EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

Domestic Part Number	IPB042N10N3G
Overseas Part Number	IPB042N10N3G
Equivalent Part Number	IPB042N10N3G

100V N-Channel Enhancement Mode MOSFET

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Product Summary

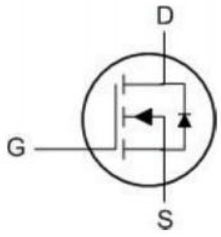
V_{DS} =100V I_D =125A

$R_{DS(ON)}$ = 3.5mΩ @ V_{GS} =10V

Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

TO-263-2L Pin Configuration



Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DS}	100	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	T_C = 25°C	I_D	125	A
	T_C = 100°C		81	
Pulsed Drain Current (2)		I_{DM}	512	A
Avalanche Energy (3)		E_{AS}	486	mJ
Power Dissipation (4)	T_C = 25°C	P_D	178	W
	T_C = 100°C		71	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

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Electrical Characteristics (@ T_J = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V			1.0	μA
		T_J = 55°C			5.0	
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	3.0	4.0	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		3.5	4.8	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 20A		35		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V		0.66	1.0	V
Diode Continuous Current	I_S	T_C = 25°C			120	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		4102		pF
Output Capacitance	C_{oss}			592		pF
Reverse Transfer Capacitance	C_{rss}			19.8		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		1.6		Ω
SWITCHING PARAMETERS (5)						
Total Gate Charge (@ V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V, V_{DS} = 50V, I_D = 20A		69		nC
Total Gate Charge (@ V_{GS} = 6.0V)	Q_g			44		nC
Gate Source Charge	Q_{gs}			24		nC
Gate Drain Charge	Q_{gd}			18.5		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 50V, R_L = 2.5Ω, R_{GEN} = 3Ω		18.0		ns
Turn-On Rise Time	t_r			23		ns
Turn-Off DelayTime	$t_{D(off)}$			37		ns
Turn-Off Fall Time	t_f			15.7		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = 20A, dI_F/dt = 100A/μs		64		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 20A, dI_F/dt = 100A/μs		126		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	46	56	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.70	0.80	°C/W

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J_Max} = 150°C.
3. E_{AS} of 486 mJ is based on starting T_J = 25°C, L = 3.0mH, I_{AS} = 18A, V_{GS} = 10V, V_{DD} = 50V; 100% test at L = 0.1mH, I_{AS} = 67A.
4. The power dissipation P_D is based on T_{J_Max} = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

