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

GPI65060TO5L

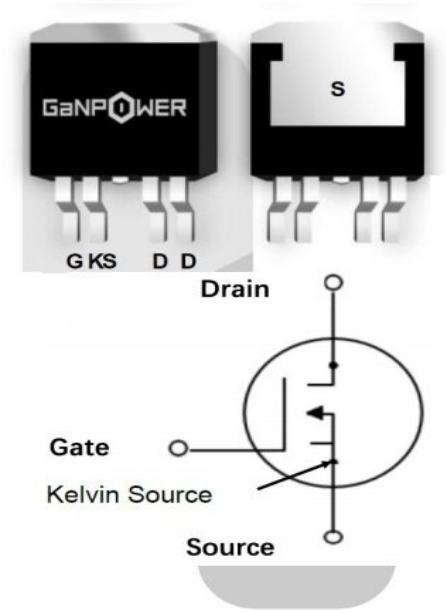
N-channel 650 V 60 A GaN Power HEMT in TO263-5L package

Datasheet version: 2.5

Features

BV_{dss}	R_{dson}	I_{ds}	Q_g
650 V	25 mΩ	60 A	16 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
- Server and Telecom Power Applications
- EV OBC and DC-DC Converters

Description

These devices are N-channel 650 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	$V_{ds}=V_{gs}$ $I_d=42mA$	0.9	1.2	2.9	V
2	BV_{dss}	Drain-Source breakdown voltage	$V_{gs}=0V$ $I_d<100uA$		650		V
3	I_{dss}	Zero gate voltage drain current, T_C = 25℃	$V_{gs}=0V$ $V_{ds}=650V$		0.6	100	uA
4	I_{gss}	Gate-Source Leakage	V_{gs} = 6V V_{ds} =0V		0.4	6	mA
5	R_{dson}	Static drain-source on resistance, T_C = 25℃	$V_{gs}=6V$ $I_d=12A$		25	30	mΩ
6	V_{sd}	Reverse conduction voltage	$I_{sd}=1.6A$ $V_{gs}=0V$	1.5	2.9	3.0	V
7	R_g	Gate resistance	F=25MHz Open drain		2.18		Ω
Dynamic Parameters				**Test data**			
	Parameters		**Conditions**	**Min**	**Typical**	**Max**	**Unit**
1	C_{iss}	Input capacitance	$V_{gs}=0V$ $V_{ds}=400V$ f=1MHz		420		pf
	C_{oss}	Output capacitance			143		pf
	C_{rss}	Reverse transfer capacitance			6		pf
3	Q_g	Gate charge	$V_{ds}=400V$ $I_d=7.5A$ $V_{gs}=6V$		16.1		nC
	Q_{gs}	Gate to source charge			1.1		nC
	Q_{gd}	Gate to drain charge			1.8		nC
2	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	$V_{ds}=400V$ $I_d=2.5A$ $R_g=10Ω$ $V_{gs}=6V$		28		ns
2	t_r	Rise time			16		ns
3	$t_{d(off)}$	Turn-off delay time			40		ns
4	t_f	Fall time			90		ns

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Absolute Max. Ratings

	Symbols	Parameters	Value	Unit
1	$V_{DS\text{-}max}$	Breakdown voltage transient @ T_{case}=25°C	800	V
2	$V_{GS\text{-}max}$	Gate to source max. transient voltage @ T_{case}=25°C	-12 to +7.5	V
3	$I_{ds\text{-}max}$	Drain to source DC current @ T_{case}=25°C	60	A
4	$I_{ds\text{-}max}$	Drain to source DC current @ T_{case}=100°C	50	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)	0.6	°C /W
2	R_{thJA}	Thermal resistance (junction to ambient)	62	°C /W
2	T_{solder}	Reflow soldering temperature	260	°C

