

N-Channel Enhancement Mode Power MOSFET

Features:

- ◆ High Density Cell Design
- ◆ Low On-Resistance
- ◆ High Speed Switching
- ◆ Low Gate Threshold Voltage
- ◆ Surface-Mounting TO-252 Package

BV_{dss}	30V
I_D	60A
R_{DS(ON)}	9mΩ

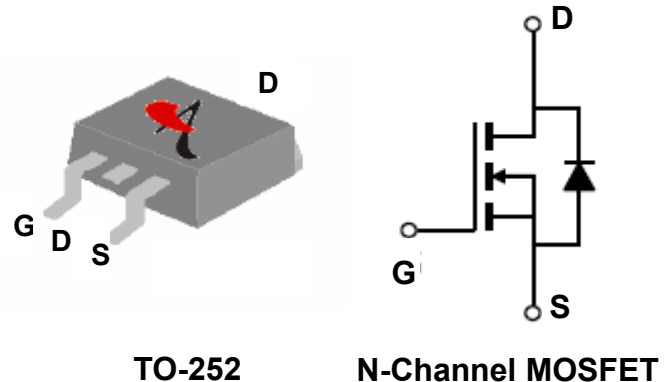
General Description:

The CAT4102N uses advanced trench technology to provide excellent characteristics. The TO-252 package is preferred for all commercial- industrial surface mount applications and ideally suited for low voltage applications such as DC/DC converters.

Application:

Specifically Designed and Optimized for High Efficiency DC/DC Converters.

Pin Configuration:



Absolute Maximum Ratings (T_c = 25°C unless otherwise specified):

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @ T _C =25°C	Continuous Drain Current, V _{GS} @ 10V	60	A
I _D @ T _C =100°C	Continuous Drain Current, V _{GS} @ 10V	43	A
I _{DM}	Pulsed Drain Current ¹	195	A
P _D @ T _C =25°C	Total Power Dissipation	53	W
	Linear Derating Factor	0.36	W/°C
T _J , T _{STG}	Junction and Storage Temperature Range	-55 to 155	°C

Thermal Characteristics:

Symbol	Parameter	Value	Units
R _{θJC}	Thermal Resistance Junction-case Max.	2.8	°C/W
R _{θJA}	Thermal Resistance Junction-ambient Max.	110	°C/W

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Electrical Characteristics ($T_j = 25^\circ\text{C}$ unless otherwise specified):

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 30V, V_{GS} = 0V, T_j = 25^\circ\text{C}$	-	-	1	μA
		$V_{DS} = 24V, V_{GS} = 0V, T_j = 175^\circ\text{C}$	-	-	250	μA
I_{GSS}	Gate-Source Leakage	$V_{GS} = \pm 20V$	-	-	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	-	3	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS} = 10V, I_D = 33A$	-	-	9	m Ω
		$V_{GS} = 4.5V, I_D = 20A$	-	-	18	m Ω
g_{FS}	Forward Transconductance ²	$V_{DS} = 10V, I_D = 33A$	-	35	-	S
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS} = 0V$	-	1410	-	pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$	-	233	-	pF
C_{rss}	Reverse Transfer Capacitance	$f = 1.0\text{MHz}$	-	162	-	pF
SWITCHING PARAMETERS						
Q_g	Total Gate Charge ²	$I_D = 20A$	-	14.7	-	nC
Q_{gs}	Gate-Source Charge	$V_{DS} = 15V$	-	3.2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS} = 4.5V$	-	7.2	-	nC
$t_{D(on)}$	Turn-on Delay Time ²	$V_{DS} = 15V$	-	8.2	-	ns
t_r	Turn-on Rise Time	$I_D = 33A$	-	105	-	ns
$t_{D(off)}$	Turn-off Delay Time	$R_G = 3.3\Omega, V_{GS} = 10V$	-	21.4	-	ns
t_f	Turn-off Fall Time	$R_D = 0.45\Omega$	-	8.5	-	ns
SOURCE-DRAIN DIODE PARAMETERS						
V_{SD}	Forward On Voltage ²	$I_S = 2.3A, V_{GS} = 0V$	-	-	1.0	V
I_S	Body Diode Continuous Current	$V_D = V_G = 0V, V_S = 1.3V$	-	-	60	A
t_{rr}	Body Diode Reverse Recovery Time	$I_S = 30A, V_{GS} = 0V$	-	28	-	nS
Q_{rr}	Body Diode Reverse Recovery Charge	$dI/dt = 100A/\mu s$	-	10	-	nC

