



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

- Simple Drive Requirement**
- Low On-resistance**
- Fast Switching Performance**
- RoHS-compliant, halogen-free**

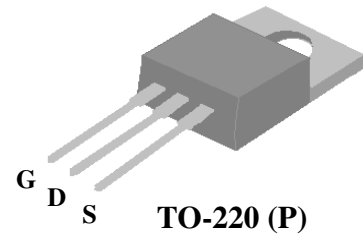


$BV_{DSS}$	100V
$R_{DS(ON)}$	28mΩ
$I_D$	38A

**Description**

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

The AP50T10GP-HF-3 is in the TO-220 through-hole package which is used in commercial applications where a low PCB footprint or an attached heatsink is required. This device is well suited for low voltage applications such as DC/DC converters.



**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	±20	V
$I_D$ at $T_C=25^\circ C$	Continuous Drain Current	38	A
$I_D$ at $T_C=100^\circ C$	Continuous Drain Current	24	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	120	A
$P_D$ at $T_C=25^\circ C$	Total Power Dissipation	89.2	W
$P_D$ at $T_A=25^\circ C$	Total Power Dissipation	2	W
$T_{STG}$	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	1.4	°C/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	62	°C/W

**Ordering Information**

**AP50T10GP-HF-3TB**    **RoHS-compliant halogen-free TO-220, shipped in tubes (50pcs/tube)**



**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	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=24A$	-	-	28	m $\Omega$
		$V_{GS}=5V, I_D=16A$	-	-	45	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	3	V
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=24A$	-	30	-	S
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V$	-	-	25	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>2</sup>	$I_D=24A$	-	42	67	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=80V$	-	7	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=10V$	-	18	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>2</sup>	$V_{DS}=50V$	-	10	-	ns
$t_r$	Rise Time	$I_D=24A$	-	30	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=1\Omega$	-	27	-	ns
$t_f$	Fall Time	$V_{GS}=10V$	-	8	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	1840	2940	pF
$C_{oss}$	Output Capacitance	$V_{DS}=25V$	-	190	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	130	-	pF
$R_g$	Gate Resistance	$f=1.0\text{MHz}$	-	1.7	-	$\Omega$

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=24A, V_{GS}=0V$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time <sup>2</sup>	$I_S=10A, V_{GS}=0V$	-	50	-	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	100	-	nC

**Notes:**

1. Pulse width limited by maximum junction temperature.
2. 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.

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Typical Electrical Characteristics

