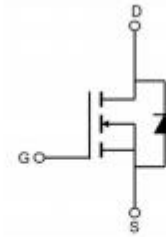


## Features

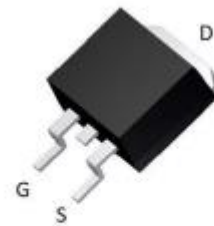
- 100V,160A  
 $R_{DS(on)} < 3.3m\ \Omega @ V_{GS}=10V$  TYP:3.0m  $\Omega$
- Surface-mounted package
- Advanced trench cell design



Schematic Diagram

## Applications

- Switch Mode Power Supply
- Uninterruptible Power Supply
- High-Frequency Switching and Synchronous Rectification



TO-263 top view

## Package Marking and Ordering

## Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G033N10D	APG033N10D	TO-263	-	-	800

## ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_c=25^\circ\text{C}$ ) <sup>(3)</sup>	$I_D$	160	A
Pulsed Drain Current <sup>(1,3)</sup>	$I_{DM}$	640	A
Single Pulsed Avalanche Energy ( $T_c=25^\circ\text{C}, L=0.1\text{mH}$ )	$E_{AS}$	240	mJ
Drain Power Dissipation	$P_D$	245	W
Thermal Resistance from Junction to Case <sup>(2)</sup>	$R_{\theta JC}$	0.61	$^\circ\text{C/W}$
Thermal Resistance- Junction to Ambient <sup>(2)</sup>	$R_{\theta JA}$	60	$^\circ\text{C/W}$
Junction Temperature	$T_J$	-55~ +175	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +175	$^\circ\text{C}$

Notes:

- 1.Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$     2. Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10$  sec    3.Limited by bonding wire

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	100	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	-	4.0	V
Drain-source on-resistance <sup>(a)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =80A	-	3.0	3.3	mΩ
Drain-source on-resistance <sup>(a)</sup>	R <sub>G</sub>	f=1.0 MHz, open drain	-	1.9	-	Ω
<b>Dynamic characteristics<sup>(b)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f =1.0MHz	-	4950	-	pF
Output Capacitance	C <sub>oss</sub>		-	1692	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	43	-	
<b>Switching characteristics<sup>(b)</sup></b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, I <sub>D</sub> =80A, R <sub>G</sub> =2.4Ω, V <sub>GS</sub> =10V	-	94	-	nS
Turn-on rise time	t <sub>r</sub>		-	142	-	
Turn-off delay time	t <sub>d(off)</sub>		-	306	-	
Turn-off fall time	t <sub>f</sub>		-	120	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =80A, V <sub>GS</sub> =10V	-	120	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	31.8	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	24	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(a)</sup>	V <sub>SD</sub>	T <sub>J</sub> =25°C, V <sub>GS</sub> =0V, I <sub>S</sub> =80A	-	-	1.2	V
Diode Forward current	I <sub>S</sub>	T <sub>C</sub> =25°C	-	-	160	A
Body Diode Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =80A, di/dt=100A/us		78		nS
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =80A, di/dt=100A/us		12		nC

