



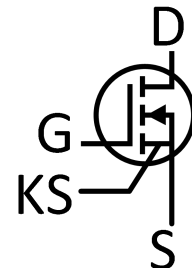
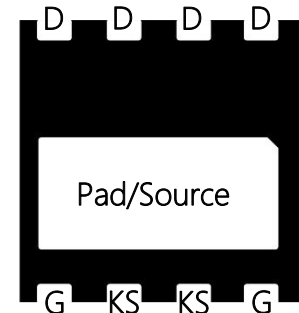
XG6508B8

650V 80mΩ E-Mode GaN HEMT

Features

BV_{dss}	R_{dson}	I_{ds}
650V	80mΩ	15A

- Enhancement mode (E-mode)
- p-GaN with GaN-on-Si technology
- High quality packaging materials
- Easy gate-drive configurations
- High frequency switching capable
- Kelvin-source for low parasitic inductance
- Zero reverse recovery losses
- Double gate pins, connect either or both



Application

- PD Adapters; Quick Chargers
- Switching Power Supplies
- PC and server powers
- Battery fast chargers
- HEV/E-Bike/Motor-Bike
- Power Factor Corrections
- Appliance motor-drives
- LED drivers
- PLC, POE power
- 5G Power Supplies

Description

- Our xGaN series devices are N-channel 650V enhancement mode (E-mode) power GaN HEMTs based on proprietary 6-inch GaN-on-silicon and p-GaN technology. Packaged with high quality materials, xGaN series devices are easy to drive, capable of switching at higher frequencies with zero reverse recovery. All xGaN devices have Kelvin-sources for reduced parasitic inductance while devices with double gate-pins and double Kelvin-source-pins (products coded with B5 and B8) offer the freedom to choose either left or right gate-pins (or connect both). This provides ultimate convenience for system designers, especially for situations where optimal PCB routing is difficult to achieve.

Type	Package	Qty
XD6508B8	DFN8*8	2500

XG6508B8

650V E-Mode GaN

Device Characteristics

Static Parameters				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	$V_{gs(TH)}$	Gate threshold voltage	$V_{ds}=V_{gs}$ $I_d=3.5mA$	0.9	1.1	1.3	V
2	BV_{dss}	Drain-Source breakdown voltage	$V_{gs}=0V$ $I_d=25\mu A$		650		V
3	I_{dss}	Zero gate voltage drain current, $T_C = 25^\circ C$	$V_{gs}=0V$ $V_{ds}=650V$		3		μA
4	I_{dss}	Zero gate voltage drain current, $T_C = 150^\circ C$	$V_{gs}=0V$ $V_{ds}=650V$		37		μA
5	I_{gss}	Gate-Source Leakage	$V_{gs} = 6V$ $V_{ds} = 0V$		300		μA
6	R_{dson}	Static drain-source on resistance, $T_C = 25^\circ C$	$V_{gs}=6V$ $I_d=5A$ $T_J=25^\circ C$		78		$m\Omega$
			$V_{gs}=6V$ $I_d=5A$ $T_J=150^\circ C$		168		
7	V_{sd}	Reverse conduction voltage	$I_{sd}=1A$ $V_{gs}=0V$	1.5	1.7	2.0	V
Dynamic Parameters				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	C_{iss}	Input capacitance	$V_{gs}=0V$		105		pf
	C_{oss}	Output capacitance	$V_{ds}=400V$		40		pf
	C_{rss}	Reverse transfer capacitance	$f=1MHz$		0.13		pf
2	Q_g	Gate charge	$V_{ds}=400V$		3.7		nC
	Q_{gs}	Gate to source charge	$I_d=9A$		0.7		nC
	Q_{gd}	Gate to drain charge	$V_{gs}=6V$		1		nC
3	Q_{rr}	Reverse recovery charge			0		nC
Switching Performance				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	$t_{d(on)}$	Turn-on delay time	$V_{ds}=400V$		2		ns
2	t_r	Rise time	$I_d=2.5A$		15		ns
3	$t_{d(off)}$	Turn-off delay time	$R_g=10\Omega$		7		ns
4	t_f	Fall time	$V_{gs}=6V$		25		ns

