SuperMOS –TO-263 85V BV_{DSS}, 3.1mΩ $R_{DS(on)}$, N-channel MOSFET

1. Description

The IPB042N10N3G(ES) is N-Channel enhancement MOS Field Effect Transistor. Using advanced shielded gate trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product IPB042N10N3G(ES) is Pb-free.

2. Features

- 85V, $R_{DS(ON)}$=3.1mΩ(Typ.) @V_{GS}=10V
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per Reel	Flammability Rating	Reel Size
IPB042N10N3G(ES)	TO-263	GNR085R036/LOT	Halogen free	Tape & Reel	800 PCS	UL 94V-0	13 Inches

Table-1 Ordering information

5. Pin Configuration and Functions

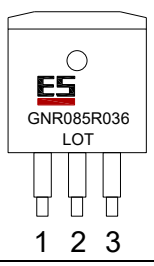
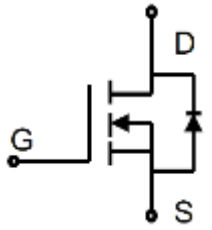
Pin	Function	Outline	Circuit Diagram
1	Gate	Note 1 	
3	Source		
2	Drain		

Table-2 Pin configuration

Note1:

This diagram is only an electrical schematic, and the actual pin size is based on POD.

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 ℃ ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	85	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	120	A
	T_C=100°C		100	
Maximum Power Dissipation	T_C=25°C	P_D	179	W
	T_C=100°C		71	
Pulsed Drain Current		I_{DM}	480	A
Operating Junction Temperature		T_J	150	°C
Lead Temperature		T_L	260	°C
Storage Temperature Range		T_{stg}	-55 to 150	°C

Thermal resistance ratings

Single Operation			
Parameter	Symbol	Typical	Unit
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	0.7	°C/W
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	65	°C/W

Electrical Characteristics

At TA = 25℃ unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	85			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=85V, V_{GS}=0V			1.0	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D=250uA	2.2		3.8	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=50A		3.1	3.6	mΩ
Forward transconductance	g_{fs}	V_{DS}=5V, I_D=50A		90		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS}=0V, f=250KHz, V_{DS}=42.5V		6862		pF
Output Capacitance	C_{OSS}			1002		
Reverse Transfer Capacitance	C_{RSS}			26		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=10V, V_{DS}=68V, I_D=50A		118		nC
Gate-to-Source Charge	Q_{GS}			33		
Gate-to-Drain Charge	Q_{GD}			35		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS}=10V, V_{DS}=42.5V, I_D=50A		45		ns
Rise Time	t_r			114		
Turn-Off Delay Time	$t_{d(OFF)}$			340		
Fall Time	t_f			61		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS}=0V, I_S=50A	0.45		1.5	V