**Notes:**

a) Pulse width ≤ 300 μs, duty cycle ≤ 2%

b) Guaranteed by design, not subject to production testing

## Typical Characteristics

Figure 1. Output Characteristics

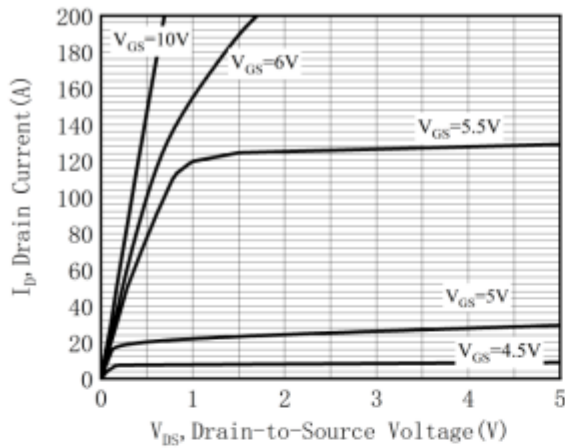


Figure 2. Transfer Characteristics

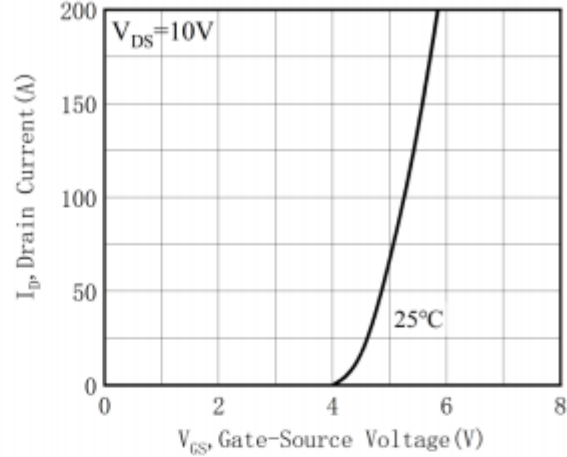


Figure 3. On-Resistance vs Drain Current

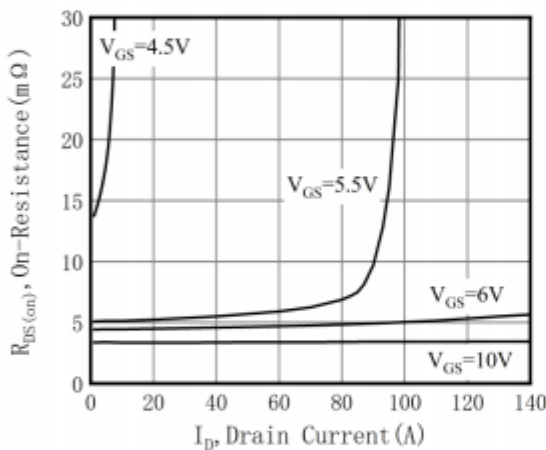


Figure 4. Capacitance

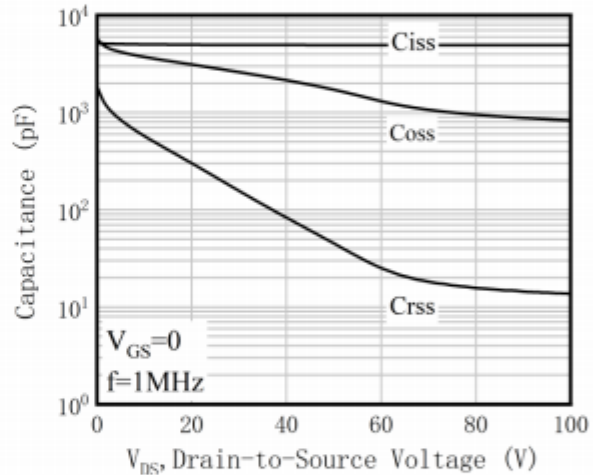


Figure 5. Gate Charge

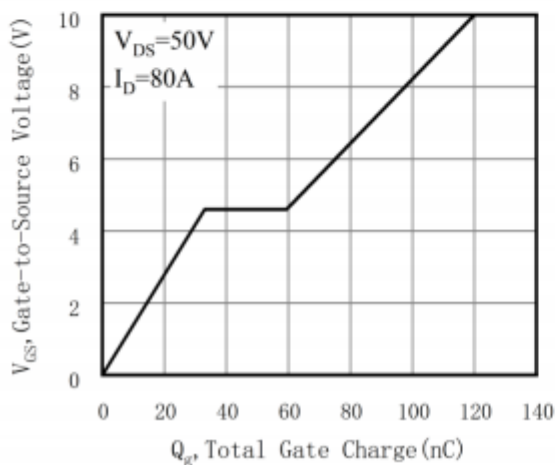
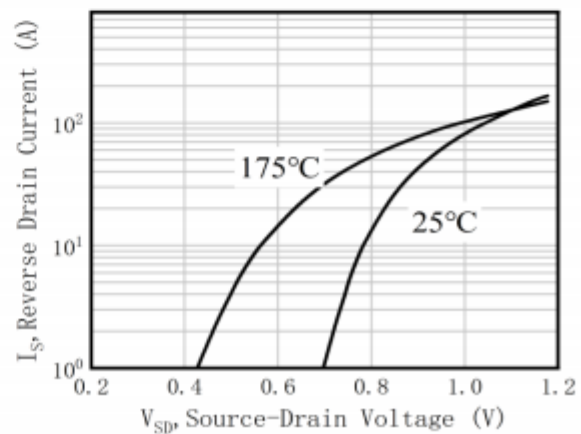