XG6508B8

650V E-Mode GaN

Absolute **Max.** Ratings

	Symbols	Parameters	Value	Unit
1	V_{DS-max}	Breakdown voltage transient @ $T_{case}=25^{\circ}C$	750	V
2	V_{GS-max}	Gate to source max. transient voltage @ $T_{case}=25^{\circ}C$	-10 to +7	V
3	I_{ds-max}	Drain to source DC current @ $T_{case}=25^{\circ}C$	15	A
4	I_{ds-max}	Drain to source DC current @ $T_{case}=100^{\circ}C$	12	A
5	$dv/dt-max$	Drain to source voltage slew rate	200	V/nS
6	T_J-max	Max junction temperature	150	$^{\circ}C$
7	$T_S-storage$	Storage temperature	-55 to 150	$^{\circ}C$

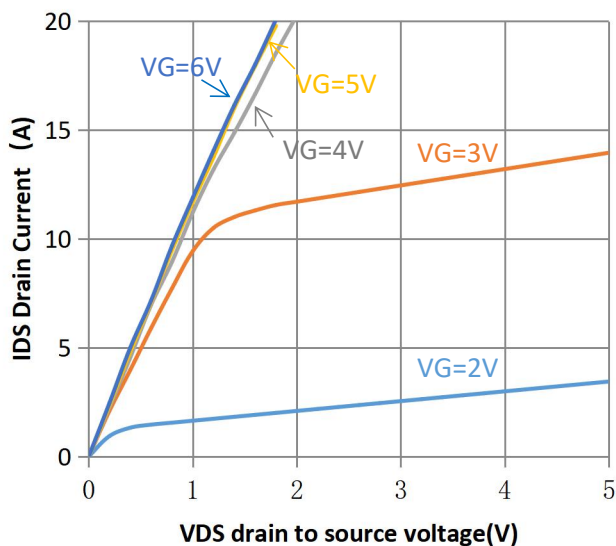
Thermal and Soldering Characteristics (Typical)

	Symbols	Parameters	Value	Unit
1	R_{thJC}	Thermal resistance (junction to case)	1.52	$^{\circ}C /W$
2	R_{thJA}	Thermal resistance (junction to ambient)	58	$^{\circ}C /W$
3	T_{solder}	Reflow soldering temperature	250	$^{\circ}C$