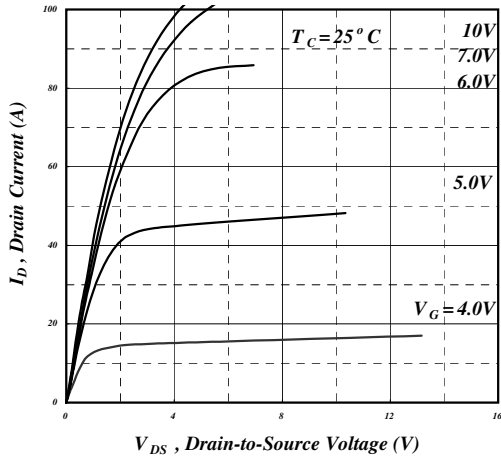


Fig 1. Typical Output Characteristics

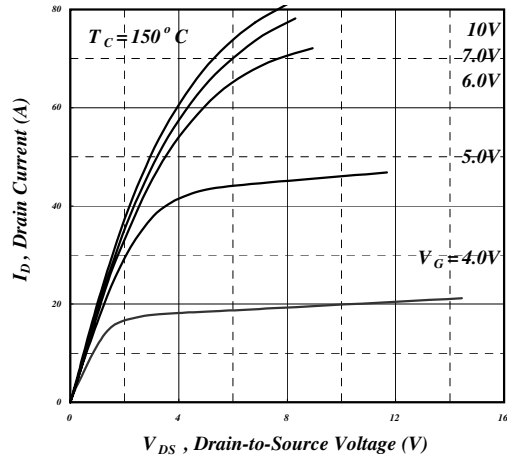


Fig 2. Typical Output Characteristics

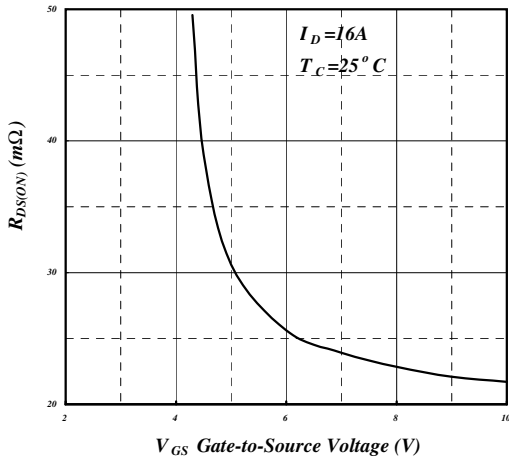


Fig 3. Normalised BVDSS vs. Junction Temperature

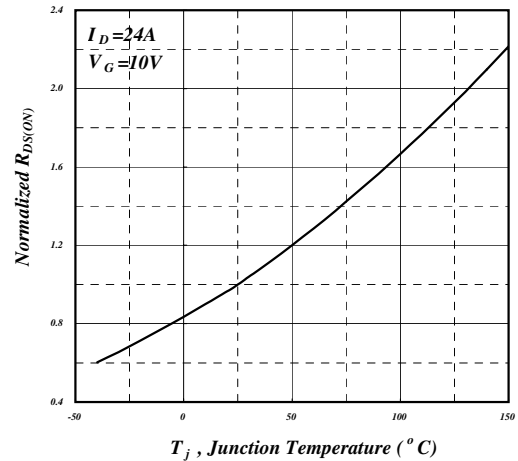


Fig 4. Normalized On-Resistance vs. Junction Temperature

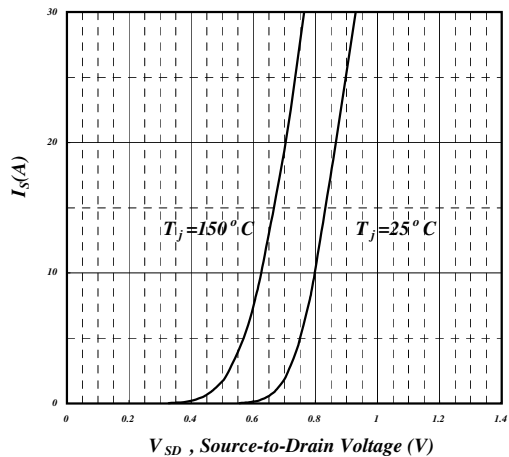


Fig 5. Forward Characteristic of Reverse Diode

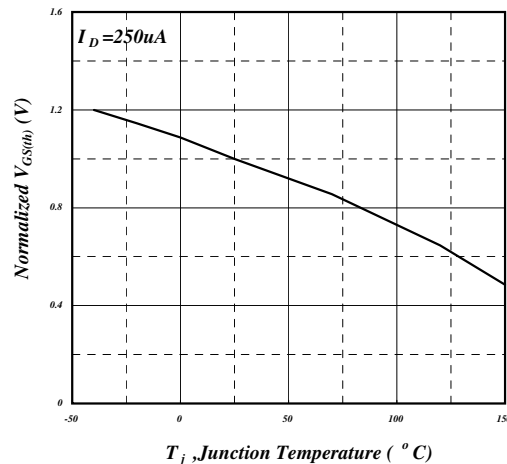


Fig 6. Gate Threshold Voltage vs. Junction Temperature



Typical Electrical Characteristics (cont.)