Figure 6. Body Diode Forward



**Typical Characteristics (cont.)**

Figure 7. On-Resistance vs Junction Temperature

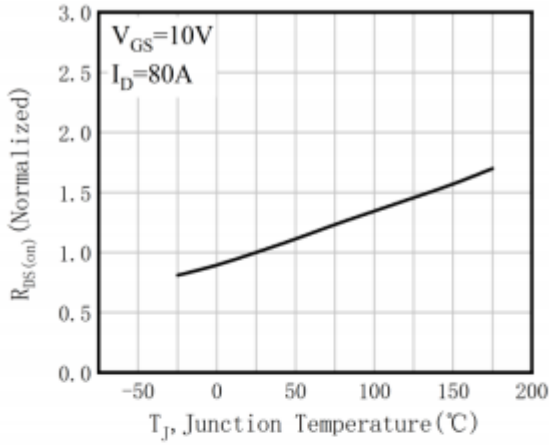


Figure 8. Threshold Voltage vs Junction Temperature

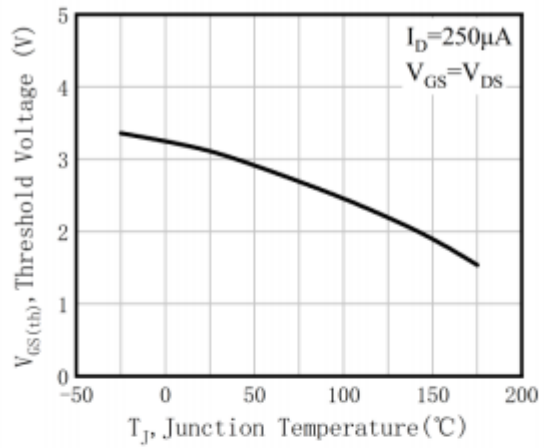


Figure 9. Transient thermal Impedance

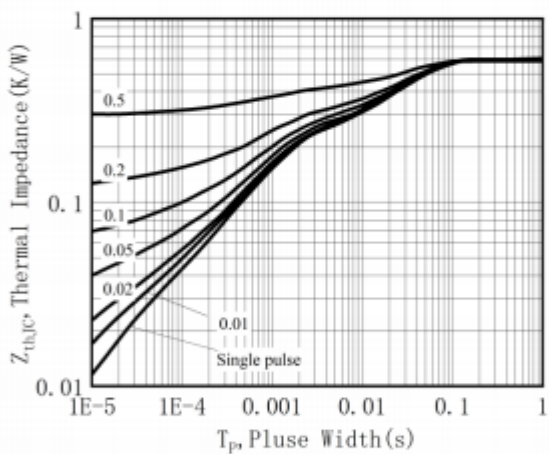
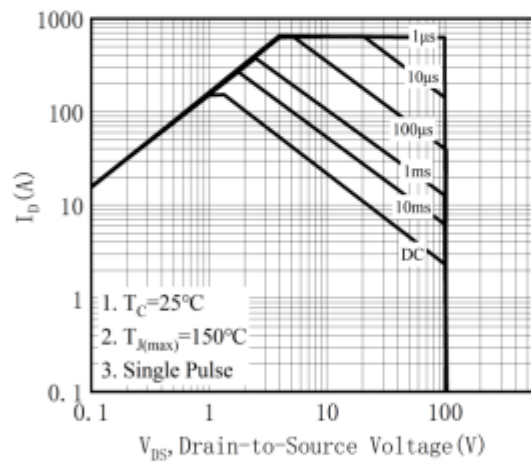
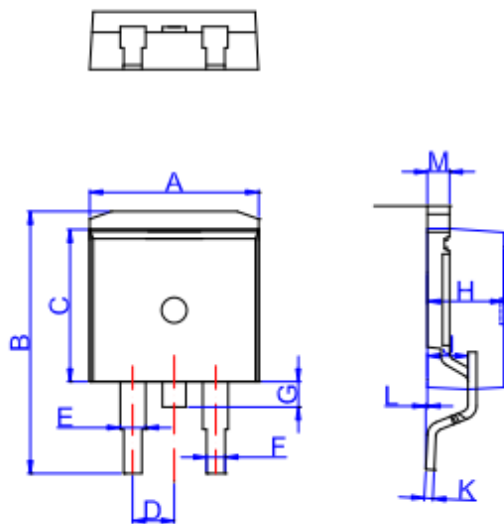


Figure 10. Safe Operating Area



## Package Dimensions

### TO-263 Package Information



TO-263

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.90		10.20	0.390		0.402
B	14.70		15.80	0.579		0.622
C	9.4		9.6	0.37		0.378
D		2.54			0.100	
E	1.20		1.40	0.047		0.055
F	0.75		0.85	0.029		0.033
G			1.75			0.069
H	4.40		4.70	0.173		0.185
J	2.30		2.70	0.091		0.106
K	0.38		0.55	0.015		0.022
L	0	0.10	0.25	0	0.004	0.010
M	1.25		1.35	0.049		0.053