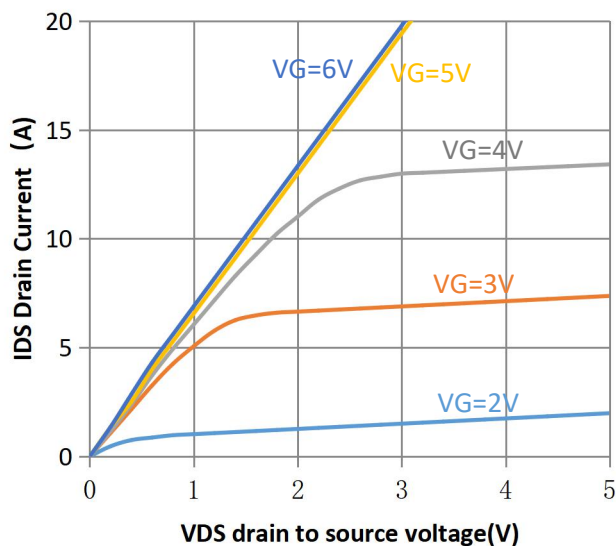
XG6508B8

650V E-Mode GaN

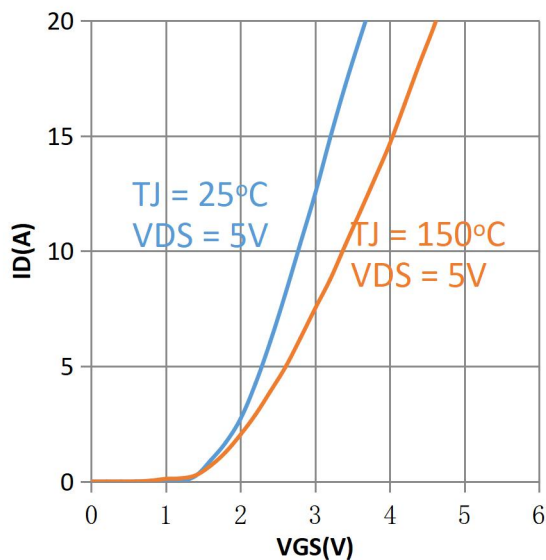
Electrical Performance



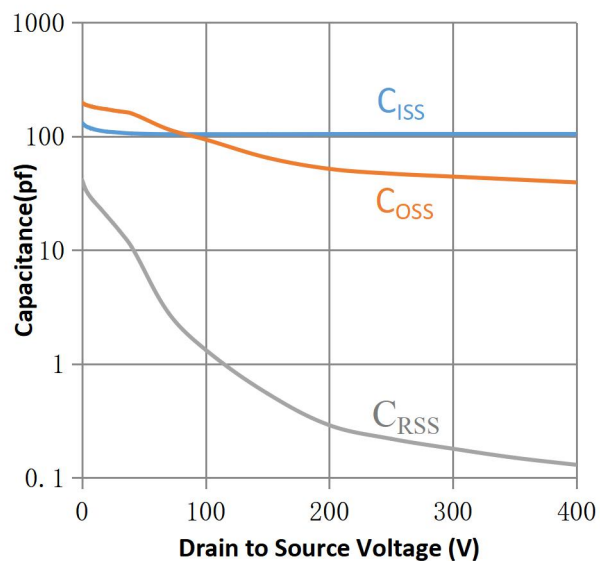
$I_{ds} - V_{ds}$ curves @25 °C



$I_{ds} - V_{ds}$ curves @150 °C



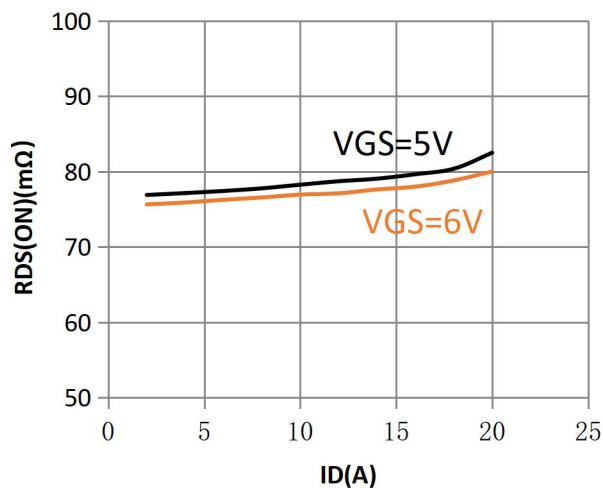