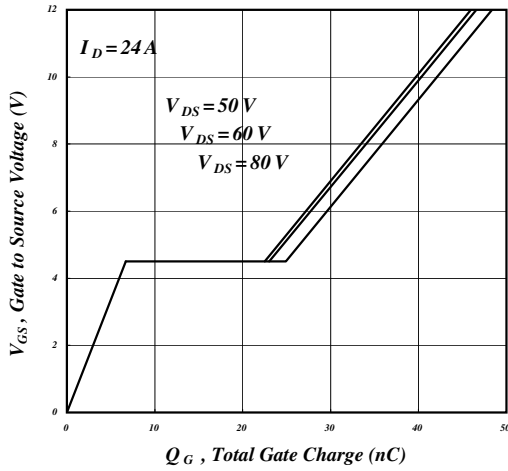


Fig 7. Gate Charge Characteristics

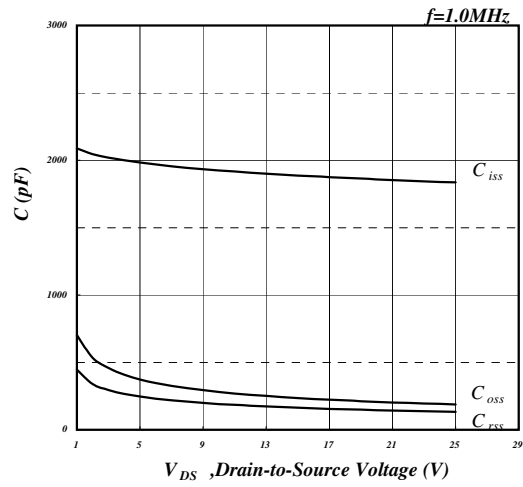


Fig 8. Typical Capacitance Characteristics

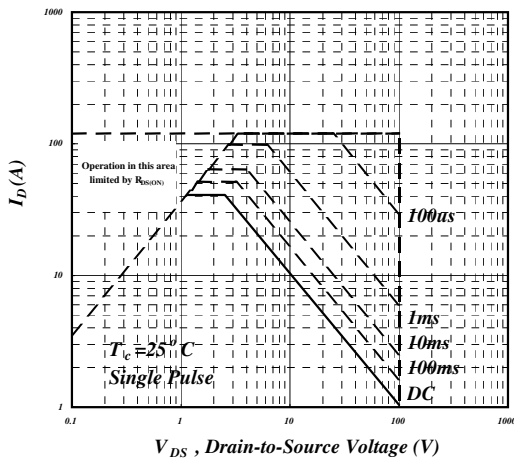


Fig 9. Maximum Safe Operating Area

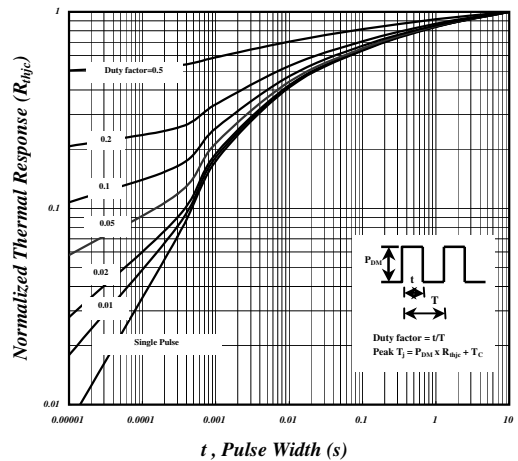


Fig 10. Effective Transient Thermal Impedance

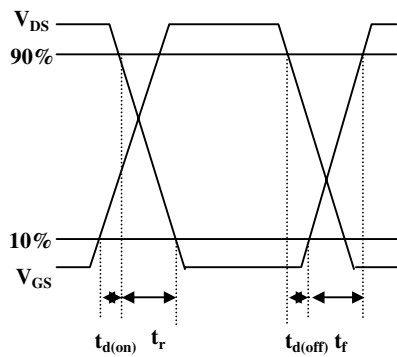


Fig 11. Switching Time Waveforms

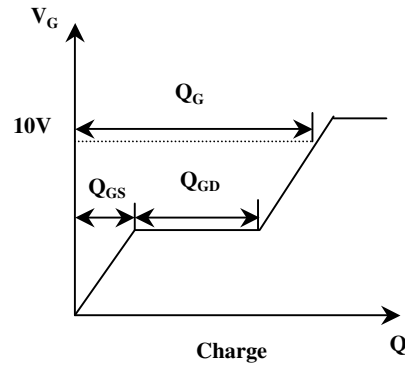
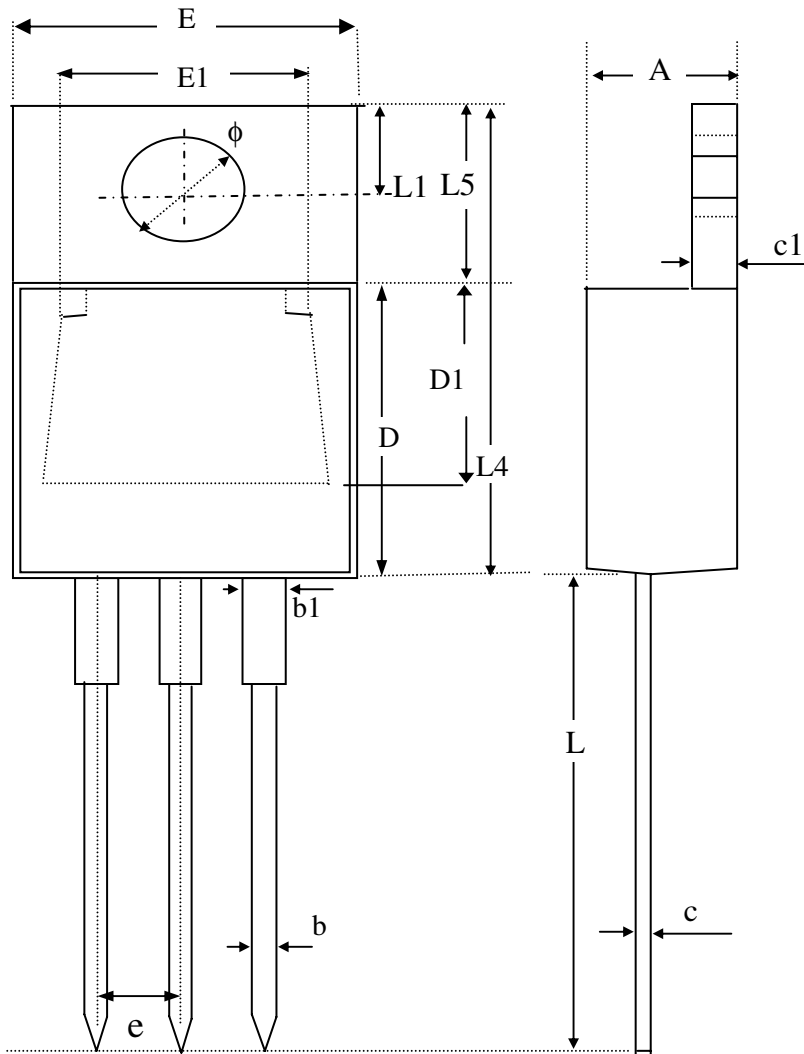


Fig 12. Gate Charge Waveform



**Package Dimensions: TO-220**



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.40	4.60	4.80
b	0.76	0.88	1.00
D	8.60	8.80	9.00
c	0.36	0.43	0.50
E	9.80	10.10	10.40
L4	14.70	15.00	15.30
L5	6.20	6.40	6.60
D1	5.10 REF.		
c1	1.25	1.35	1.45
b1	1.17	1.32	1.47
L	13.25	13.75	14.25
e	2.54 REF.		
L1	2.60	2.75	2.89
phi	3.71	3.84	3.96
E1	7.4 REF.		

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

**Marking Information: TO-220**

