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230 -3410 LOUGHEED HWY
VANCOUVER, BC, V5M 2A4 CANADA

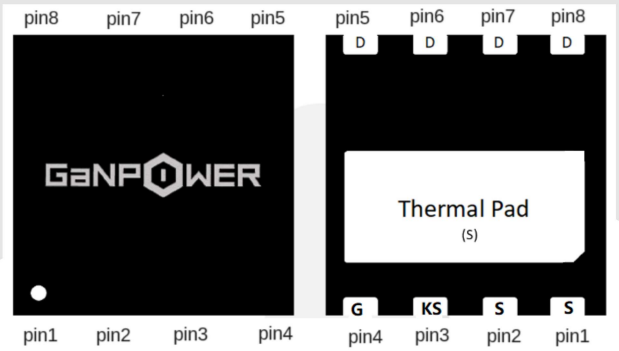
GPI90007DF88

N-channel 900V 7A GaN Power HEMT in DFN 8X8 Package

Datasheet version 1.1 Preliminary

Features

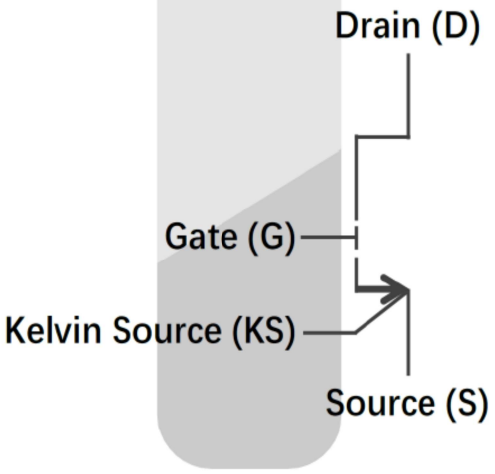
BV_{dss}	R_{dson}	I_{ds}	Q_g
900 V	170 mΩ	7 A (25 °C), 16A (pulse)	2.1 nC



- Ultra-low $R_{DS(on)}$
- High dv/dt capability
- Extremely low input capacitance
- Zero Qrr
- Outstanding switching performance
- Low Profile

Applications

- Switching Power Applications
- Adapters, Quick Chargers



Description

These devices are N-channel 900 V Power GaN HEMTs based on proprietary E-mode GaN on silicon technology. The resulting product has extremely low on state resistance, very low input capacitance and zero reverse recovery charge making it especially suitable for applications which require superior power density, ultra-high switching frequency and outstanding efficiency.

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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=5mA (T_J=25 °C)	0.9	1.2	2.9	V
			V_{ds}=V_{gs}, I_d=5mA (T_J=150 °C)		1.15		V
2	BV_{dss}	Drain-Source breakdown voltage	V_{gs}=0V, I_d < 20 µA (T_J=25 °C)		900		V
3	I_{dss}	Zero gate voltage drain leakage current	V_{gs}=0V, V_{ds}= 650V T_j = 25 '		1	17	µA
4	I_{gss}	Gate-Source Leakage	V_{gs} = 6V, V_{ds} = 0V		30	700	µA
5	R_{dson}	drain-source on resistance	V_{gs}=6V, I_d=1.4A T_j = 25 '		170	225	mΩ
			V_{gs}=6V, I_d=1.4A T_j = 150 '		420		mΩ
6	V_{sd}	Reverse conduction voltage	I_{sd}=0.2A, V_{gs}=0V	1.2	2.2	3	V
7	R_g	Gate resistance	f=25Mhz Open drain		1.1		Ω
Dynamic Parameters				**Test data**			
	Parameters		**Conditions**	**Min**	**Typical**	**Max**	**Unit**
1	C_{ISS}	Input capacitance	V_{gs} = 0 V		60		pf
2	C_{OSS}	Output capacitance	V_{ds} = 500 V		16		pf
3	C_{RSS}	Reverse transfer capacitance	f = 100 kHz		0.37		pf
4	$C_{O(er)}$	Effective output capacitance, energy related	Vds = 0 - 500V		22.7		pf
5	Q_g	Gate charge	Vds = 500V		2.1		nC
6	Q_{gs}	Gate to source charge	Id = 1.75A		0.4		nC
7	Q_{gd}	Gate to drain charge	Vgs = 6V		0.52		nC
8	Q_{OSS}	Output Charge	Vds = 0 - 500V		18		nC
9	Q_{rr}	Reverse recovery charge			0		nC

