

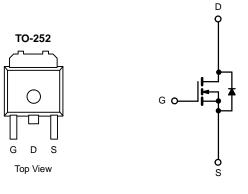
# IPD33CN10N G-VB Datasheet N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY					
V <sub>(BR)DSS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)			
100	0.030 at V <sub>GS</sub> = 10 V	40			
100	0.035 at V <sub>GS</sub> = 4.5 V	37			

### FEATURES

- Trench Power MOSFETS
- 175 °C Junction Temperature
- Low Thermal Resistance Package





N-Channel MOSFET

Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V <sub>DS</sub>	100	V	
Gate-Source Voltage		V <sub>GS</sub>	± 20	V	
Continuous Drain Current ( $T_1 = 175 \text{ °C}$ )	T <sub>C</sub> = 25 °C	L	40		
Continuous Drain Current (1) = 175 C)	T <sub>C</sub> = 125 °C	I <sub>D</sub>	23	_	
Pulsed Drain Current		I <sub>DM</sub>	120	A	
Avalanche Current		I <sub>AR</sub>	35		
Repetitive Avalanche Energy <sup>a</sup>	L = 0.1 mH	E <sub>AR</sub>	61	mJ	
	T <sub>C</sub> = 25 °C	P	107 <sup>b</sup>	w	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C <sup>c</sup>	– P <sub>D</sub> –	3.75	7 ~ ~	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stq</sub>	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Limit	Unit		
Junction-to-Ambient	(PCB Mount) <sup>c</sup>	R <sub>thJA</sub>	40	°C/W		
Junction-to-Case (Drain)		R <sub>thJC</sub>	1.4	0/10		

Notes:

a. Duty cycle  $\leq$  1 %.

b. See SOA curve for voltage derating.

c. When Mounted on 1" square PCB (FR-4 material).

\* Pb containing terminations are not RoHS compliant, exemptions may apply.

<b>SPECIFICATIONS</b> $T_J = 25^{\circ}$	C, unless of	therwise noted					
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static		-					
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	$V_{SS} = 0 V, I_D = 250 \mu A$	100			V	
Gate-Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$	1		3		
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA	
		$V_{DS} = 100 \ W_{GS} = 0 \ V$			1		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{DS}$ = 100 V, $V_{GS}$ = 0 V, $T_{J}$ = 125 °C			50 µA		
		$V_{DS}$ = 100 V, $V_{GS}$ = 0 V, $T_{J}$ = 175 °C			250	1	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5 V$ , $V_{GS} = 10 V$	75			А	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A		0.030		Ω	
Drain Course On Chata Desistence	r	$V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 3 \text{ A}$		0.035			
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5 A, T <sub>J</sub> = 125 °C		0.053			
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3 A, T <sub>J</sub> = 175 °C		0.067			
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 15 A	10			S	
Dynamic <sup>b</sup>	•			•			
Input Capacitance	C <sub>iss</sub>			2600		pF	
Output Capacitance	C <sub>oss</sub>	$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz		290			
Reverse Transfer Capacitance	C <sub>rss</sub>			120			
Total Gate Charge <sup>c</sup>	Qg			35	60	nC	
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{DS} = 50 \text{ V}, \text{ V}_{GS} = 10 \text{ V}, \text{ I}_{D} = 40 \text{ A}$		11			
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			9			
Gate Resistance	R <sub>G</sub>			1.7		Ω	
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			11	20		
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD}$ = 50 V, $R_L$ = 1.25 $\Omega$		12	20	ns	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	${\sf I}_{\sf D}\cong$ 40 A, ${\sf V}_{\sf GEN}$ = 10 V, ${\sf R}_{\sf G}$ = 2.5 $\Omega$		30	45		
Fall Time <sup>c</sup>	t <sub>f</sub>			12	20		
Source-Drain Diode Ratings and Cha	aracteristics 7	r <sub>c</sub> = 25 °C <sup>b</sup>					
Continuous Current	ا <sub>S</sub>				40	A	
Pulsed Current	I <sub>SM</sub>				120		
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 30 A, V <sub>GS</sub> = 0 V		1.0	1.5	V	
Reverse Recovery Time	t <sub>rr</sub>			60	100	ns	
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>	I <sub>F</sub> = 30 A, di/dt = 100 A/μs		5	8	А	
Reverse Recovery Charge	Q <sub>rr</sub>			0.15	0.4	μC	

Notes:

a. Pulse test; pulse width  $\leq$  300  $\mu s,$  duty cycle  $\leq$  2 %

b. Guaranteed by design, not subject to production testing.

c. Independent of operating temperature.

