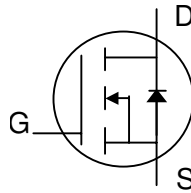




**N-channel Enhancement-mode Power MOSFET**

- Low On-Resistance
- Simple Drive Requirement
- Fast Switching Characteristics
- RoHS-compliant, halogen-free



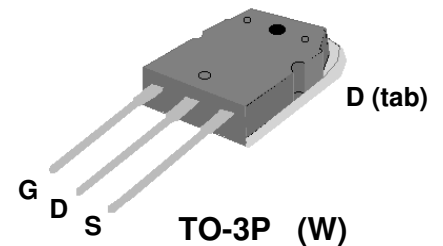
$BV_{DSS}$	500V
$R_{DS(ON)}$	270mΩ
$I_D$	20A

**Description**

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

The AP18N50W-HF-3 is in the TO-3P through-hole package which is widely used in higher power commercial and industrial applications where an attached heatsink is required.

This device is well suited for use in applications such as motor drives, inverters and DC/DC converters.



**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	500	V
$V_{GS}$	Gate-Source Voltage	±30	V
$I_D$ at $T_C=25^\circ\text{C}^\circ$	Continuous Drain Current	20	A
$I_D$ at $T_C=100^\circ\text{C}$	Continuous Drain Current	10	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	80	A
$P_D$ at $T_C=25^\circ\text{C}$	Total Power Dissipation	150	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>2</sup>	200	mJ
$I_{AR}$	Avalanche Current	20	A
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_J$	Operating Junction Temperature Range	-55 to 150	°C

**Thermal Data**

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	0.833	°C/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	40	°C/W

**Ordering Information**

**AP18N50W-HF-3TB** : in RoHS-compliant, halogen-free TO-3P, shipped in tubes (1440 pcs/carton)



**Electrical Specifications at  $T_j=25^\circ\text{C}$  (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	500	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>3</sup>	$V_{GS}=10V, I_D=10A$	-	-	270	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=10A$	-	10	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=400V, V_{GS}=0V$	-	-	100	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>3</sup>	$I_D=20A$	-	94	150	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=400V$	-	23	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=10V$	-	36	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>3</sup>	$V_{DD}=200V$	-	113	-	ns
$t_r$	Rise Time	$I_D=10A$	-	80	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=50\Omega, V_{GS}=10V$	-	525	-	ns
$t_f$	Fall Time	$R_D=20\Omega$	-	100	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	4600	7400	pF
$C_{oss}$	Output Capacitance	$V_{DS}=25V$	-	350	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0MHz$	-	10	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>3</sup>	$I_S=20A, V_{GS}=0V$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time <sup>3</sup>	$I_S=20A, V_{GS}=0V$	-	490	-	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu s$	-	10	-	$\mu C$

**Notes:**

1. Pulse width limited by maximum junction temperature.
2. Starting  $T_j=25^\circ\text{C}$ ,  $V_{DD}=50V$ ,  $L=1mH$ ,  $R_G=25\Omega$
3. Pulse test

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.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