7. Typical Characteristic

Figure 1. Typ. Output Characteristics

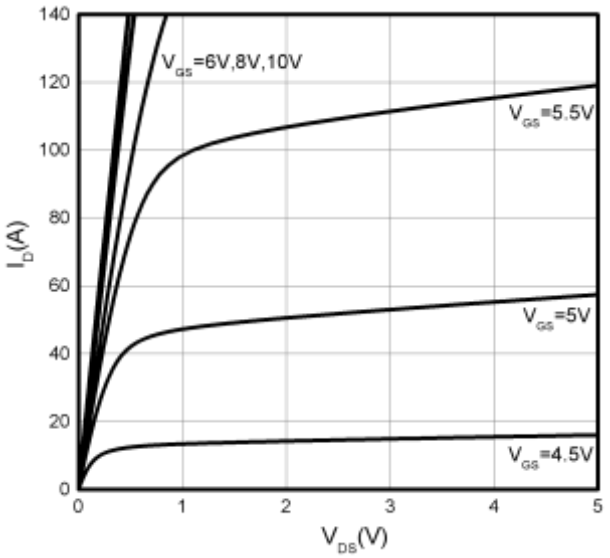


Figure 2. Transfer Characteristics

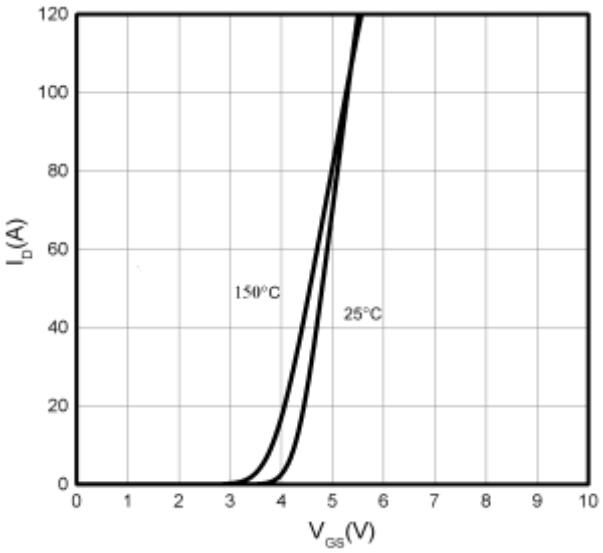


Figure 3. On-Resistance vs. Drain Current

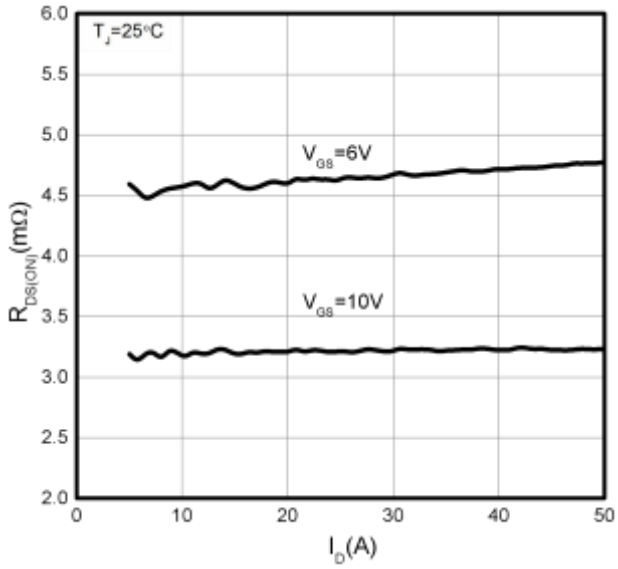


Figure 4. On-Resistance vs. Temperature