Ordering

Order Code	Package Type	Packaging Method	Qty
GPI65060TO5L	TO263-5L		

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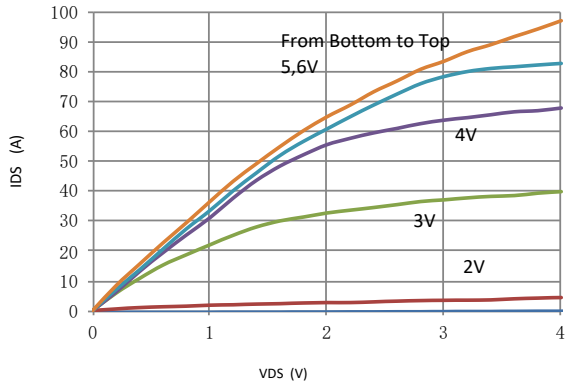
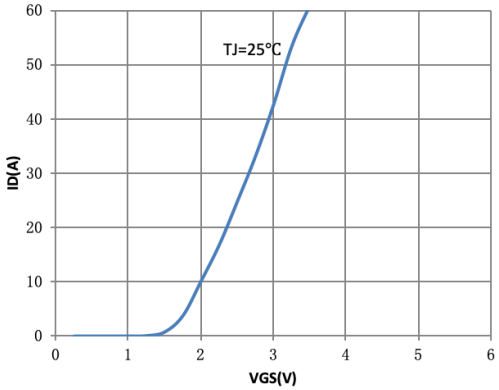
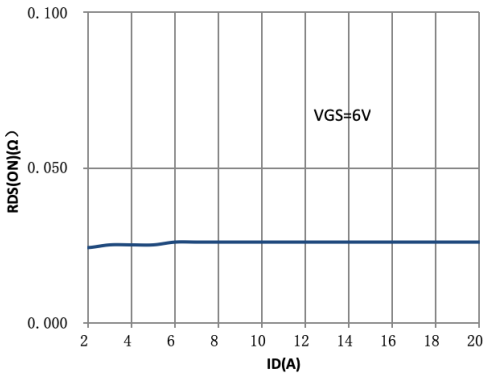
Electrical Performance



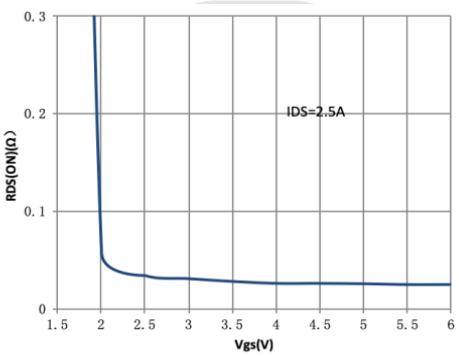
I_{ds} – V_{ds} curve @ 25 °C



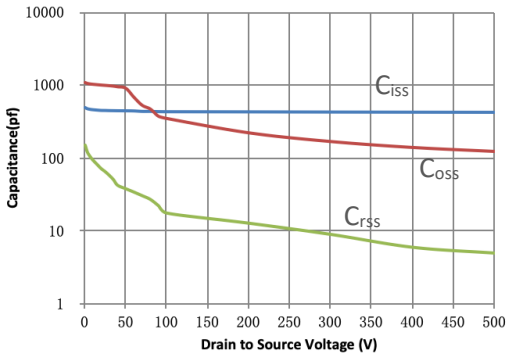
I_{ds} – V_{gs} curve @ 25°C



R_{dson} vs. I_{ds} Pulsed measurement



R_{dson} vs. V_{gs}@ 25 °C



Capacitance vs. V_{ds} Curve @ 25 °C

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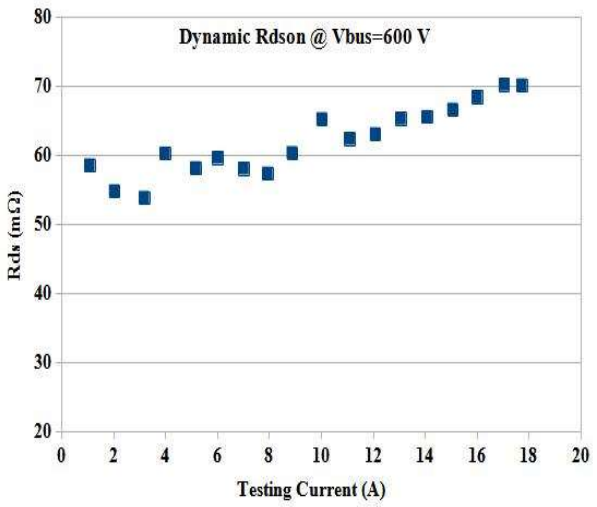
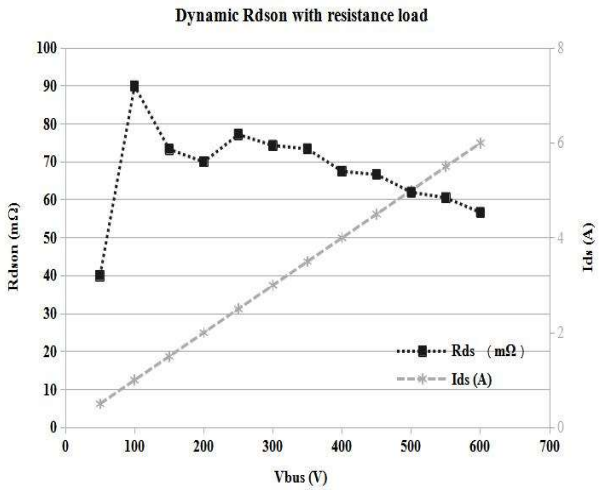