Transfer curves @25 °C & 150 °C



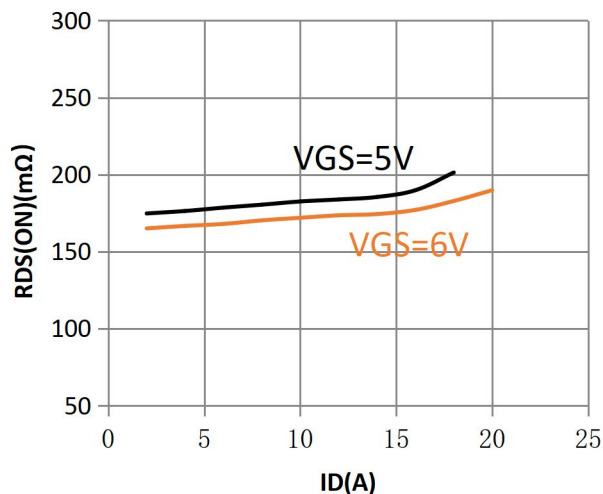
Capacitance curves

XG6508B8

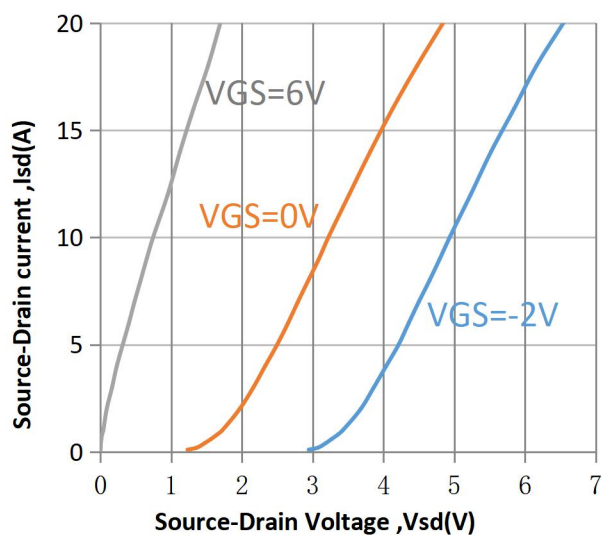
650V E-Mode GaN



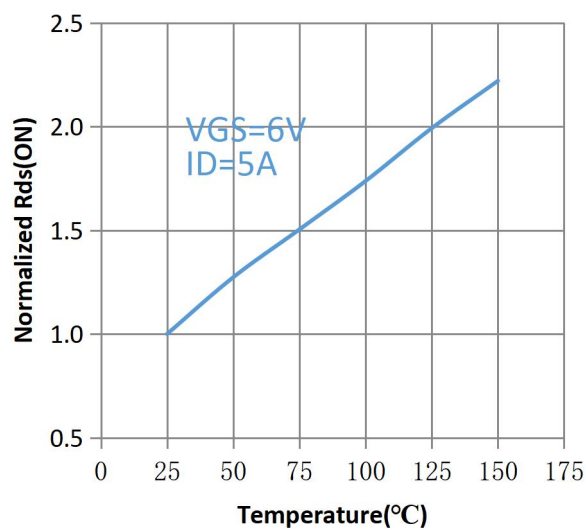
ON-resistance for various drain current @ $T_j=25^{\circ}C$



