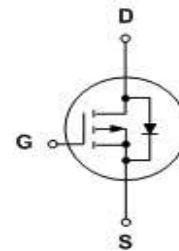


AP50P06

P-Channel Enhancement Mosfet

Feature

- -60V,-50A
 $R_{DS(ON)} < 22m\Omega @ V_{GS} = -10V$ TYP:18 m Ω
 $R_{DS(ON)} < 30m\Omega @ V_{GS} = -4.5V$ TYP:25 m Ω
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
50P06	AP50P06	TO-220	13 inch	-	1000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a=25^{\circ}C$)	I_D	-50	A
Continuous Drain Current ($T_a=100^{\circ}C$)	I_D	-24	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	-120	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	276	mJ
Power Dissipation	P_D	50	W
Thermal Resistance from Junction to Case ⁽⁴⁾	$R_{\theta JC}$	2.5	$^{\circ}C/W$
Thermal Resistance from Junction to Ambient ⁽⁴⁾	$R_{\theta JA}$	50	$^{\circ}C/W$
Junction Temperature	T_J	150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-60	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -48V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-	-3	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -15A$	-	18	22	m Ω
		$V_{GS} = -4.5V, I_D = -10A$	-	25	30	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -30V, V_{GS} = 0V, f = 1MHz$	-	4580	-	pF
Output Capacitance	C_{oss}		-	175	-	
Reverse Transfer Capacitance	C_{rss}		-	130	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -30V, I_D = -15A, R_L = 3.9\Omega$ $V_{GS} = -10V, R_G = 3\Omega$	-	66	-	ns
Turn-on rise time	t_r		-	100	-	
Turn-off delay time	$t_{d(off)}$		-	465	-	
Turn-off fall time	t_f		-	205	-	
Total Gate Charge	Q_g	$V_{DS} = -30V, I_D = -15A,$ $V_{GS} = -10V$	-	72	-	nC
Gate-Source Charge	Q_{gs}		-	19	-	
Gate-Drain Charge	Q_{gd}		-	10	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽²⁾	V_{DS}	$V_{GS} = 0V, I_S = -10A$	-	-	-1.3	V
Diode Forward current ⁽³⁾	I_S		-	-	-50	A
Reverse Recovery Charge	Q_{rr}	$I_F = -15A, di/dt = 100A/\mu s$		23		nC
Reverse Recovery Time	T_{rr}	$I_F = -15A, di/dt = 100A/\mu s$		23		ns

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = -30V, R_G = 20\Omega, L = 0.5mH$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t \leq 10$ sec

