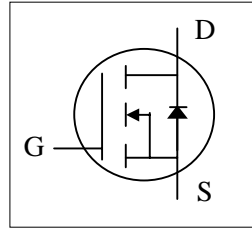




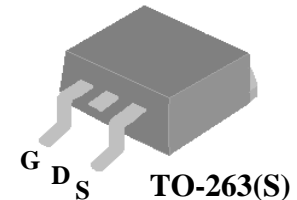
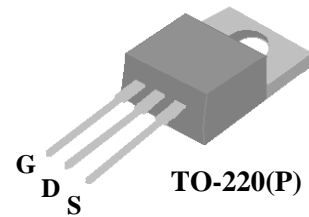
- ▼ Low Gate Charge
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



$BV_{DSS}$	200V
$R_{DS(ON)}$	170m $\Omega$
$I_D$	18A

## Description

AP18N20 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications. The TO-263 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for high current application due to the low connection resistance. The through-hole version (AP18N20GP) are available for low-profile applications.



## Absolute Maximum Ratings @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	200	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}$	18	A
$I_D @ T_C=100^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}$	9.5	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	60	A
$P_D @ T_C=25^\circ\text{C}$	Total Power Dissipation	89	W
	Linear Derating Factor	0.7	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

## Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	1.4	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>3</sup>	40	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	62	$^\circ\text{C}/\text{W}$



# AP18N20GS/P-HF

## Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =1mA	200	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =8A	-	-	170	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2	-	4	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =10A	-	9.5	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =200V, V <sub>GS</sub> =0V	-	-	10	uA
	Drain-Source Leakage Current (T <sub>j</sub> =125°C)	V <sub>DS</sub> =160V, V <sub>GS</sub> =0V	-	-	250	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	I <sub>D</sub> =10A	-	19	30	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =160V	-	5	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =10V	-	6	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>2</sup>	V <sub>DD</sub> =100V	-	9	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =11A	-	21	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =9.1Ω	-	25	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	19	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	1065	1700	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	185	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	3	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	1.6	2.4	Ω

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =10A, V <sub>GS</sub> =0V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =10A, V <sub>GS</sub> =0V	-	180	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	1150	-	nC

### Notes:

- 1.Pulse width limited by Maximum junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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APEC RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.