ON-resistance for various drain current @ $T_j=150^{\circ}C$



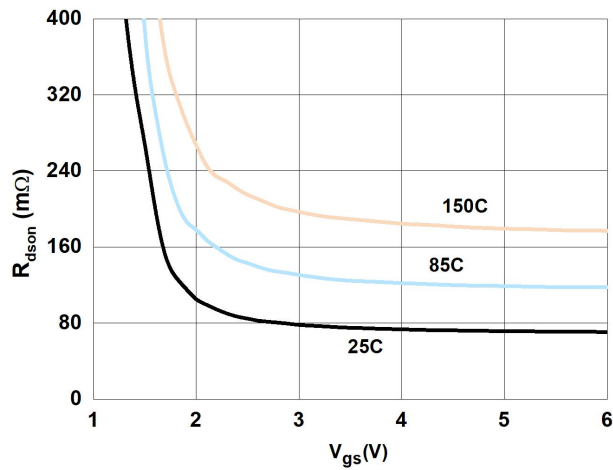
Reverse conducting curves



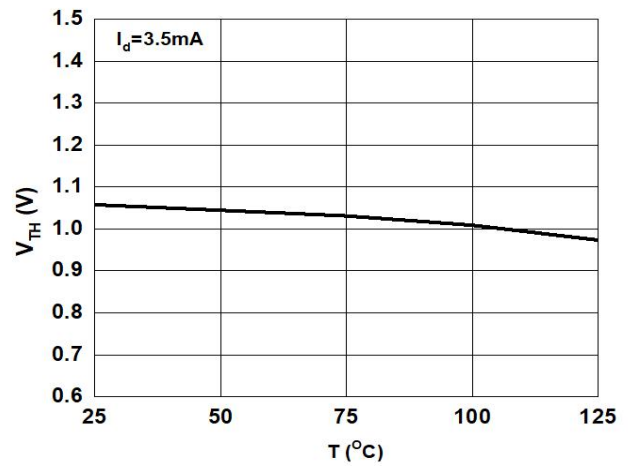
ON-resistance @ different temperatures

XG6508B8

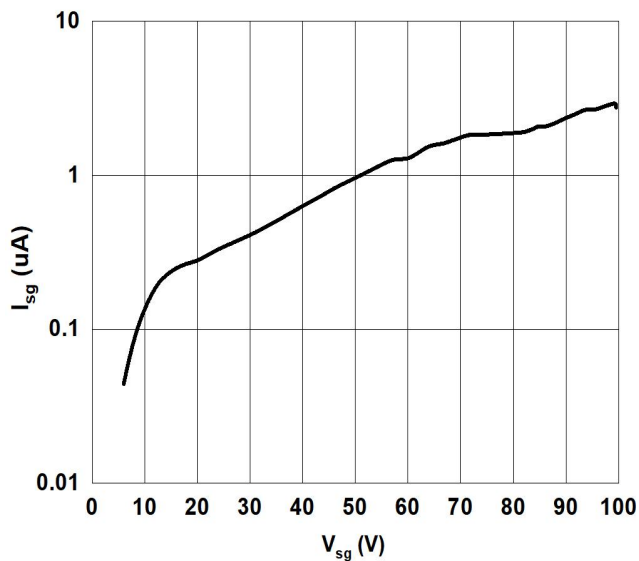
650V E-Mode GaN



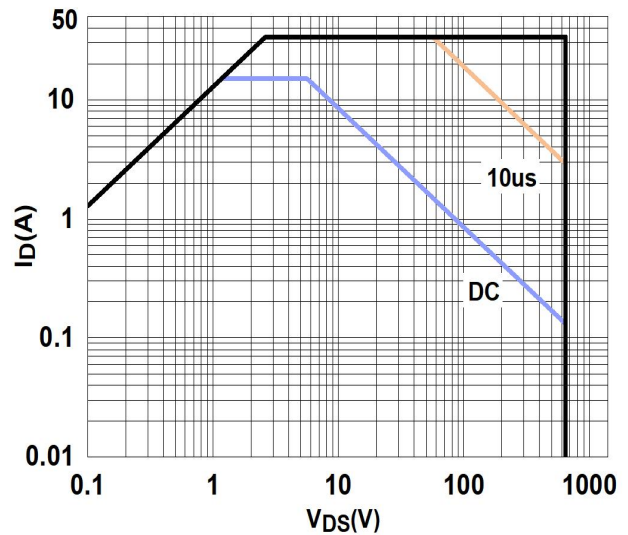
ON-resistance for @ different V_{gs}
@T=25°C & 85°C & 150°C