Test Circuit

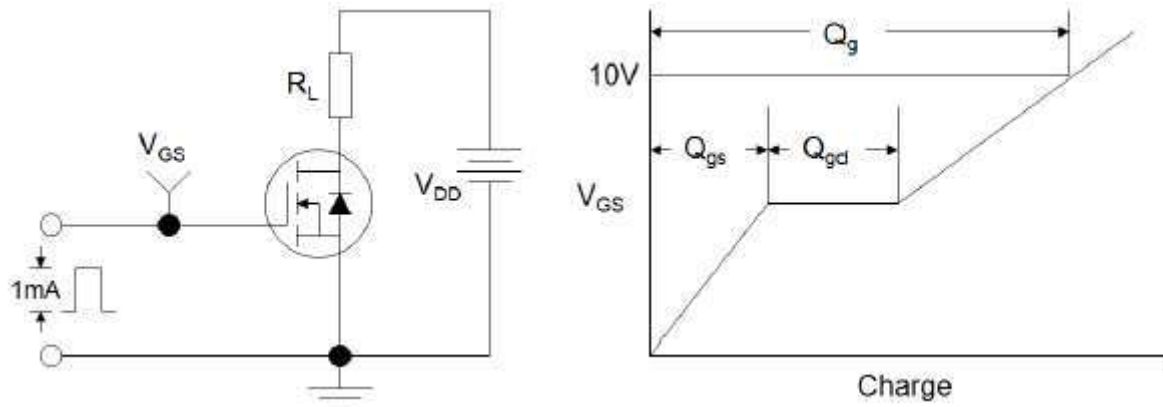


Figure1:Gate Charge Test Circuit & Waveform

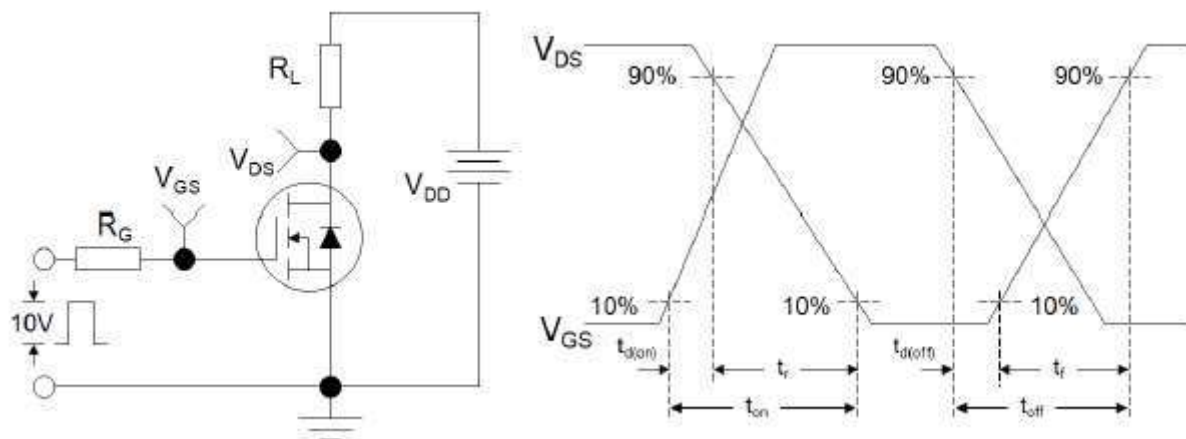


Figure 2: Resistive Switching Test Circuit & Waveforms

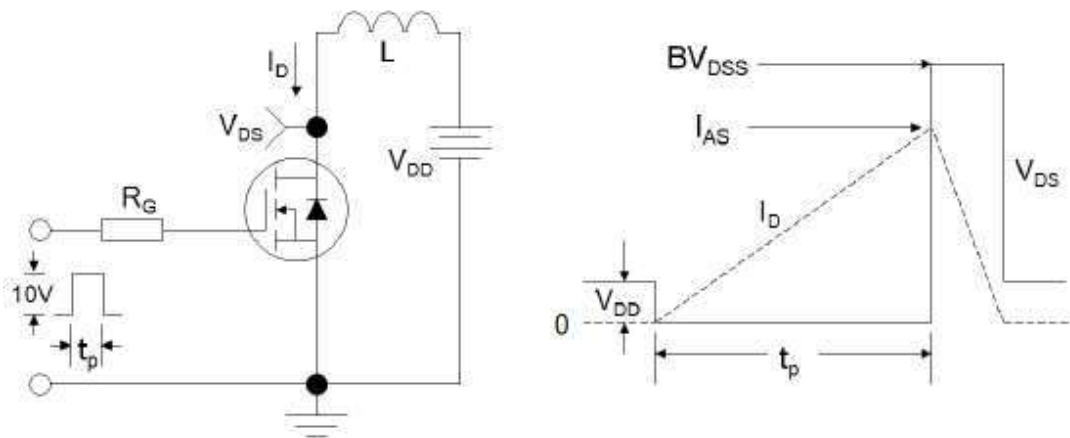
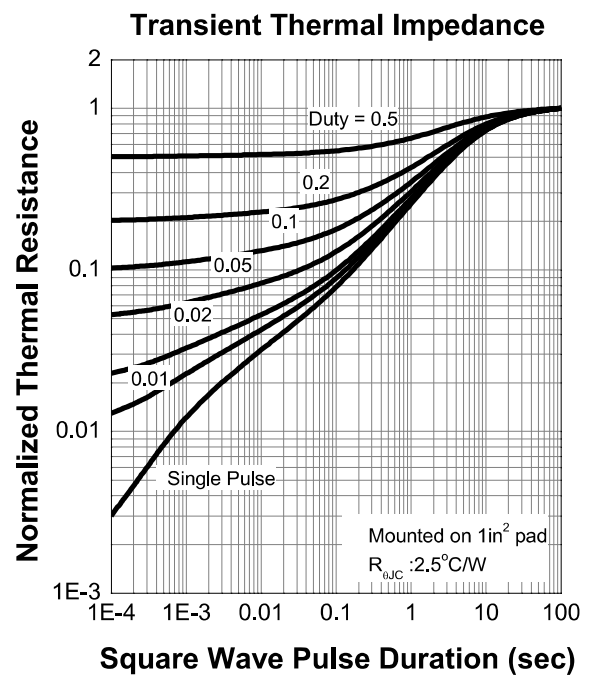