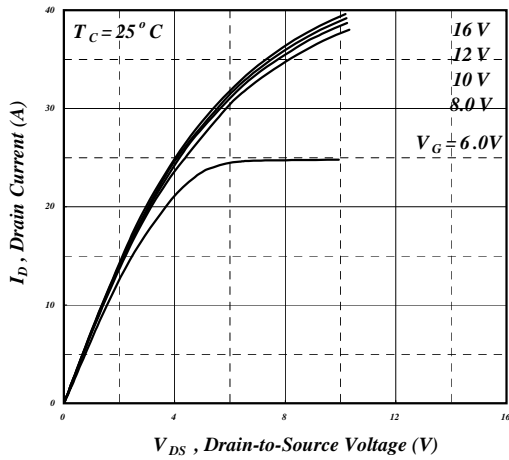


Fig 1. Typical Output Characteristics

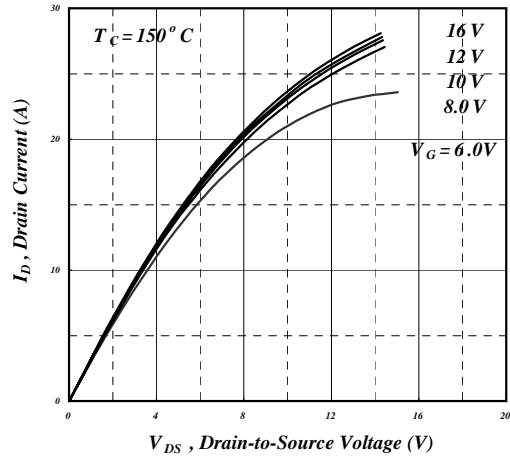


Fig 2. Typical Output Characteristics

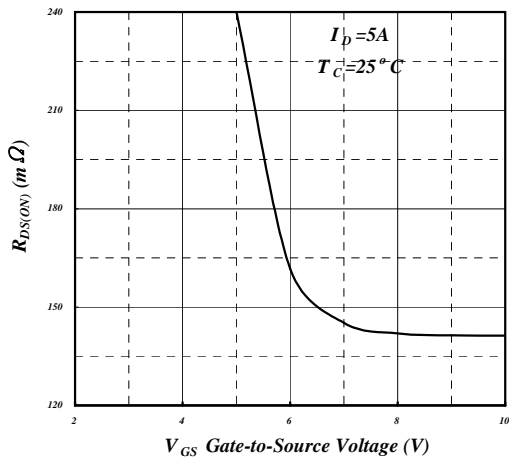


Fig 3. On-Resistance v.s. Gate Voltage

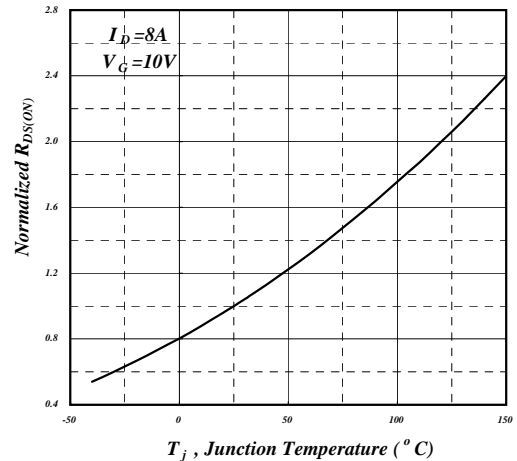


Fig 4. Normalized On-Resistance v.s. Junction Temperature