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



Typical Electrical Characteristics

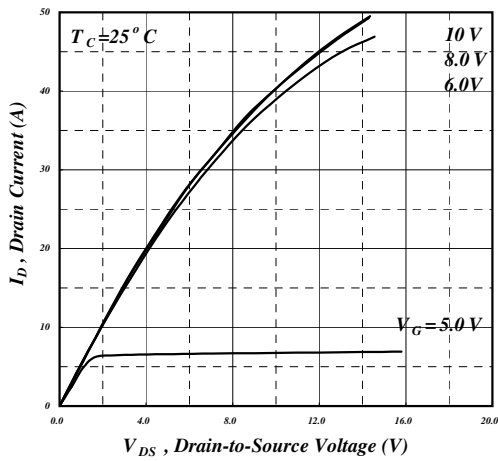


Fig 1. Typical Output Characteristics

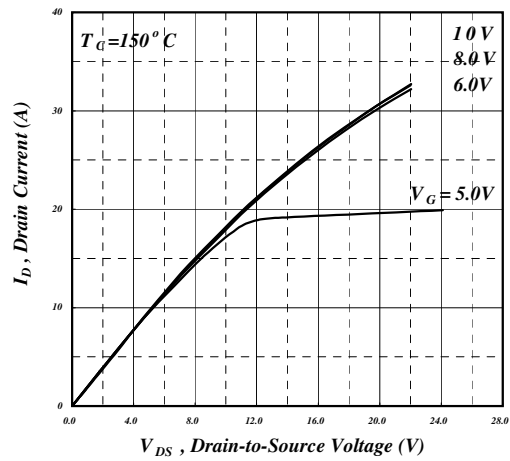


Fig 2. Typical Output Characteristics

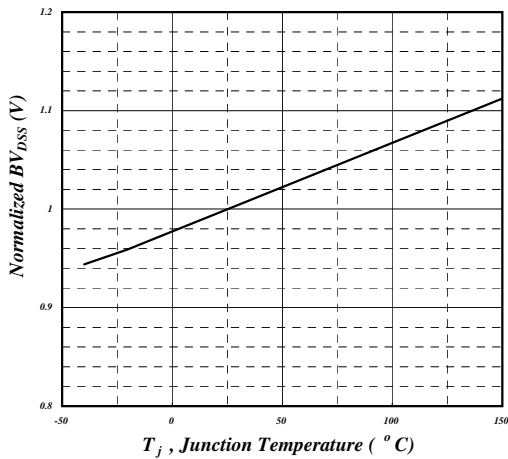


Fig 3. Normalized BVdss vs. Junction Temperature

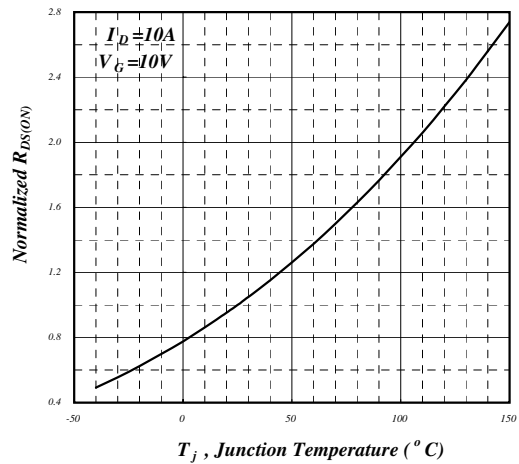


Fig 4. Normalized On-Resistance vs. Junction Temperature

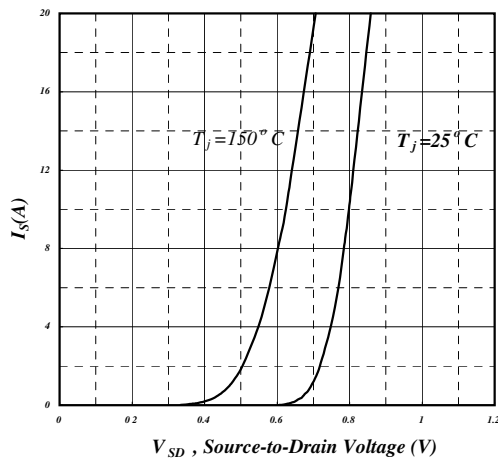


Fig 5. Forward Characteristic of Reverse Diode

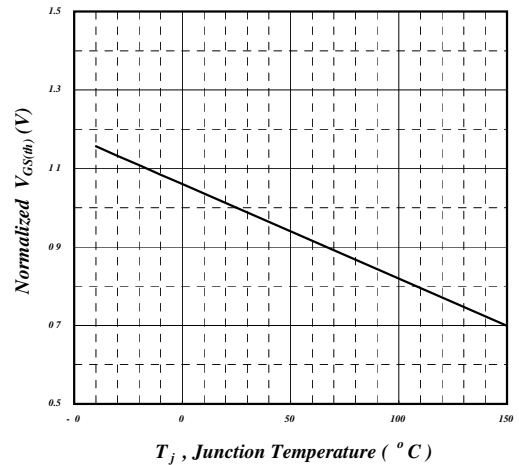


Fig 6. Gate Threshold Voltage vs. Junction Temperature



Typical Electrical Characteristics (cont.)

