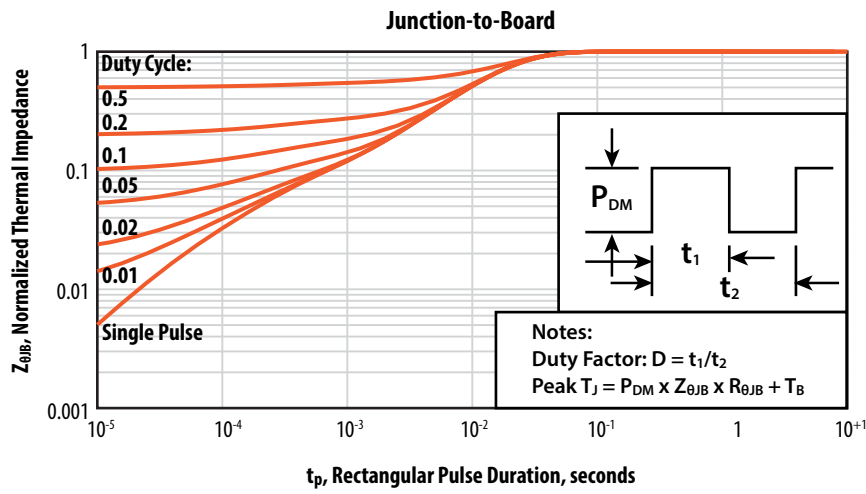
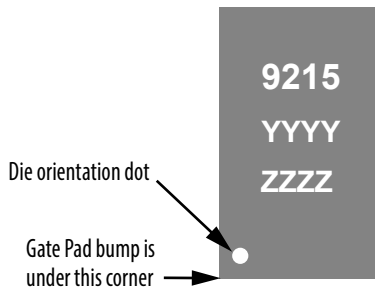


Figure 12: Transient Thermal Response Curves



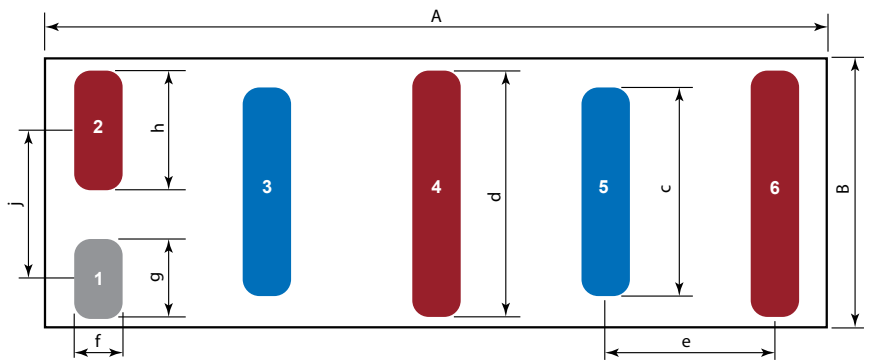
DIE MARKINGS



Part Number	Laser Markings		
	Part # Marking Line 1	Lot_Date Code Marking Line 2	Lot_Date Code Marking Line 3
EPC29215_55	9215	YYYY	ZZZZ

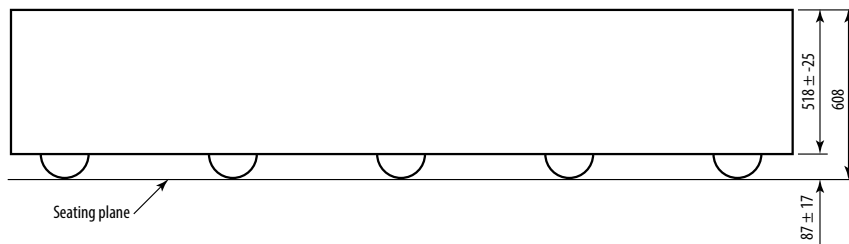
DIE OUTLINE

Solder Bump View



DIM	Micrometers		
	MIN	Nominal	MAX
A	4570	4600	4630
B	1570	1600	1630
c		1210	
d		1450	
e		1000	
f		275	
g		450	
h		700	
j		875	

Side View

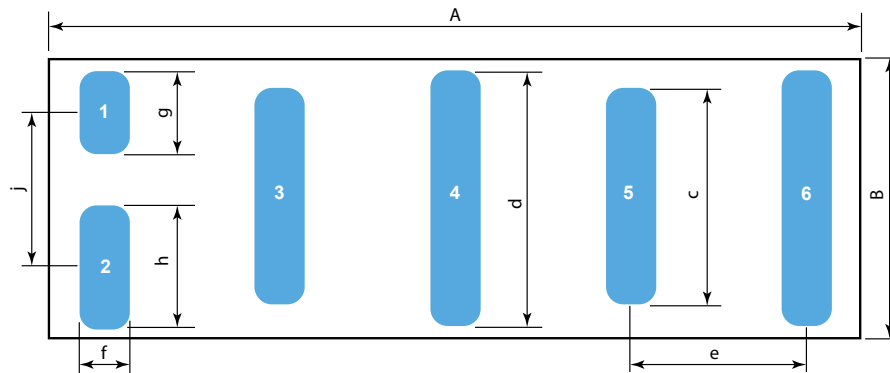


Pad 1 is Gate;
 Pads 2, 4, 6 are Source;
 Pads 3, 5 are Drain

RECOMMENDED

LAND PATTERN

(units in μm)



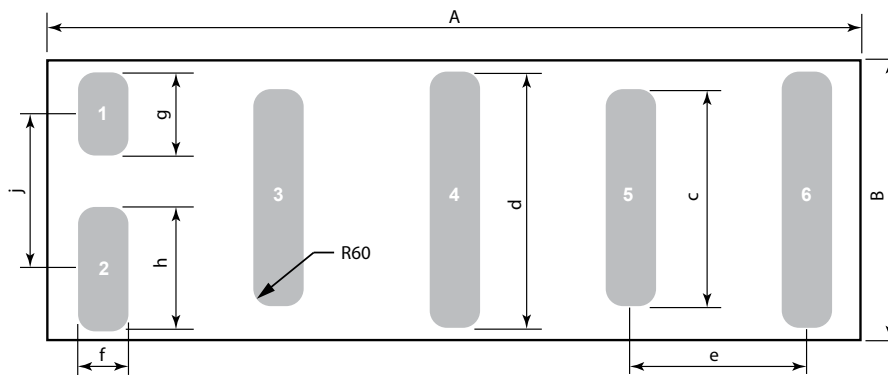
Land pattern is solder mask defined
 It is recommended to have on-Cu trace PCB vias

Pad 1 is Gate;
 Pads 2, 4, 6 are Source;
 Pads 3, 5 are Drain

DIM	Nominal
A	4600
B	1600
c	1210
d	1450
e	1000
f	275
g	450
h	700
j	875

RECOMMENDED STENCIL DRAWING

(units in μm)



DIM	Nominal
A	4600
B	1600
c	1210
d	1450
e	1000
f	275
g	450
h	700
j	875

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

The corner has a radius of R60.

Intended for use with SAC305 Type 3 solder, reference 88.5% metals content.

Split stencil design can be provided upon request, but EPC has tested this stencil design and not found any scooping issues.

Additional assembly resources available at <https://epc-co.com/epc/design-support/assemblybasics>

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Information subject to
change without notice.

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