100V N-Channel Enhancement Mode MOSFET

Typical Electrical & Thermal Characteristics

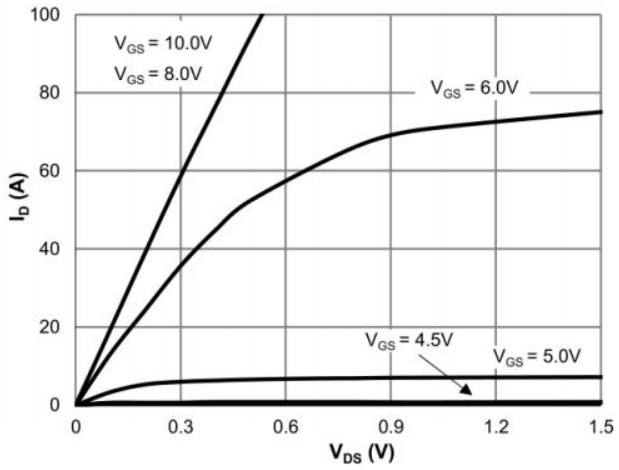

Figure 1: Saturation Characteristics

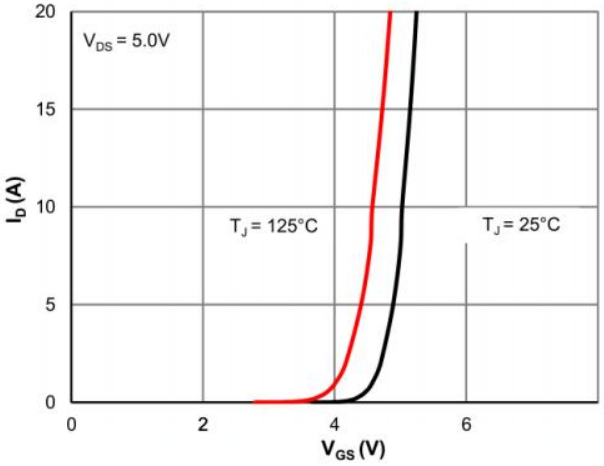

Figure 2: Transfer Characteristics

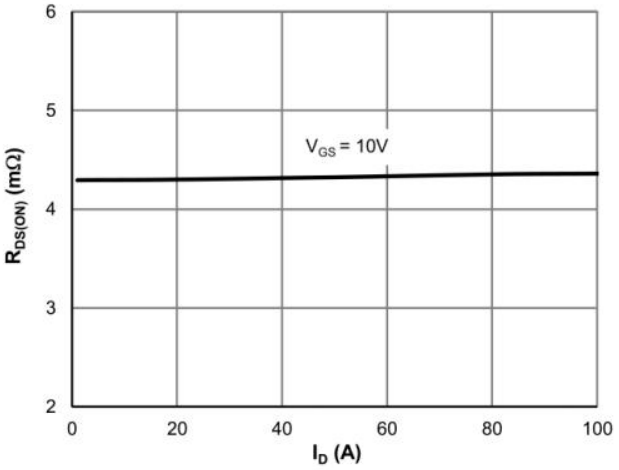

Figure 3: $R_{DS(ON)}$ vs. Drain Current

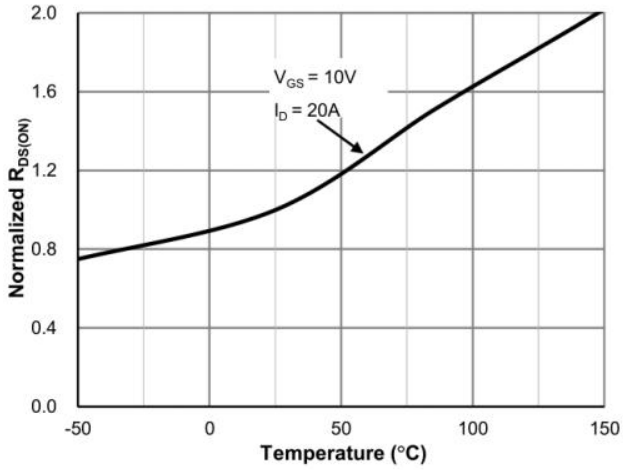

Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

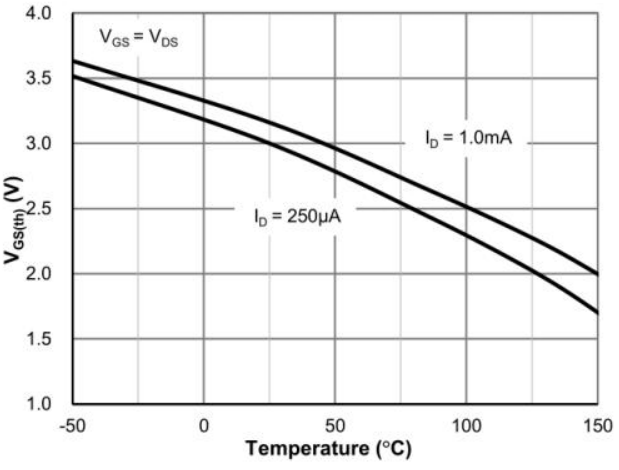

Figure 5: $V_{GS(th)}$ vs. Junction Temperature

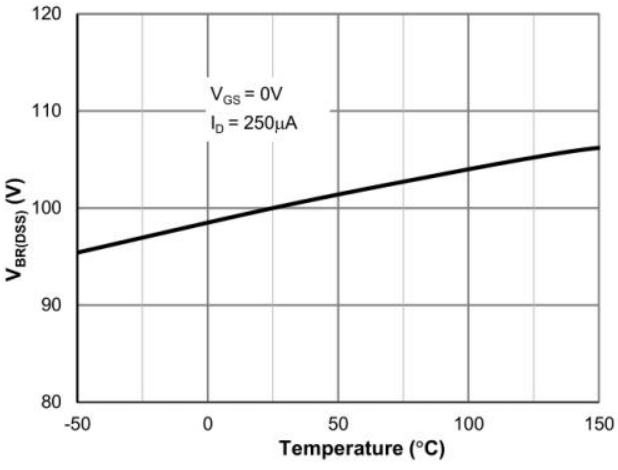

Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

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Typical Electrical & Thermal Characteristics

