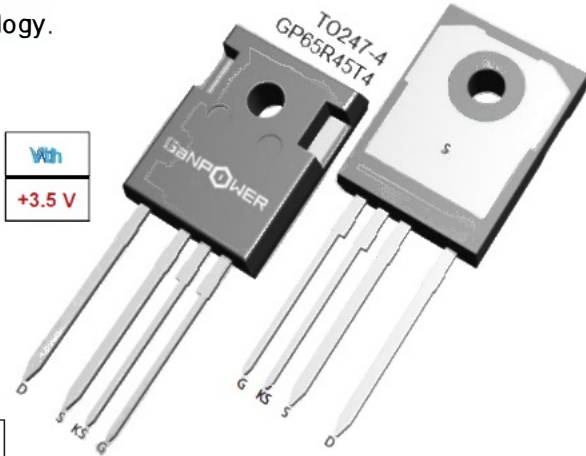


## Description

The GP90R45xx is a 900V E-mode GaN transistor based on silicon technology.

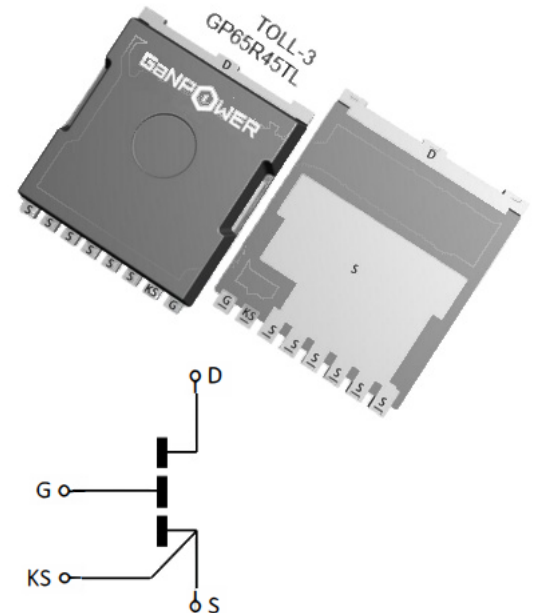
## Features

BV <sub>dss</sub>		R <sub>dson@25°C</sub>		I <sub>ds@25°C</sub>		Q <sub>g</sub>	V <sub>gs</sub>	V <sub>th</sub>
Transient	1100 V	Typ	45 mΩ	Max	30 A	6.9 nC	±20 V	+3.5 V
Continuous	900 V	Max	60 mΩ	Pulse	62 A			



## Absolute Max. Ratings

	Symbols	Parameters	Value	Unit
1	V <sub>ds</sub> -max	Breakdown voltage transient @ T <sub>case</sub> =25°C~125°C	1100	V
		Breakdown voltage continuous @ T <sub>case</sub> =25°C~125°C	900	V
2	V <sub>gs</sub> -max	Gate to source max. voltage @ T <sub>case</sub> =25°C	-20 ~ +30	V
3	I <sub>ds</sub> -max	Drain to source max current @ T <sub>case</sub> =25°C, V <sub>gs</sub> = +12 V, f=500KHz, V <sub>bus</sub> =900V	30	A
		Drain to source max current @ T <sub>case</sub> =125°C, V <sub>gs</sub> = +12 V, f=500KHz, V <sub>bus</sub> =900V	28	A
		Drain to source pulse current @ T <sub>case</sub> =25°C, pulse width 10 μs, V <sub>gs</sub> = +12 V, V <sub>bus</sub> = 900V	62	A
4	dv/dt-max	Drain to source voltage slew rate	200	V/ns
5	T <sub>J</sub> -max	Max junction temperature	150	C
6	T <sub>s</sub> -storage	Storage temperature	-55 ~ 150	C
7	T <sub>J</sub> -operate	Operating temperature	-55 ~ 150	C



## Thermal and Soldering Characteristics

	Symbols	Parameters	Value	Unit	Package
1	R <sub>thJC</sub>	Thermal resistance (junction to case)	0.6	C/W	TO247-4
			0.27		TOLL-3
2	R <sub>thJA</sub>	Thermal resistance (junction to ambient)	62	C/W	TO247-4
			40		TOLL-3
3	T <sub>solder</sub>	Reflow soldering temperature	260	C	All

## Ordering Information

Order Code	Package Type	Packaging	Qty
GP90R45T4	TO247-4	Tube	30
GP90R45TL	TOLL-3 PG-HSOF-8-3	Tape-and-Reel	2000