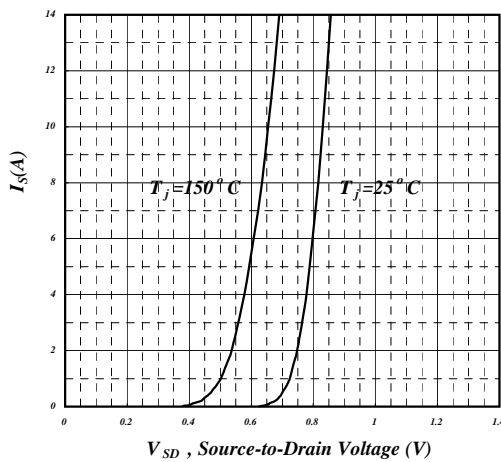


Fig 5. Forward Characteristic of Reverse Diode

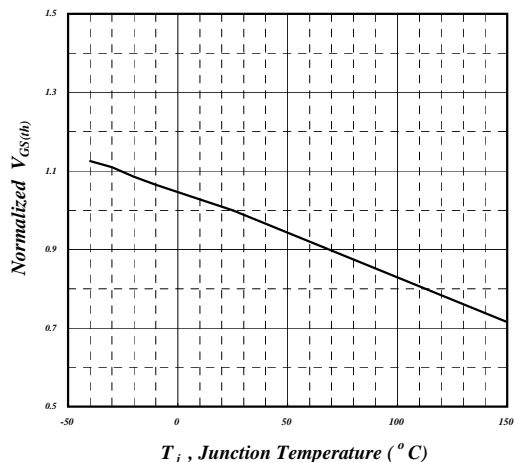


Fig 6. Gate Threshold Voltage v.s. Junction Temperature



# AP18N20GS/P-HF

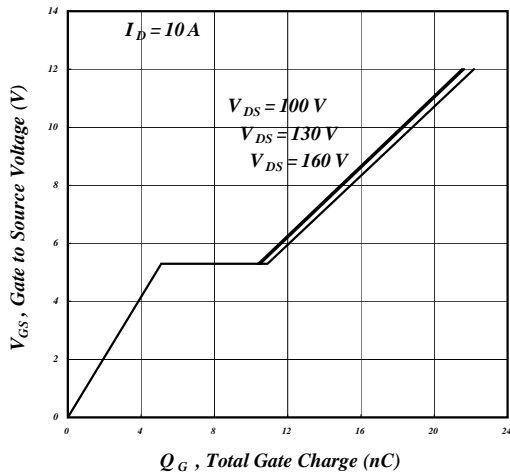


Fig 7. Gate Charge Characteristics

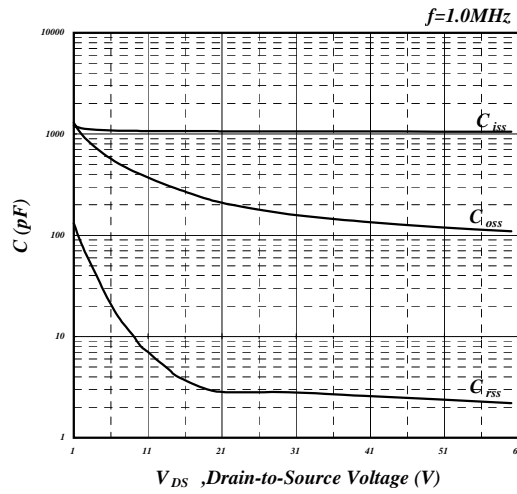