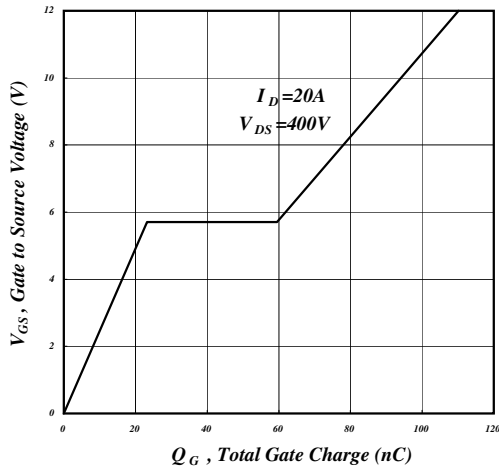


Fig 7. Gate Charge Characteristics

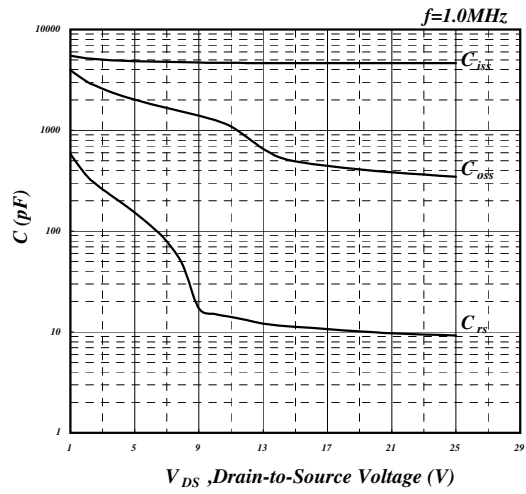


Fig 8. Typical Capacitance Characteristics

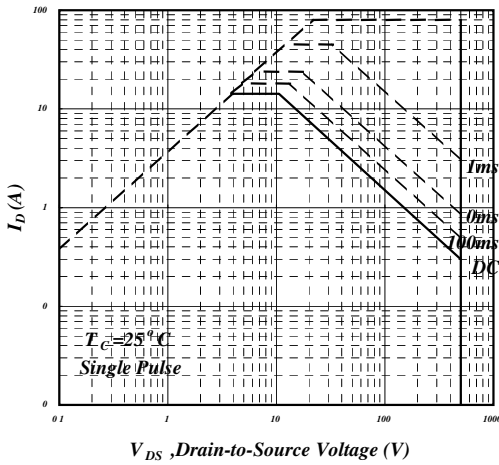


Fig 9. Maximum Safe Operating Area

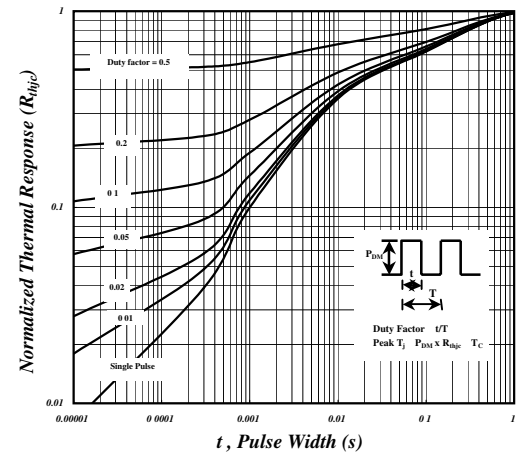


Fig 10. Effective Transient Thermal Impedance

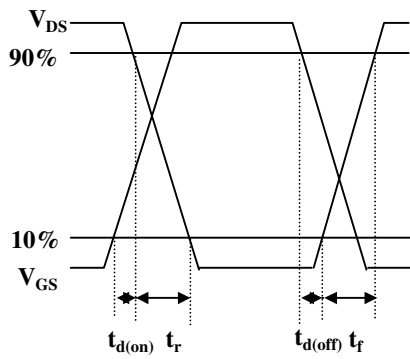


Fig 11. Switching Time Waveform

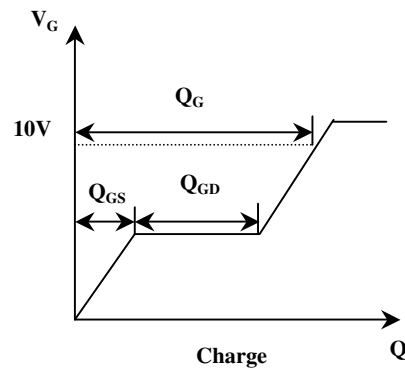
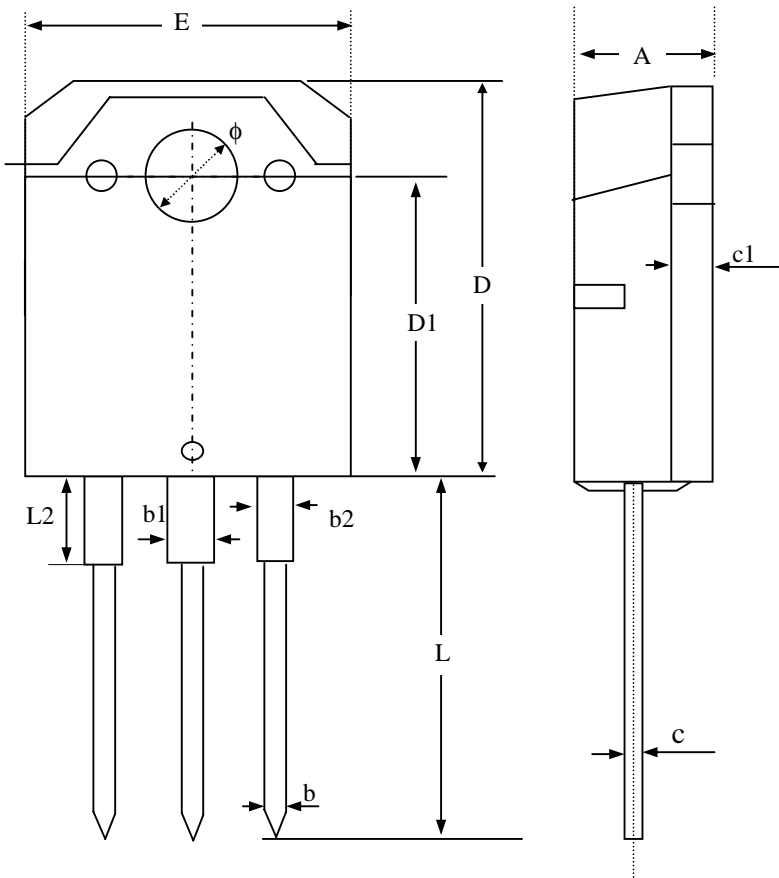


Fig 12. Gate Charge Waveform

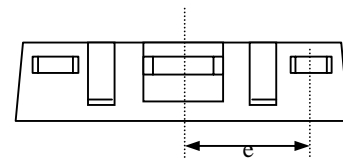


**Package Dimensions: TO-3P**



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.50	4.80	5.10
b	0.80	1.00	1.30
b1	1.80	2.50	3.20
b2	1.30	--	2.30
c	0.40	0.60	0.90
c1	1.40	--	2.20
D	19.70	20.00	20.30
D1	14.70	15.00	15.30
E	15.30	--	16.10
e	4.45	5.45	6.45
L	17.50	--	20.50
L2	1.00	--	3.70
$\phi$	3.00	3.20	3.40

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.



**Marking Information:**