## Device Characteristics

Static Parameters				Test data				
	Parameters		Conditions	Min	Typical	Max	Unit	
1	V <sub>gs</sub> (TH)	Gate threshold voltage	V <sub>ds</sub> =V <sub>gs</sub> , I <sub>d</sub> =21 mA (T <sub>j</sub> =25 °C)	3.0	3.5	4.0	V	
2	V <sub>gs</sub> <sup>1</sup>	Gate-Source voltage range		-20	12	20	V	
3	BV <sub>dss</sub> <sup>2</sup>	Drain-Source breakdown voltage	V <sub>gs</sub> =0V, I <sub>d</sub> < 1 mA (T <sub>j</sub> =25 °C)		900		V	
4	I <sub>dss</sub>	Zero gate voltage drain leakage current	V <sub>gs</sub> =0V, V <sub>ds</sub> = 700V T <sub>j</sub> = 25 °C		1.3	2.0	μA	
5	I <sub>gss</sub>	Gate-Source Leakage	V <sub>gs</sub> = 6V, V <sub>ds</sub> = 0V		0.7	30	mA	
6	R <sub>dson</sub>	drain-source on resistance	V <sub>gs</sub> =6V, I <sub>d</sub> =0.8A T <sub>j</sub> = 25 °C		45	60	mΩ	
7	V <sub>sd</sub>	Reverse conduction voltage	I <sub>sd</sub> =0.12A, V <sub>gs</sub> =0V	1.2	2.0	3	V	
8	R <sub>g</sub>	Gate resistance	f=25Mhz Open drain		1.5		Ω	
Dynamic Parameters				Test data				
	Parameters		Conditions	Min	Typical	Max	Unit	
1	C <sub>iss</sub>	Input capacitance	V <sub>gs</sub> = 0 V V <sub>ds</sub> = 700 V f = 1MHz		10		pf	
2	C <sub>oss</sub>	Output capacitance				72		pf
3	C <sub>rss</sub>	Reverse transfer capacitance				4.6		pf
4	Q <sub>g</sub>	Gate charge	V <sub>ds</sub> = 700V I <sub>d</sub> = 9A V <sub>gs</sub> = 6V		6.9		nC	
5	Q <sub>gs</sub>	Gate to source charge				1.5		nC
6	Q <sub>gd</sub>	Gate to drain charge				1.8		nC
7	Q <sub>rr</sub>	Reverse recovery charge			0		nC	
Switching Performance				Test data				
	Parameters		Conditions	Min	Typical	Max	Unit	
1	t <sub>d</sub> (on)	Turn-on delay time	V <sub>ds</sub> = 800V I <sub>d</sub> = 15A R <sub>g</sub> = 10Ω V <sub>gs</sub> = -3/6.5V		34		ns	
2	t <sub>r</sub>	Rise time				26		ns
3	t <sub>d</sub> (off)	Turn-off delay time				33		ns
4	t <sub>f</sub>	Fall time				20		ns

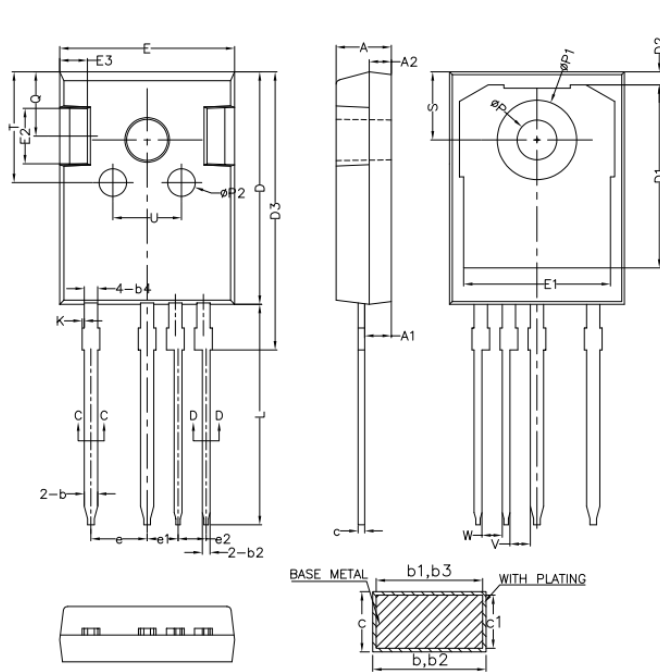
<sup>1</sup> A wider range of gate driving from -20V to 20V can be accepted, but recommended range is still 0V to +12V.

Wider range protects the gate from damage, but at some cost of power loss.

<sup>2</sup> BV<sub>dss</sub> refers to DC withstanding voltage. This product is recommended for DC bus voltage of 400V-900V.

Package Information

TO247-4



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
b	1.16	-	1.29
b1	1.15	1.20	1.25
b2	0.66	-	0.79
b3	0.65	0.70	0.75
b4	1.16	-	1.29
c	0.59	-	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
D3	24.97	25.12	25.27
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	4.98	5.08	5.18
e1	2.69	2.79	2.89
e2	2.44	2.54	2.64
K	0	-	0.20
L	19.80	19.92	20.10
P	3.50	3.60	3.70
P1	-	-	7.40
P2	2.40	2.50	2.60
Q	5.60	-	6.00
S	6.00	6.15	6.30
T	9.80	-	10.20
U	6.00	-	6.40
V	1.44	1.84	2.24
W	1.44	1.84	2.24

NOTES:  
1.ALL DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.  
2.EJECTION MARK DEPTH 0.10±0.15/0.08.

TOLL-3