Fig 8. Typical Capacitance Characteristics

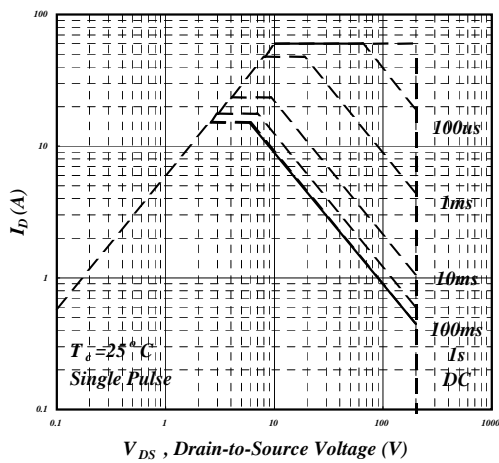


Fig 9. Maximum Safe Operating Area

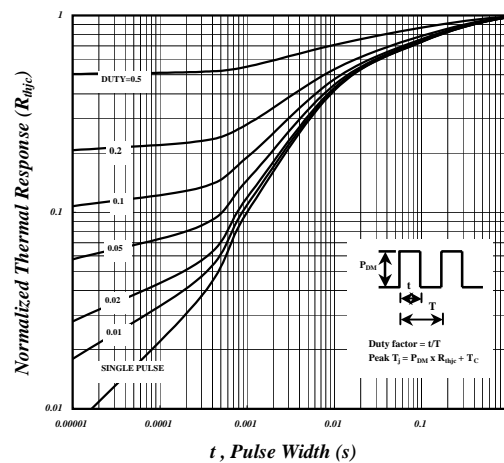


Fig 10. Effective Transient Thermal Impedance

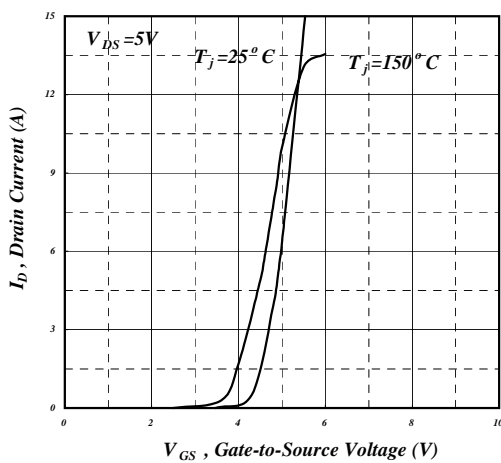


Fig 11. Transfer Characteristics

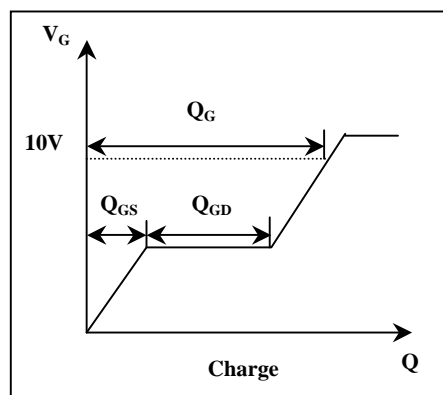
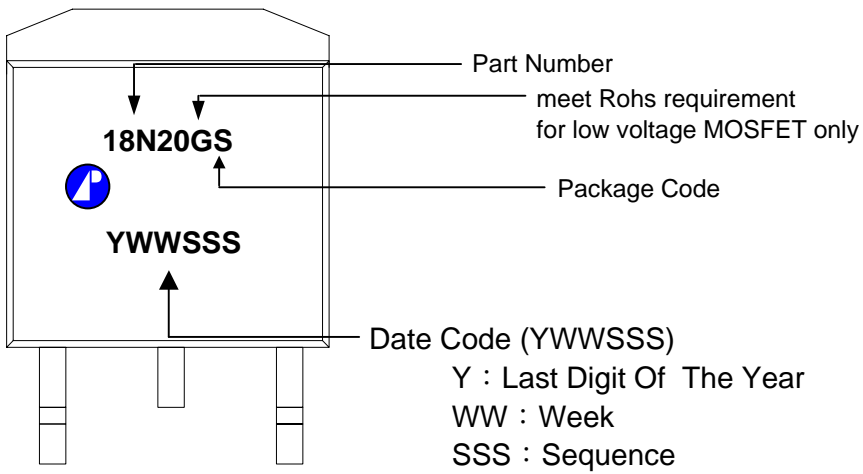