Notes:

1. Pulse width limited by safe operating area.
2. Pulse width $< 300\mu s$, duty cycle $< 2\%$.

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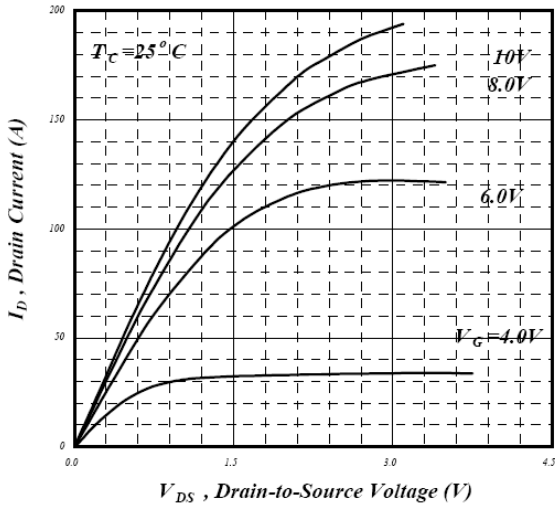


Fig1. Typical Output Characteristics

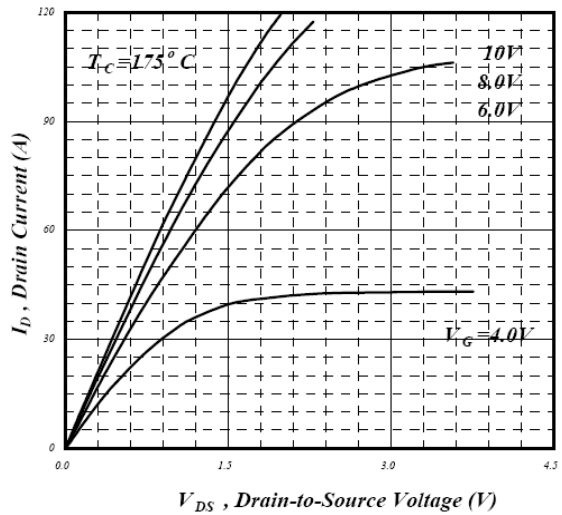


Fig2. Typical Output Characteristics

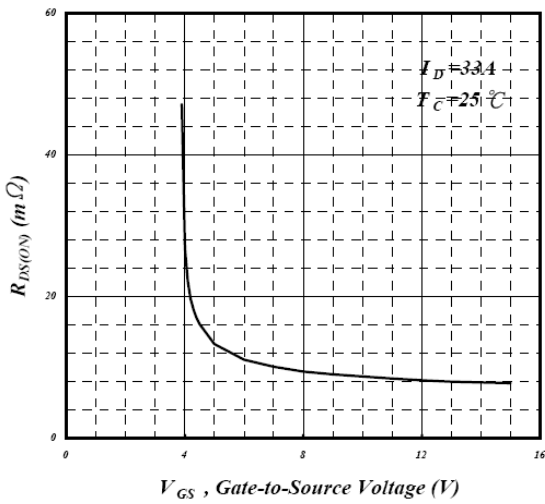


Fig 3. On-Resistance v.s. Gate Voltage