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Switching Performance				Test data			
	Parameters		**Conditions**	**Min**	**Typical**	**Max**	**Unit**
1	$t_{d(on)}$	Turn-on delay time	V_{ds} = 500V I_d = 1.75A R_g = 10Ω V_{gs} = 6V		4		ns
2	t_r	Rise time			8		ns
3	$t_{d(off)}$	Turn-off delay time			14		ns
4	t_f	Fall time			8		ns

Absolute Max. Ratings

	Symbols	**Parameters**	**Value**	**Unit**
1	$V_{DS\text{-}max}$	Breakdown voltage transient @ T_{case}=25°C	900	V
2	$V_{GS\text{-}max}$	Gate to source max. voltage @ T_{case}=25°C	-12 to +7.5	V
3	$I_{ds\text{-}max}$	Drain to source pulse current @ T_{case}=25°C, pulse width 10 µs, V_{GS} = 6 V	16	A
4	$I_{ds\text{-}max}$	Drain to source pulse current @ T_{case}=150°C	7	A
5	$dv/dt_{\text{-}max}$	Drain to source voltage slew rate	200	V/ns
6	$T_{J\text{-}max}$	Max junction temperature	150	°C
7	$T_{S\text{-}storage}$	Storage temperature	-55 to 150	°C

Thermal and Soldering Characteristics (Typical)

	Symbols	**Parameters**	**Value**	**Unit**
1	R_{thJC}	Thermal resistance (junction to case)	2.2	°C /W
2	R_{thJA}	Thermal resistance (junction to ambient)	62	°C /W
3	T_{solder}	Reflow soldering temperature	250	°C

Ordering

Order Code	**Package Type**	**Packaging Method**	**Qty**
GPI90007DF88	DFN surface mount, bottom cooled, 8X8 mm		

Electrical Performance

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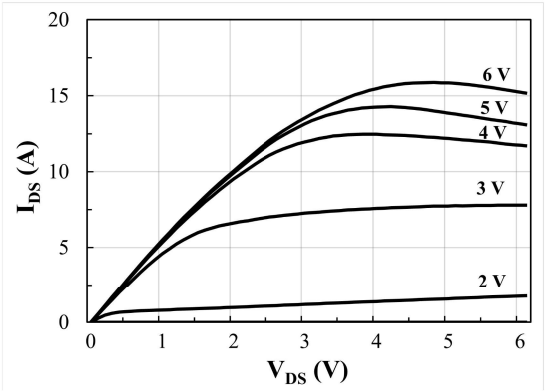
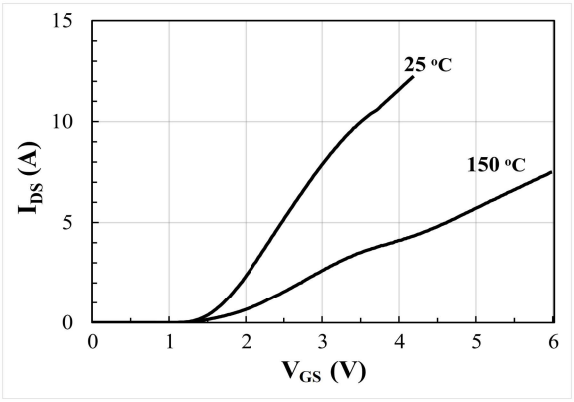
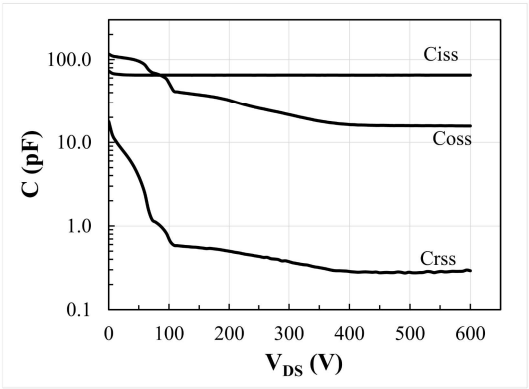