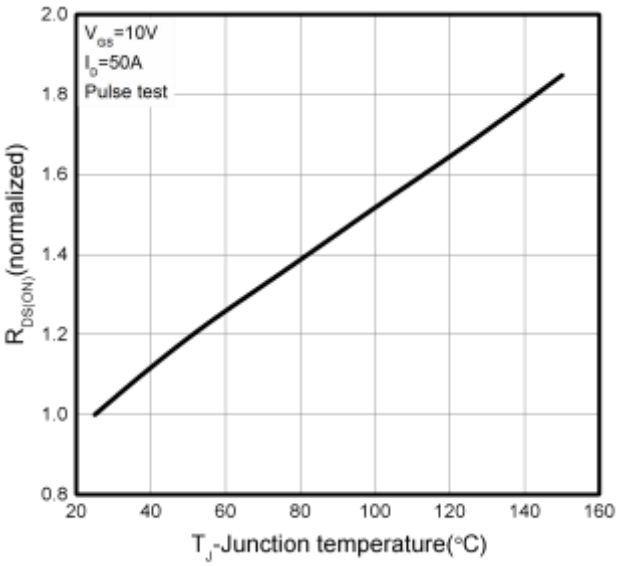


Figure 5. Rds(on) vs. Gate Voltage

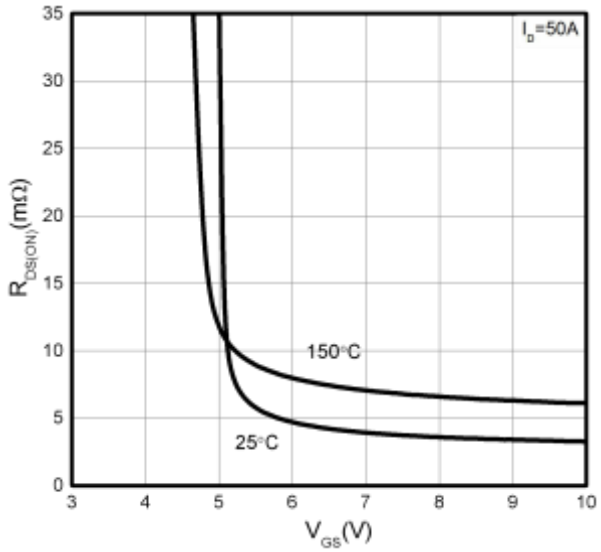


Figure 6. Body-Diode Characteristics

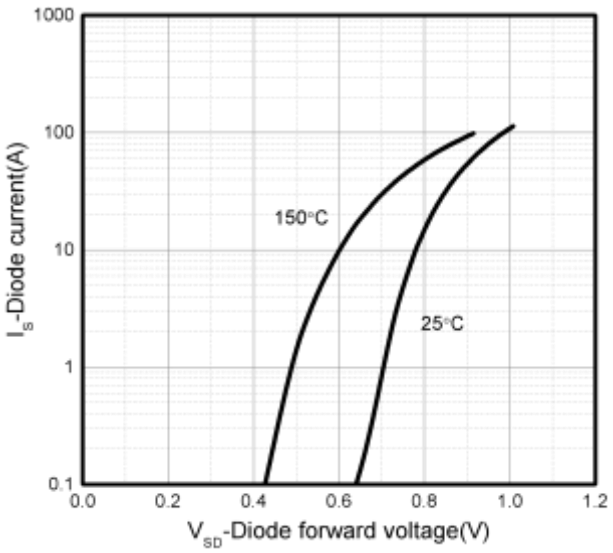
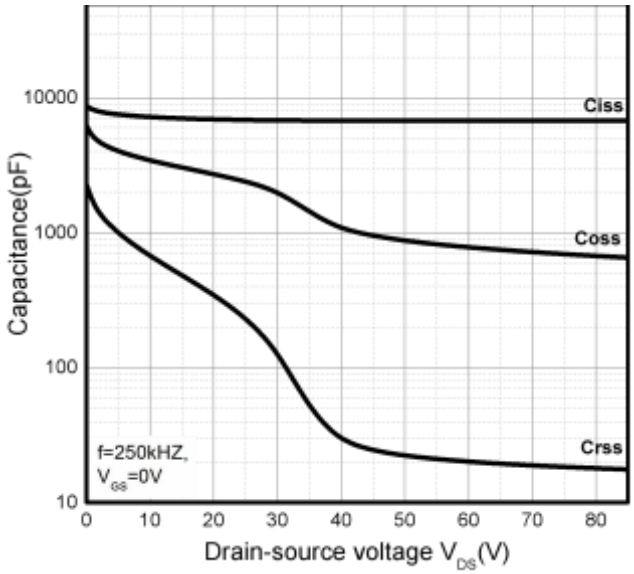
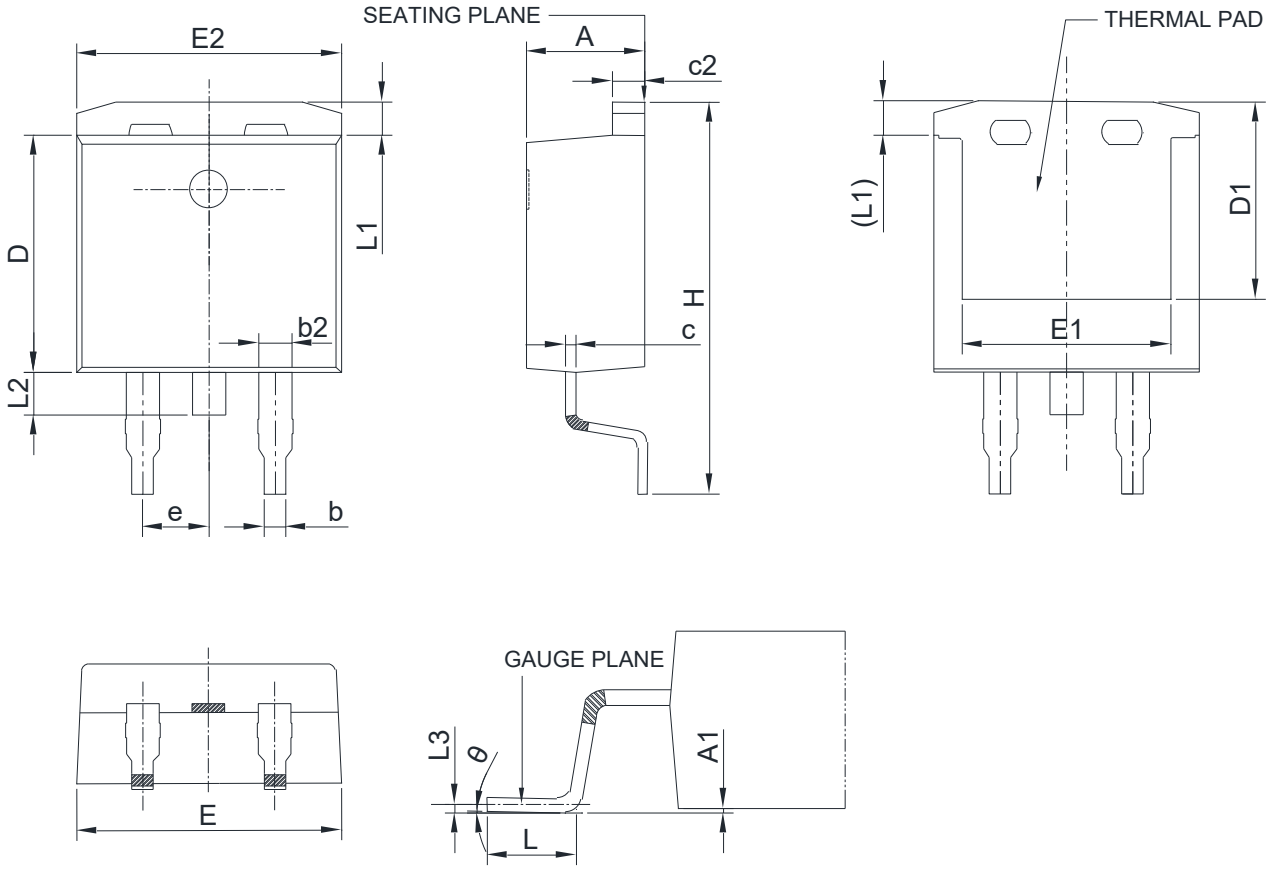