V_{th} @ different temperatures



Reverse Gate Voltage



Safe Operation Area

XG6508B8

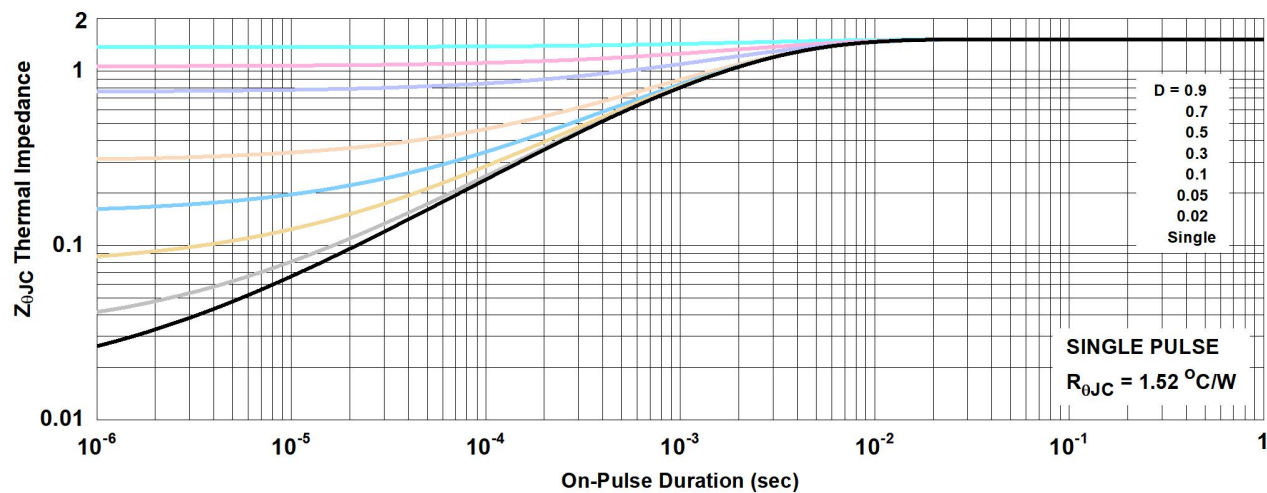
650V E-Mode GaN



芯干线科技

WWW.X-IPM.COM

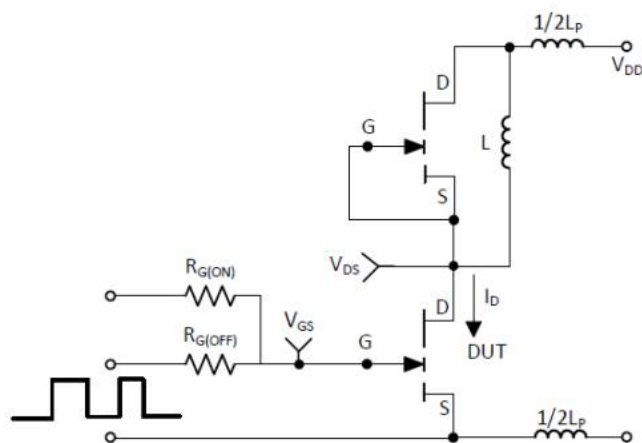
宽禁带功率器件专家



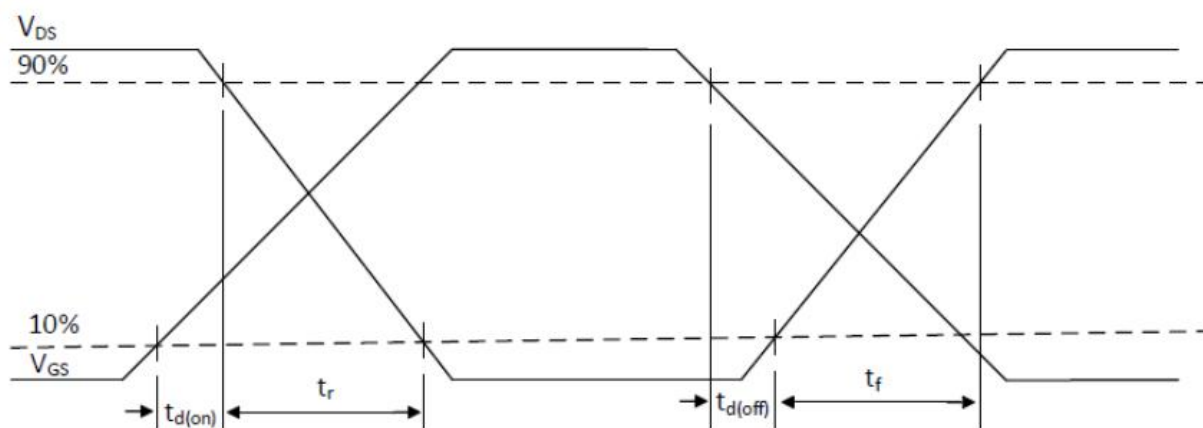
Transient Thermal Impedance

XG6508B8

650V E-Mode GaN



Switching Test Circuit

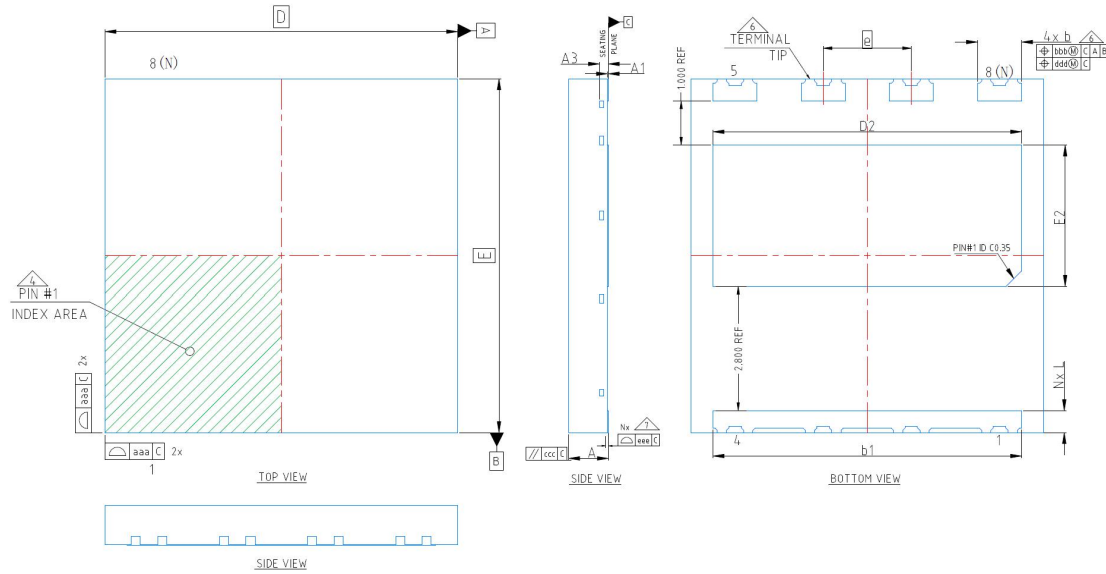


Switching Time Waveform

XG6508B8

650V E-Mode GaN

Package Information



Dimension Table						
Thickness Symbol	V			W		
	MINIMUM	NOMINAL	MAXIMUM	MINIMUM	NOMINAL	MAXIMUM
A	0.80	0.90	1.00	0.70	0.75	0.80
A1	0.00	0.02	0.05	0.00	0.02	0.05
A3	---	0.20 Ref	---	---	0.20 Ref	---
b	0.90	1.00	1.10	0.90	1.00	1.10
b1	6.90	7.00	7.10	6.90	7.00	7.10
D	8.00 BSC			8.00 BSC		