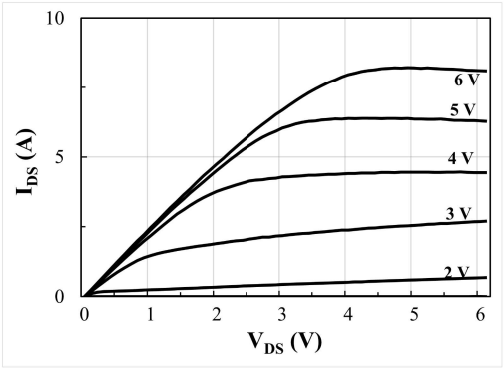
I_{DS} vs. V_{DS} @ T_j = 25 °C



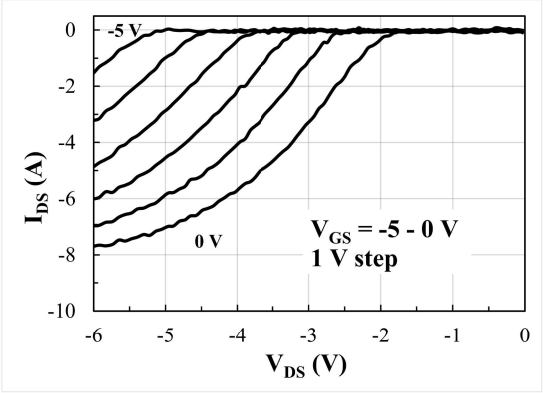
I_{DS} vs. V_{GS} @ T_j = 25 °C and 150 °C



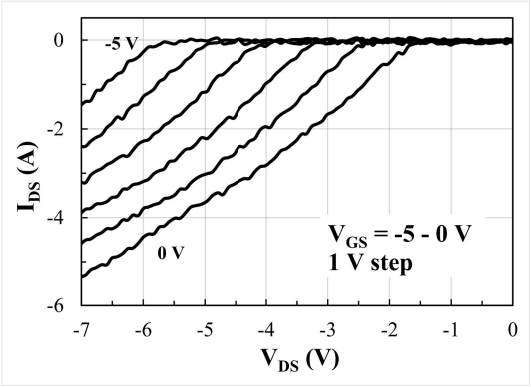
Capacitance vs. V_{ds} Curve @ T_j =25 °C



I_{DS} vs. V_{DS} @ T_j = 150 °C



I_{sd} vs. V_{sd} reverse conduction curve @ T_j = 25 °C



I_{sd} vs. V_{sd} reverse conduction curve @ T_j = 150°C

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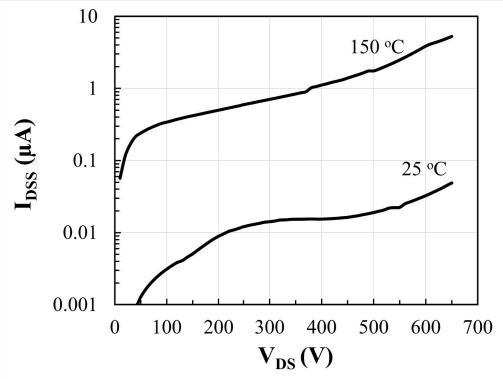
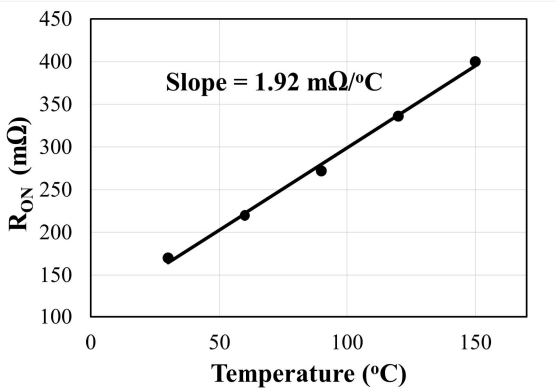
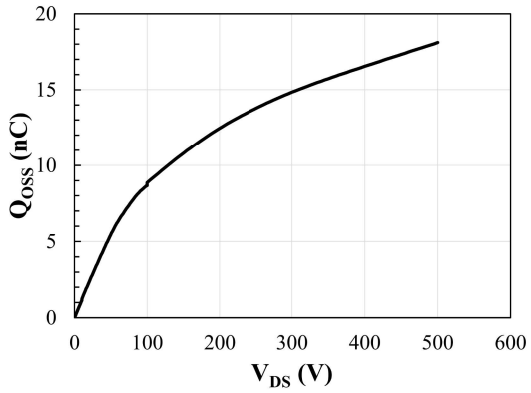


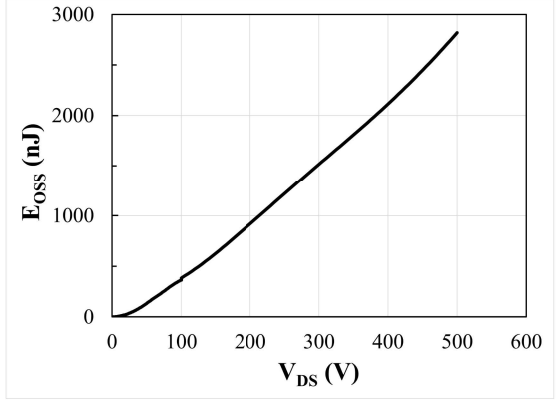
Typical off-state drain leakage current I_{DSS} vs. V_{DS} @ T_J = 25 °C and 150 °C