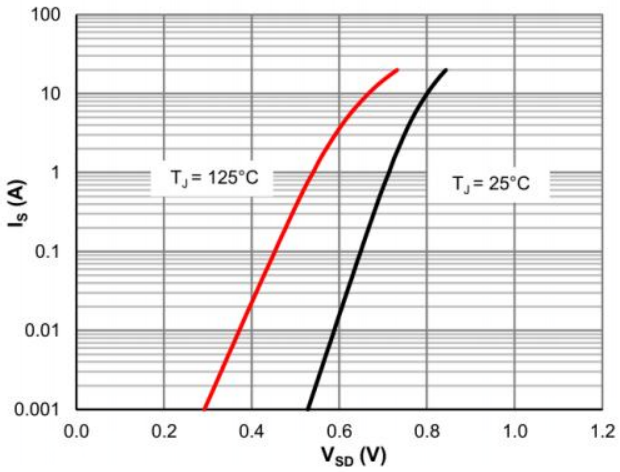


Figure 7: Body-Diode Characteristics

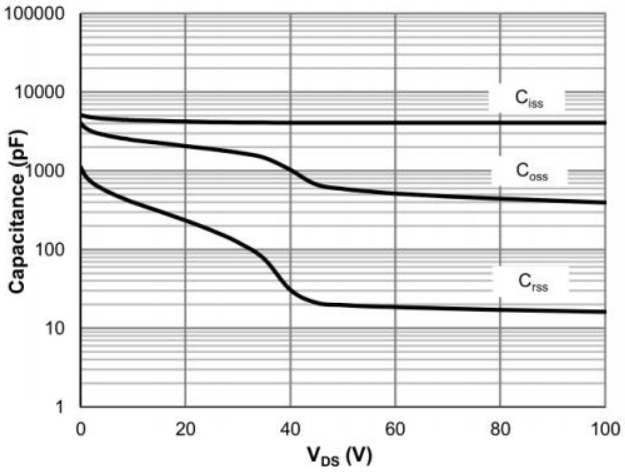


Figure 8: Capacitance Characteristics

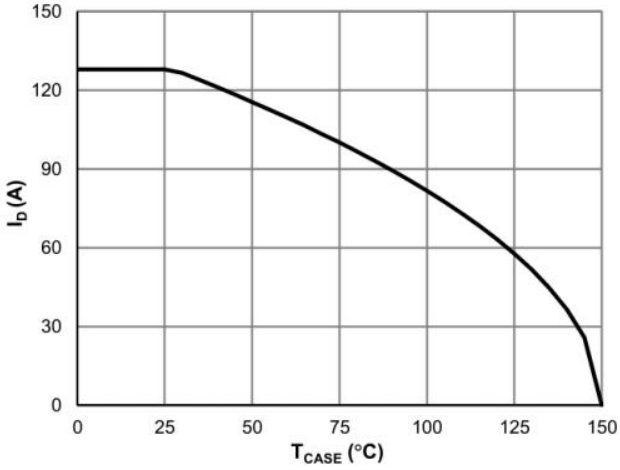


Figure 9: Current De-rating

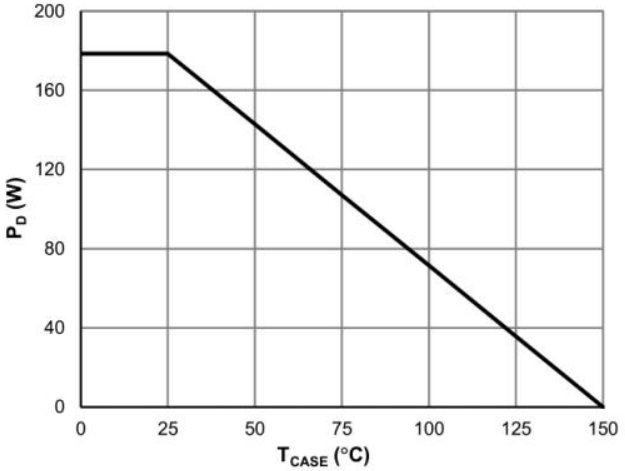


Figure 10: Power De-rating

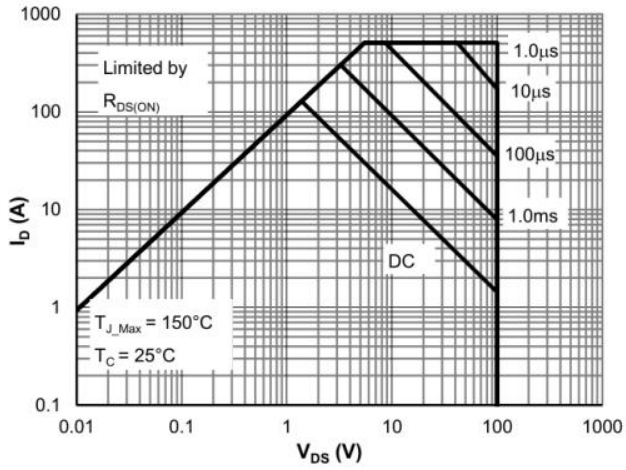


Figure 11: Maximum Safe Operating Area