E	8.00 BSC			8.00 BSC		
e	2.00 BSC			2.00 BSC		
D2	6.90	7.00	7.10	6.90	7.00	7.10
E2	3.10	3.20	3.30	3.10	3.20	3.30
L	0.40	0.50	0.60	0.40	0.50	0.60
aaa	0.05					
bbb	0.10					
ccc	0.10					
ddd	0.05					
eee	0.08					
N	8			3		
ND	4			5		
NOTES	1, 2					
LF PART NO	446063					

NOTE:

1. Dimensioning and tolerancing conform to ASME Y14.5-2009.
2. All dimensions are in millimeters.
3. N is the total number of terminals.

4. The location of the marked terminal #1 identifier is within the hatched area.

5. ND refers to the maximum number of terminals on E side.

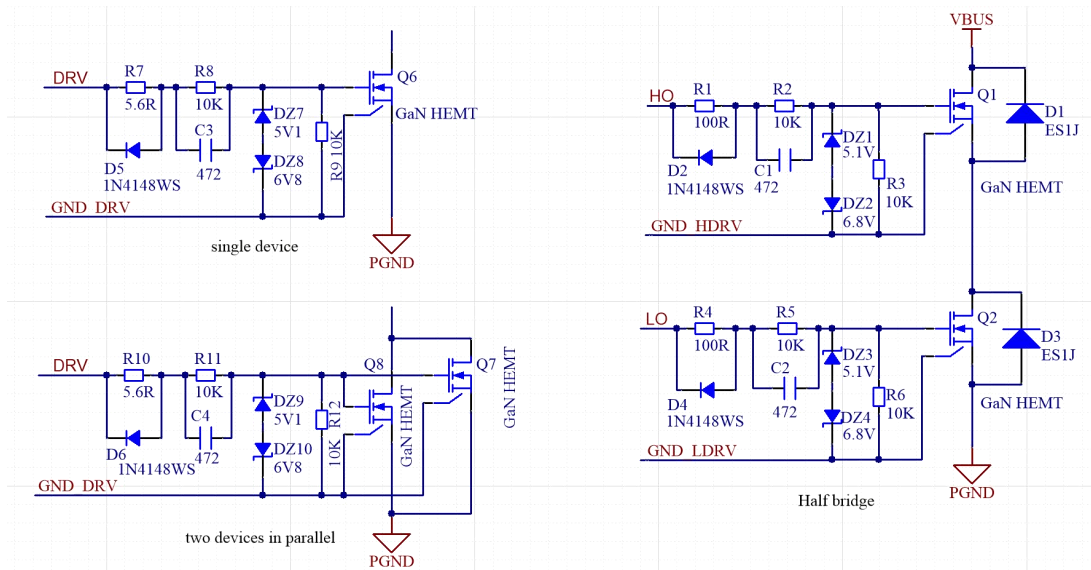
6. Dimension b applies to the metalized terminal. If the terminal has a radius on the other end of it, dimension b should not be measured in that radius area.