Dynamic R_{dson} with inductive load @bus voltage of 600V



Dynamic Rdson with resistive load @166KHz, 50%duty, 5 pulses

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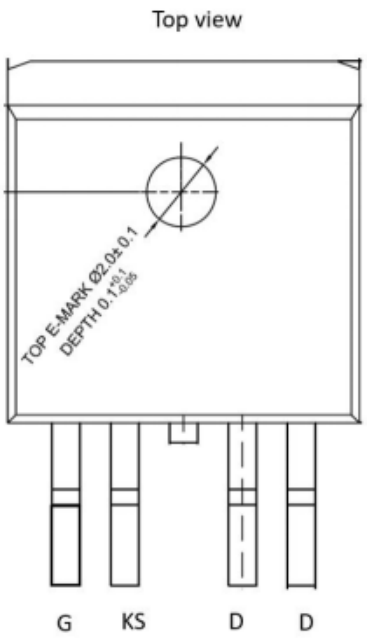
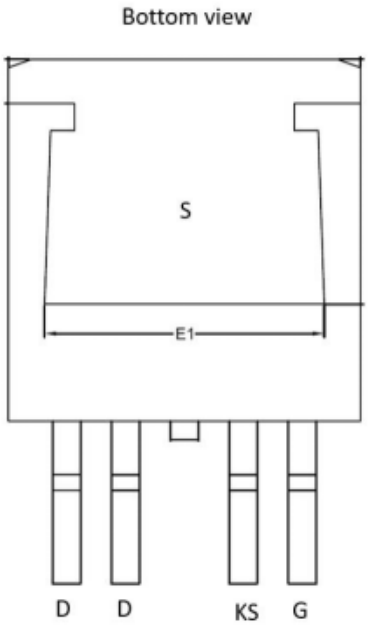
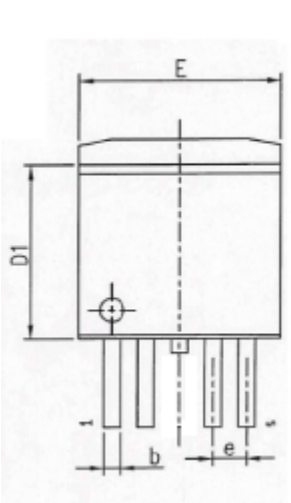
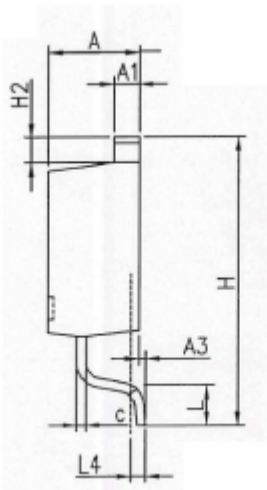
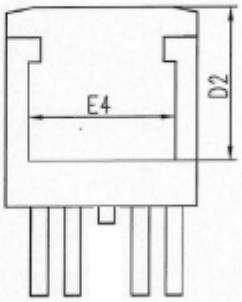
Package Information











COMMON DIMENSIONS

SYMBOL	MM		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.17	1.27	1.42
A3	0	–	0.25
b	0.71	–	0.97
c	0.33	–	0.76
D1	8.38	8.70	9.00
D2	6.00	–	–
E	9.90	10.16	10.39
E4	7.30	–	–
e	1.70BSC		
H	–	–	14.35
H2	–	–	1.27
L	–	1.98	–
L4	–	0.76	–

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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.