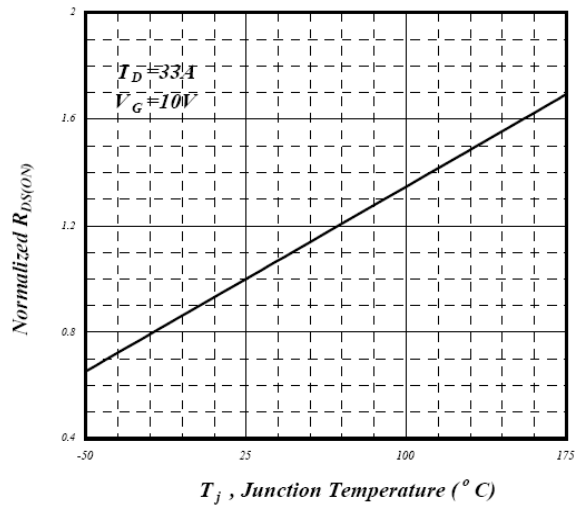


Fig 4. Normalized On-Resistance v.s. Junction Temperature

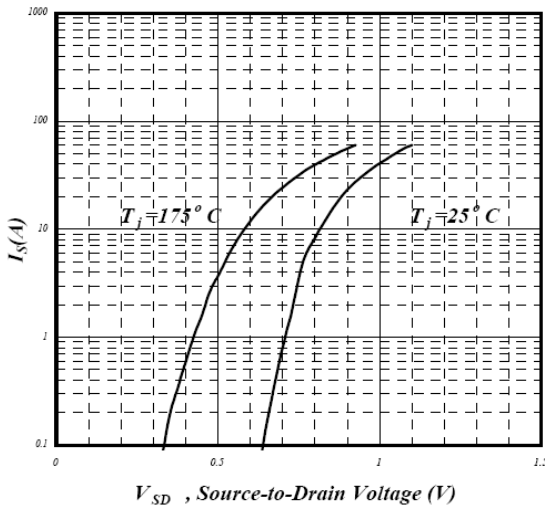


Fig 5. Forward Characteristics of Reverse Diode

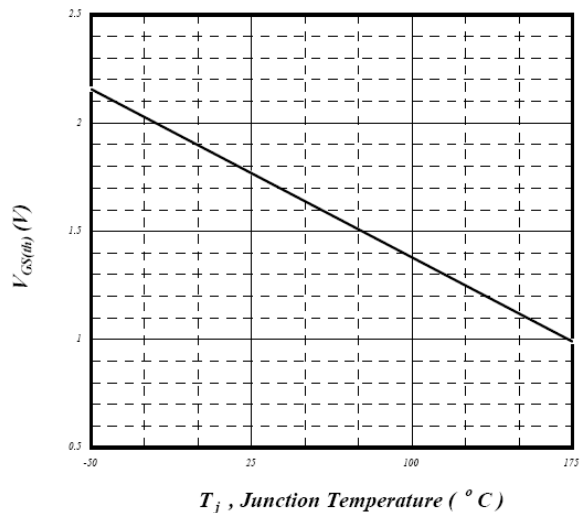


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

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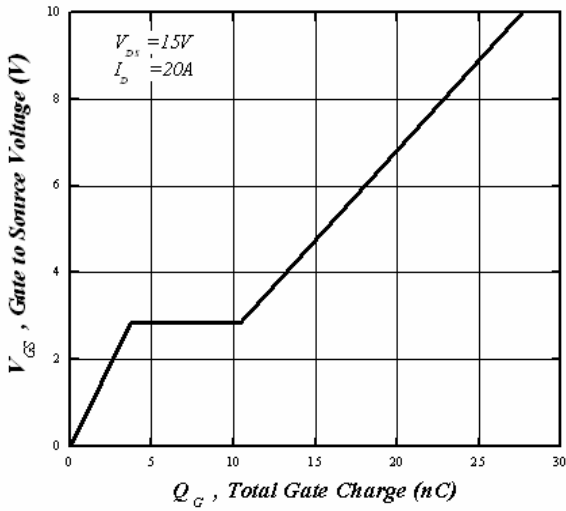