7. Coplanarity applies to the terminals and all other bottom surface metalization.

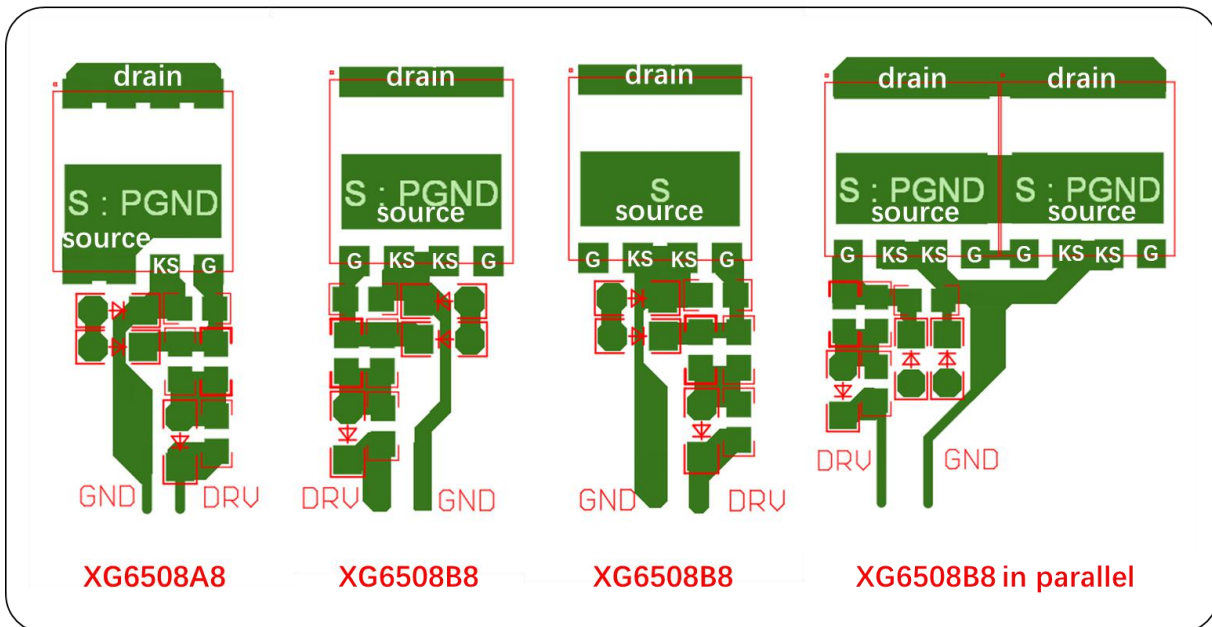
XG6508B8

650V E-Mode GaN

Gate Driving Examples



Gate Driving Layout Examples



XG6508B8

650V E-Mode GaN



Revision History

Revision History

Document revision	Date	Description of changes
2.7	2023.10.11	Target datasheet

Nanjing X-IPM Technologies Co., Ltd.

TEL: 025-51180705

Address: Room 1403, 34th Headquarter Base Park,
70th Phoenix Road, Jiangning Development Zone, Nanjing