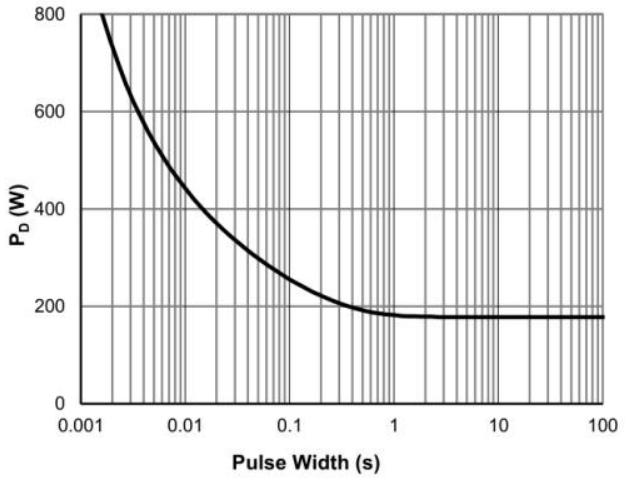


Figure 12: Single Pulse Power Rating, Junction-to-Case

Typical Electrical & Thermal Characteristics

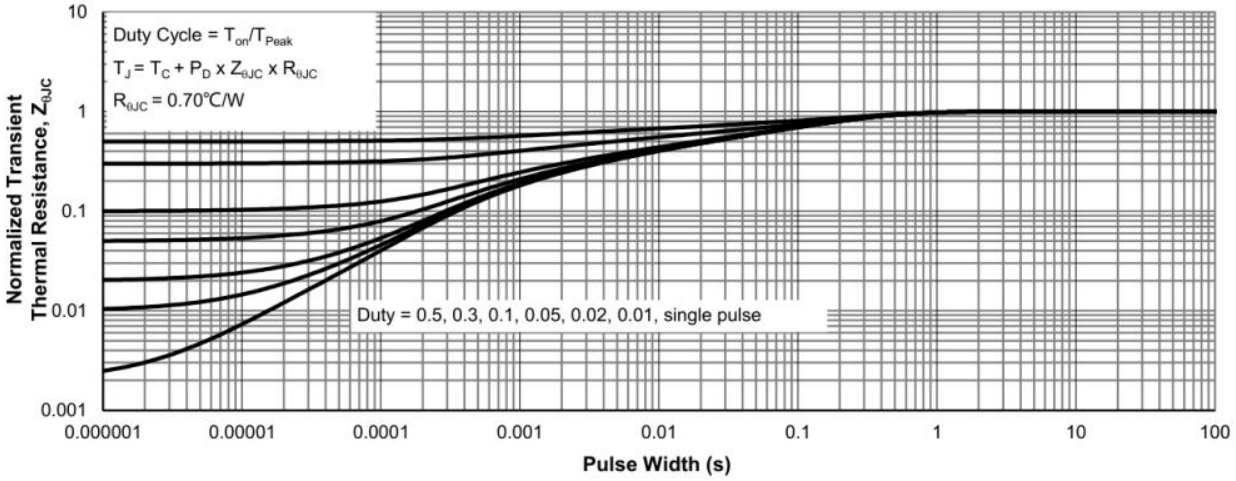
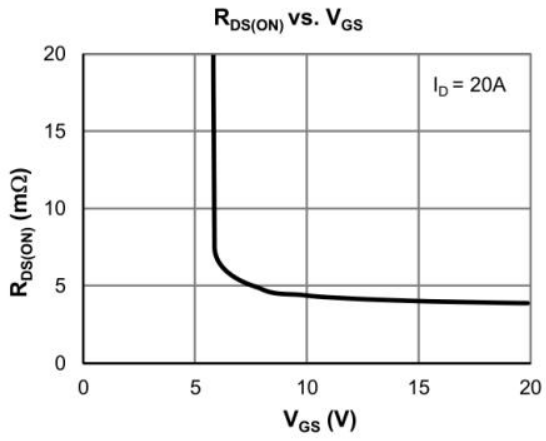
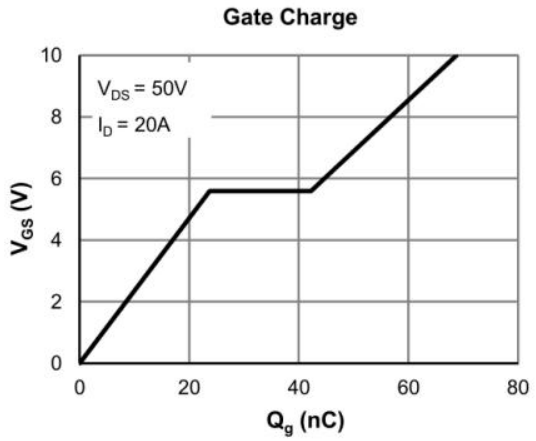


Figure 13: Normalized Maximum Transient Thermal Impedance