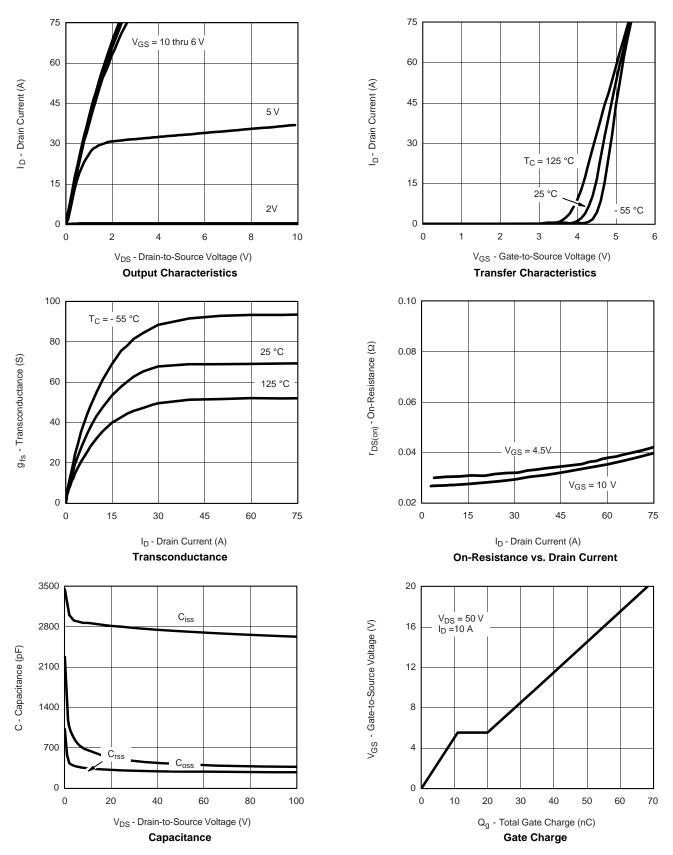
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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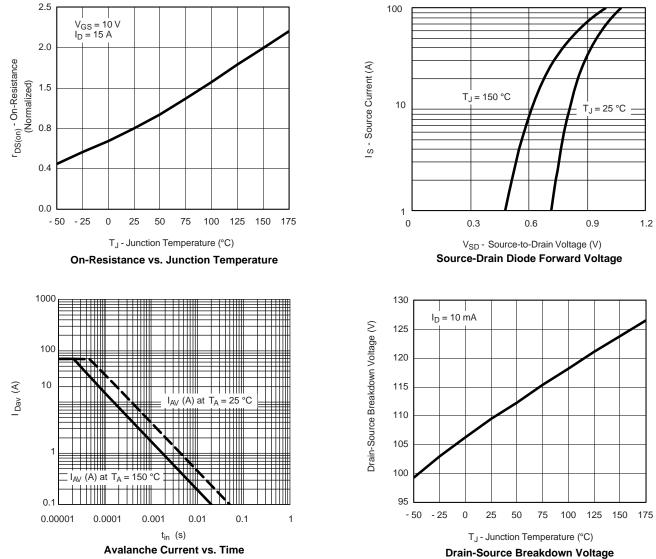


### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





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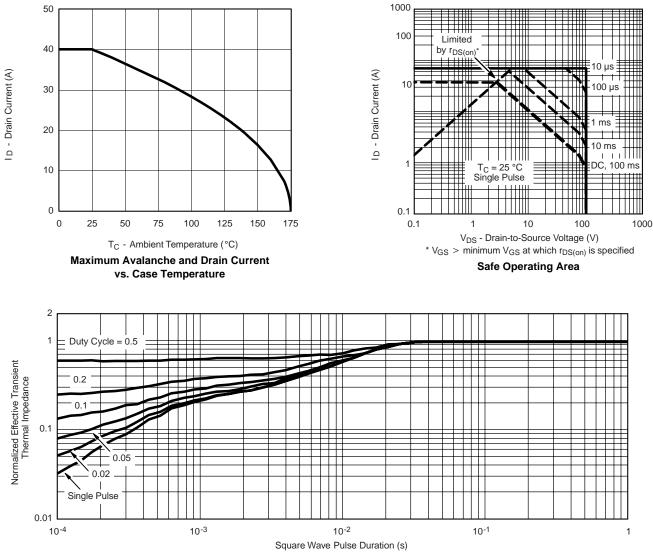


vs. Junction Temperature

### IPD33CN10N G-VB



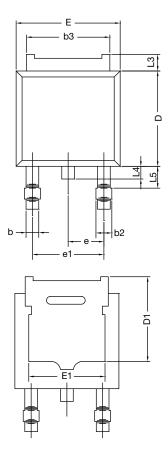
### **THERMAL RATINGS**



Normalized Thermal Transient Impedance, Junction-to-Case



# **TO-252AA CASE OUTLINE**





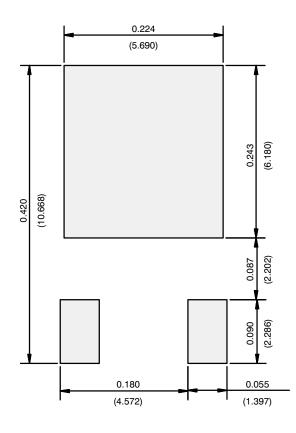
	MILLIN	IETERS	INC	INCHES		
DIM.	MIN.	MAX.	MIN.	MAX.		
А	2.18	2.38	0.086	0.094		
A1	-	0.127	-	0.005		
b	0.64	0.88	0.025	0.035		
b2	0.76	1.14	0.030	0.045		
b3	4.95	5.46	0.195	0.215		
С	0.46	0.61	0.018	0.024		
C2	0.46	0.89	0.018	0.035		
D	5.97	6.22	0.235	0.245		
D1	5.21	-	0.205	-		
E	6.35	6.73	0.250	0.265		
E1	4.32	-	0.170	-		
Н	9.40	10.41	0.370	0.410		
е	2.28	2.28 BSC		0.090 BSC		
e1	4.56 BSC		0.180 BSC			
L	1.40	1.78	0.055	0.070		
L3	0.89	1.27	0.035	0.050		
L4	-	1.02	-	0.040		
L5	1.14	1.52	0.045	0.060		
ECN: X12-0247-Rev. M, 24-Dec-12 DWG: 5347						

#### Note

• Dimension L3 is for reference only.



### **RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)**



Recommended Minimum Pads Dimensions in Inches/(mm)



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