On-state resistance vs. T_J @ I_D = 1.75 A, V_{GS} = 6V



Output charge Q_{OSS} vs. V_{DS}



Stored Energy Characteristic E_{OSS} vs. V_{DS}

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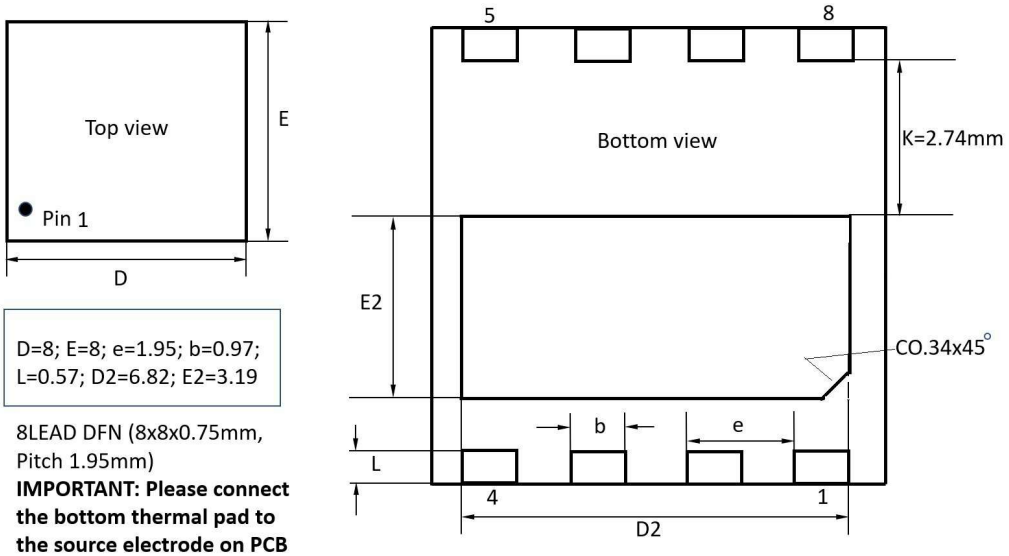
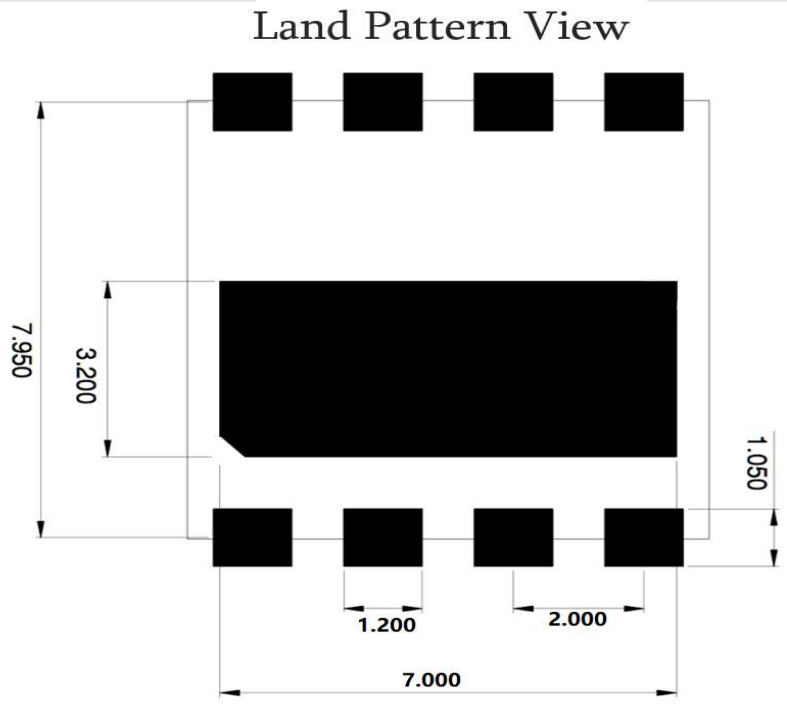
Package Information



D=8; E=8; e=1.95; b=0.97;
L=0.57; D2=6.82; E2=3.19

8LEAD DFN (8x8x0.75mm, Pitch 1.95mm)
IMPORTANT: Please connect the bottom thermal pad to the source electrode on PCB



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Further Information

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Data Source– Data here are based on recent tests but all parameters may not be up to date. Actual final test data from packaging production are available for selected customers upon request.