Figure 7. Capacitance Characteristics



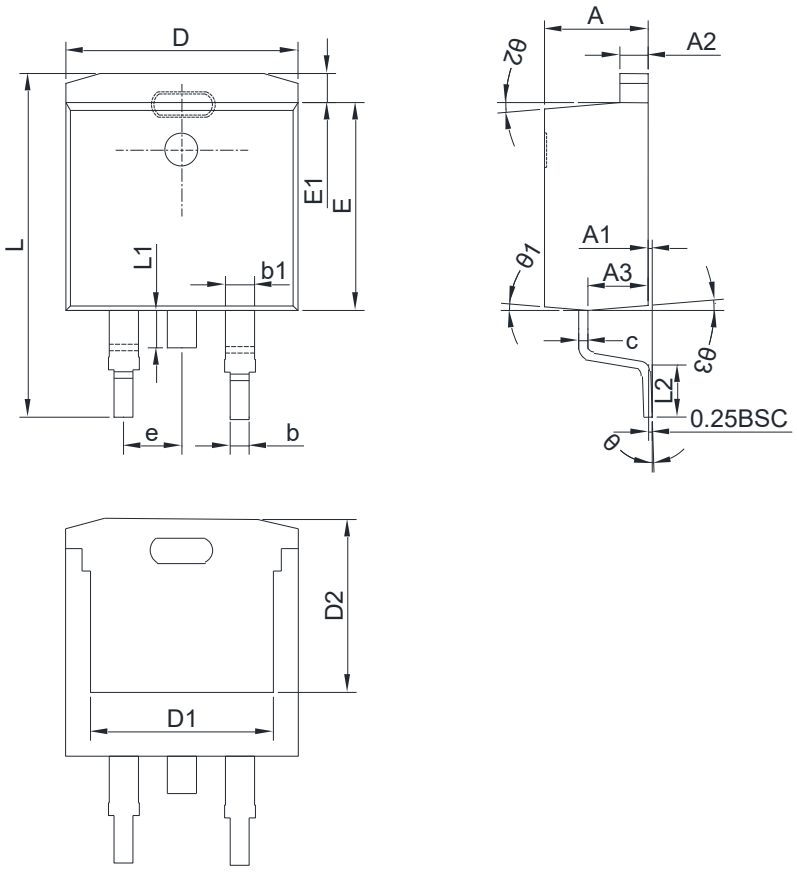
8. Dimension (TO-263)