Fig 7. Gate Charge Characteristics

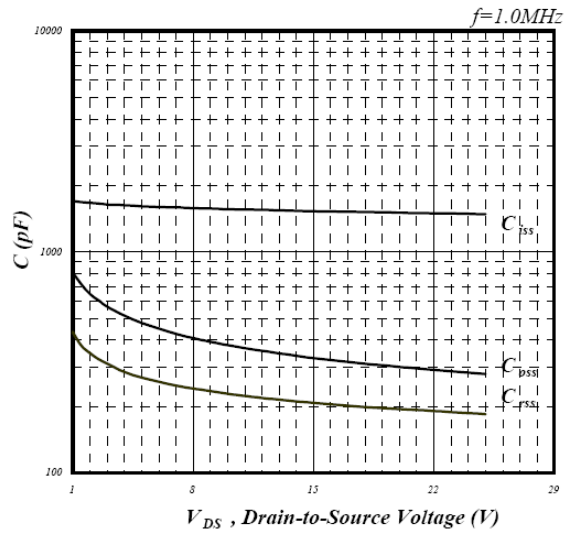


Fig 8. Typical Capacitance Characteristics

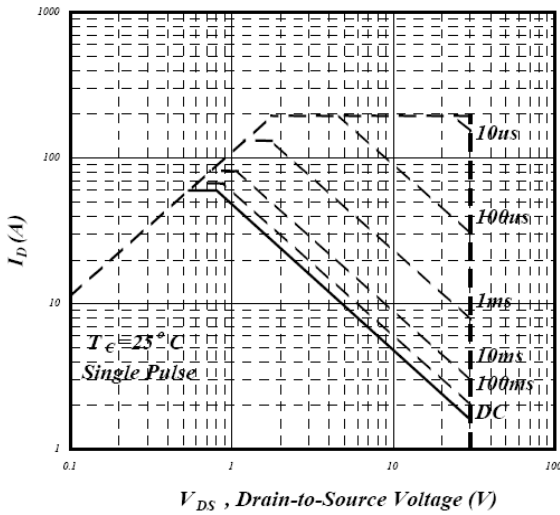


Fig 9. Maximum Safe Operating Area

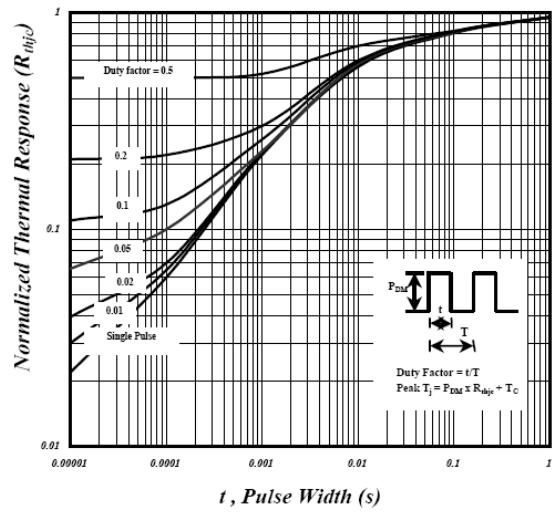
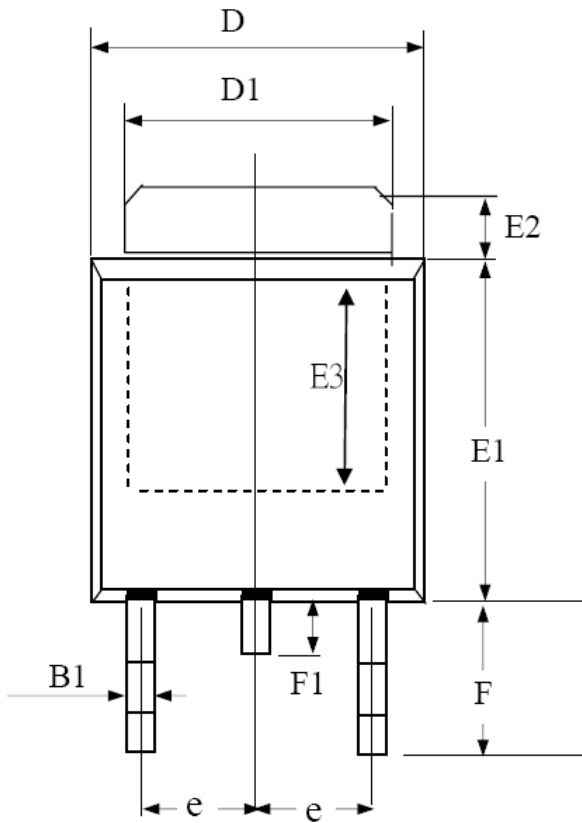


Fig 10. Effective Transient Thermal Impedance

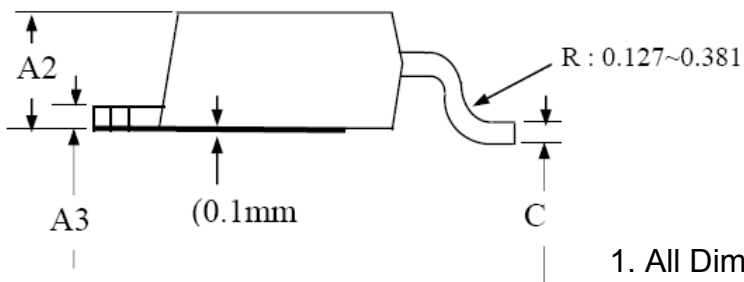
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MECHINICAL DIMENSION:

TO-252 (D-PAK) Package Outline



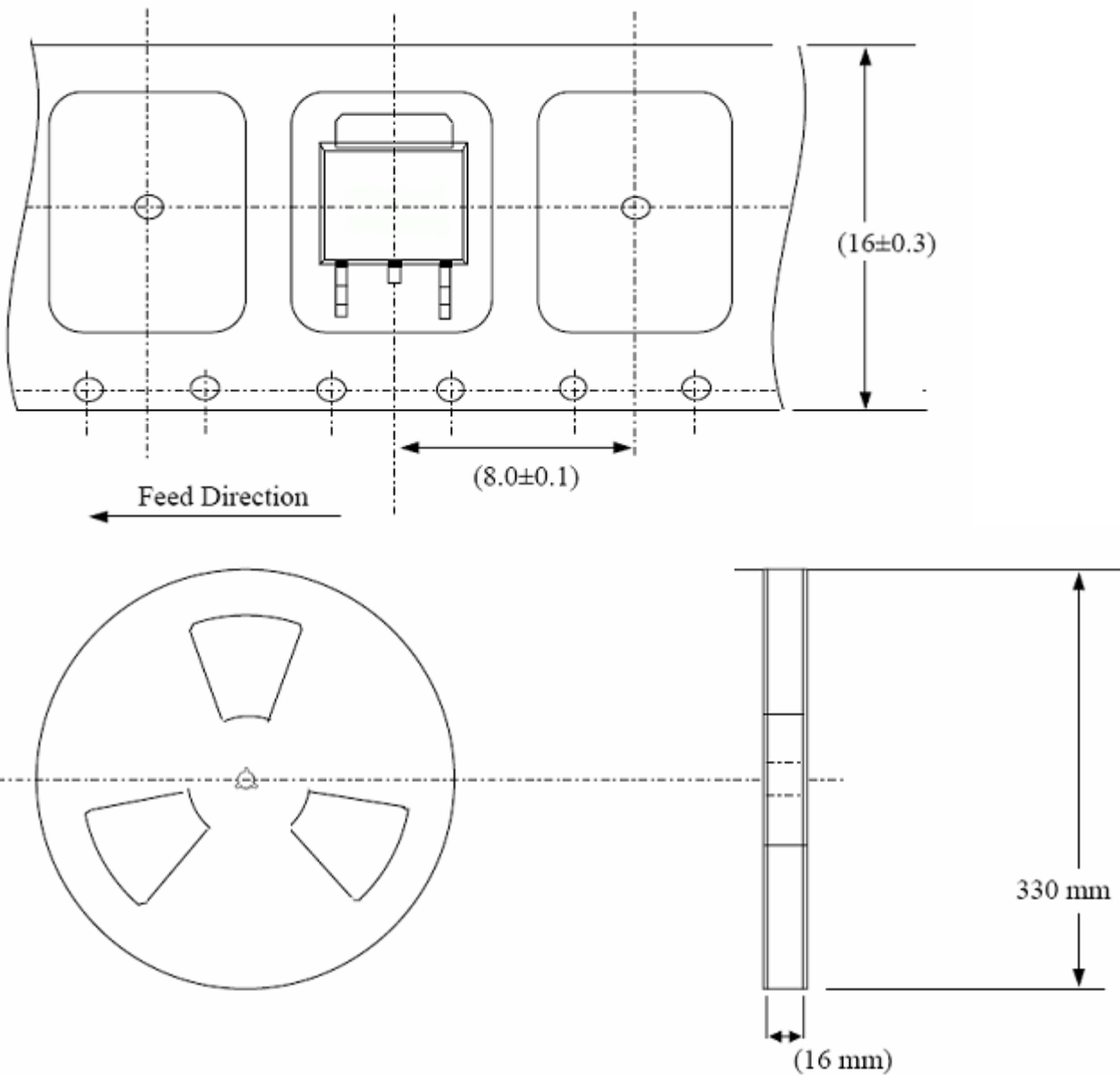
SYMBOLS	Millimeters		
	MIN	NOM	MAX
A2	1.80	2.30	2.80
A3	0.40	0.50	0.60
B1	0.40	0.70	1.00
D	6.00	6.50	7.00
D1	4.80	5.35	5.90
F	2.20	2.63	3.05
F1	0.50	0.85	1.20
E1	5.10	5.70	6.30
E2	0.50	1.10	1.70
E3	3.50	4.00	4.50
e	--	2.30	--
C	0.35	0.50	0.65



1. All Dimensions Are in Millimeters.
2. Dimension Does Not Include Mold Protrusions.

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TO-252 Tape & Reel Information



1. All Dimensions Are Shown in Millimeters.
2. Packing : 3000 pcs / reel

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