Fig 12. Gate Charge Waveform

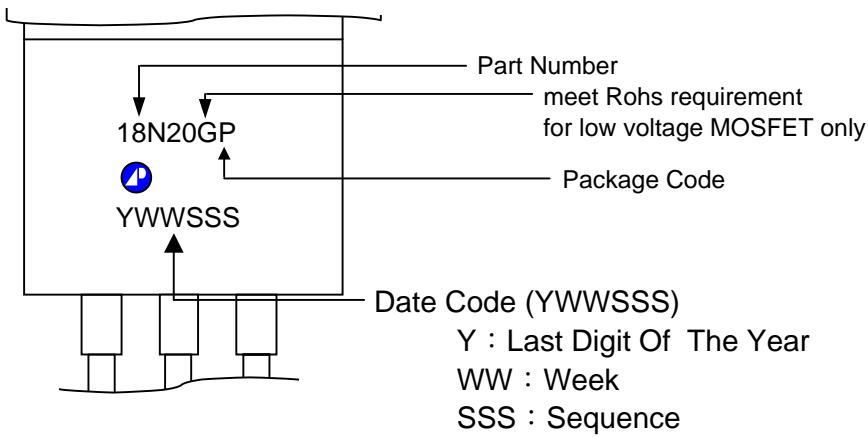


# MARKING INFORMATION

## TO-263

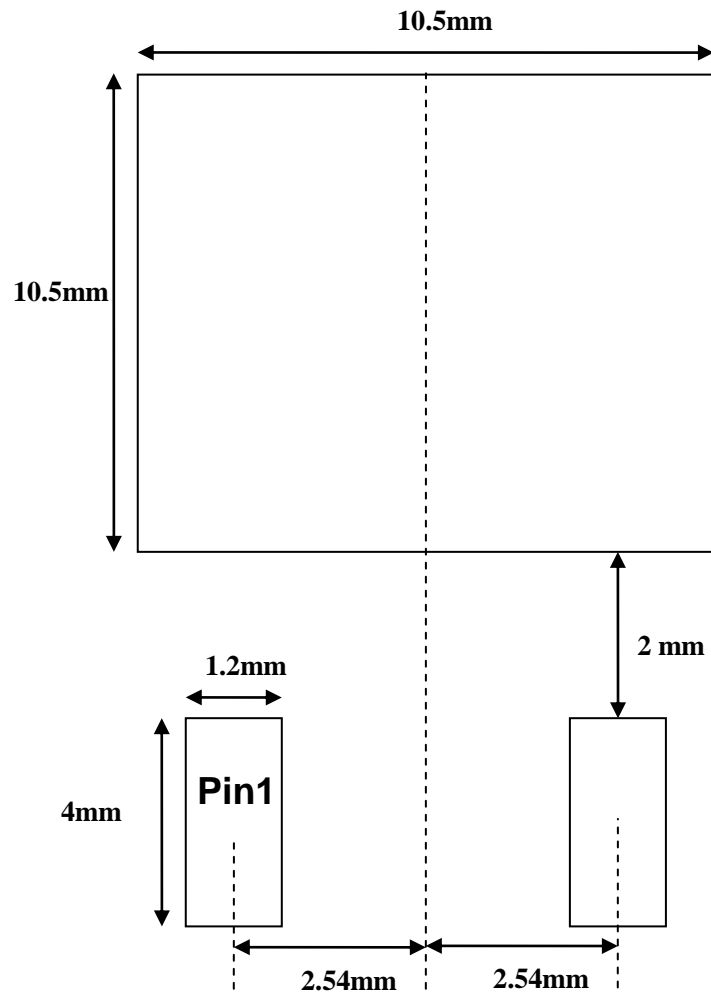


## TO-220



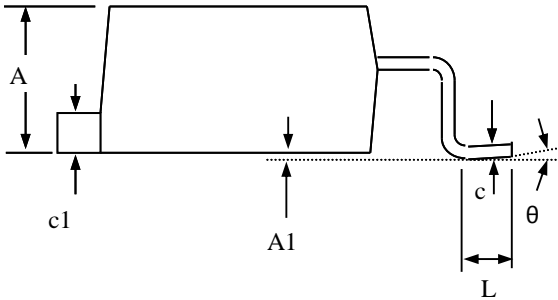
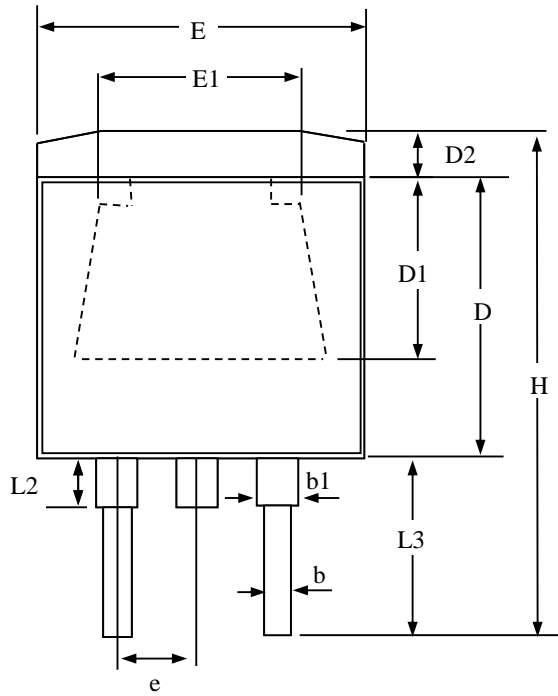


TO-263 FOOTPRINT :





**Package Outline : TO-263**



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.00	4.75	5.20
A1	0.00	0.15	0.30
b	0.50	0.90	1.10
b1	1.07	1.27	1.47
c	0.30	0.55	0.80
c1	1.10	1.40	1.70
D	8.30	9.05	9.80
D1	5.10(ref)		
D2	1.27(ref)		
E	9.50	10.10	10.70
E1	7.00~9.00(ref)		
e	2.04	2.54	3.04
L1	2.54(ref)		
L2	1.5 (ref)		
L3	3.50	4.50	5.50
θ	0°	-----	8°
H	13.07	15.27	16.57

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