POD A(Q)



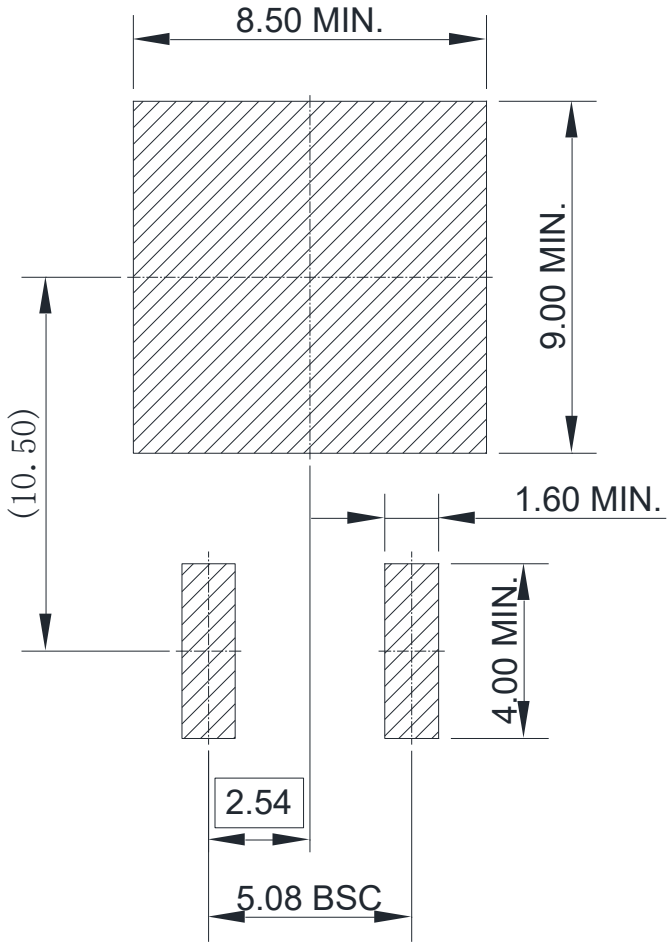
COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER							
SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.47	4.57	4.67	E	9.70	9.92	10.30
A1	0.00	0.10	0.25	E1	7.98	8.18	8.48
b	0.71	0.81	0.91	E2	9.85	10.00	10.15
b2	1.17	1.27	1.37	L	2.25	2.54	2.80
c	0.360	0.381	0.500	L1	1.10	1.35	1.60
c2	1.17	1.27	1.37	L2			1.78
D	8.70	9.00	9.30	L3	0.254BSC		
D1	7.10	7.44	7.80	e	2.44	2.54	2.64
H	15.00	15.28	15.60	θ	0°		8°

POD B(X)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER							
SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.37	4.57	4.77	E	8.50	8.70	8.90
A1	0.00		0.25	E1	1.07	1.27	1.47
A2	1.22	1.27	1.42	e	2.540TYP		
A3	2.49	2.69	2.89	L	14.70	15.10	15.50
b	0.70	0.81	0.96	L1	1.40	1.55	1.70
b1	1.17	1.27	1.47	L2	2.00	2.30	2.60
c	0.30	0.38	0.53	θ	0°		9°
D	9.86	10.16	10.36	θ1	7° TYP		
D1	8.400REF			θ2	7° TYP		
D2	7.073REF			θ3	3° TYP		

9. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

DISCLAIMER

ELECSUPER PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with ElecSuper products. You are solely responsible for
(1) selecting the appropriate ElecSuper products for your application;
(2) designing, validating and testing your application;
(3) ensuring your application meets applicable standards, and any other safety, security, or other requirements.
These resources are subject to change without notice. ElecSuper grants you permission to use these resources only for development of an application that uses the ElecSuper products described in the resource. Other reproduction and display of these resources are prohibited. No license is granted to any other ElecSuper intellectual property right or to any third party intellectual property right. ElecSuper disclaims responsibility for, and you will fully indemnify ElecSuper and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources. ElecSuper’s products are provided subject to ElecSuper’s Terms of Sale or other applicable terms available either on www.elecsuper.com or provided in conjunction with such ElecSuper products. ElecSuper’s provision of these resources does not expand or otherwise alter ElecSuper’s applicable warranties or warranty disclaimers for ElecSuper products.