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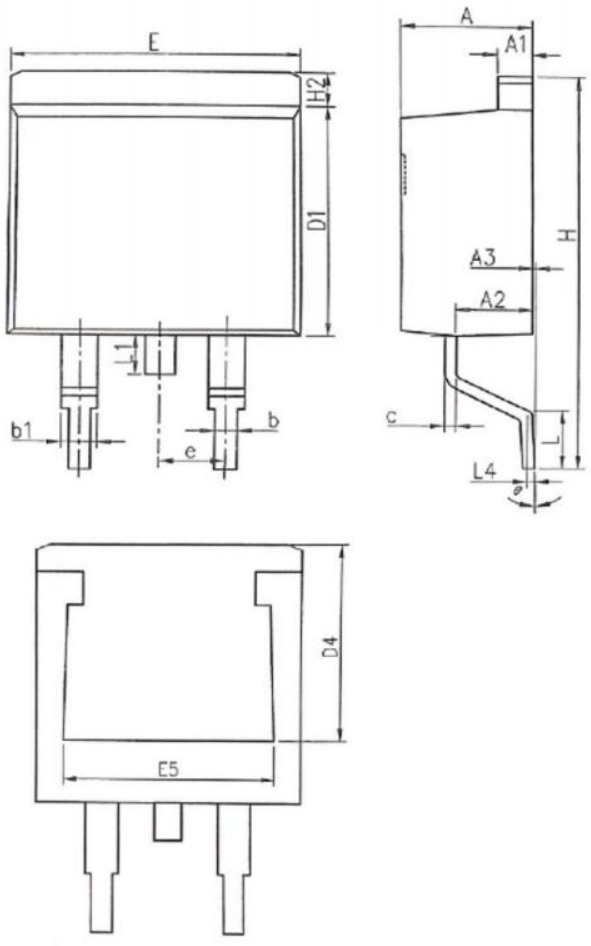
Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.20	2.90
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.28	0.60
D1	8.45	9.30
D4	6.60	-
E	9.80	10.40
E5	7.06	-
e	2.54BSC	
H	14.70	15.70
H2	1.07	1.47
L	2.00	2.80
L1	-	1.75
L4	0.254BSC	
θ	0°	9°

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