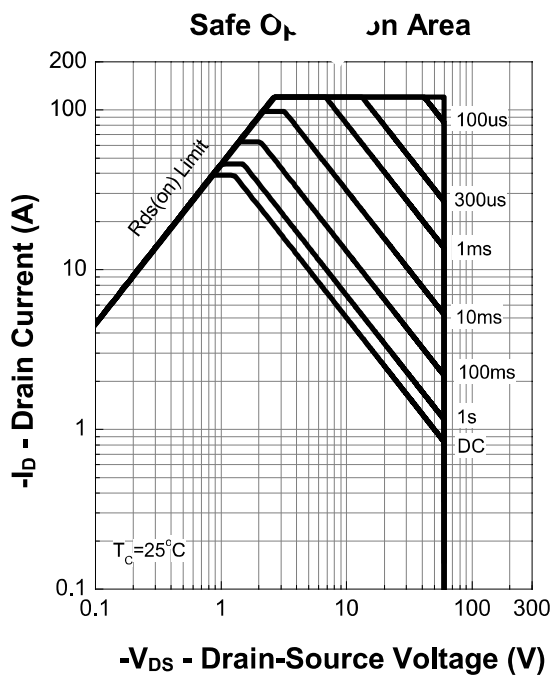
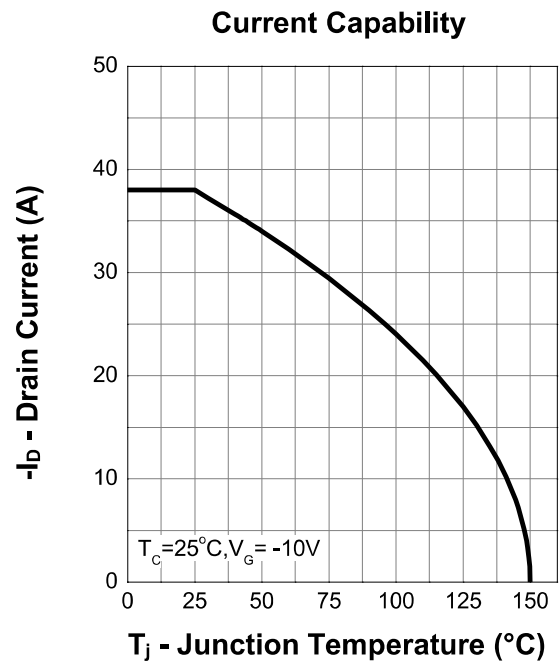
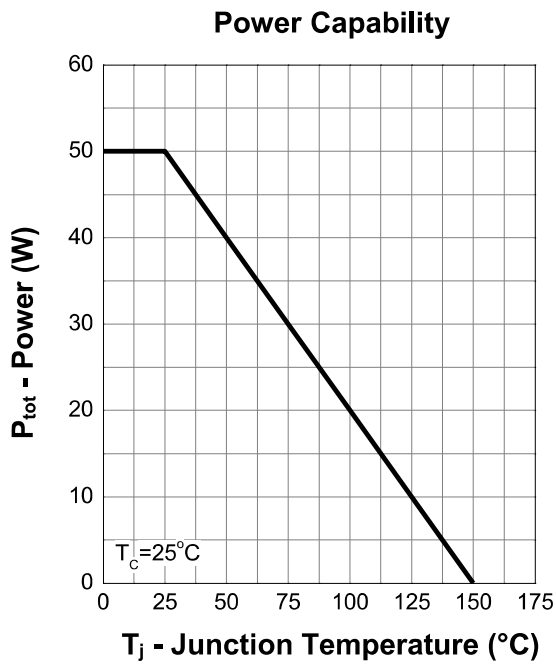


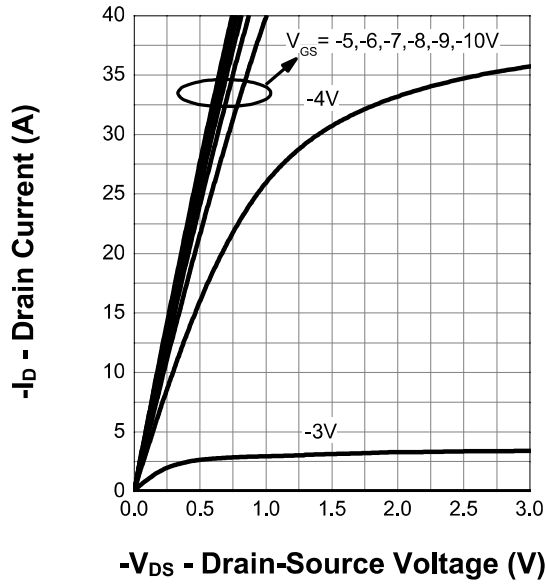
Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Typical Characteristics

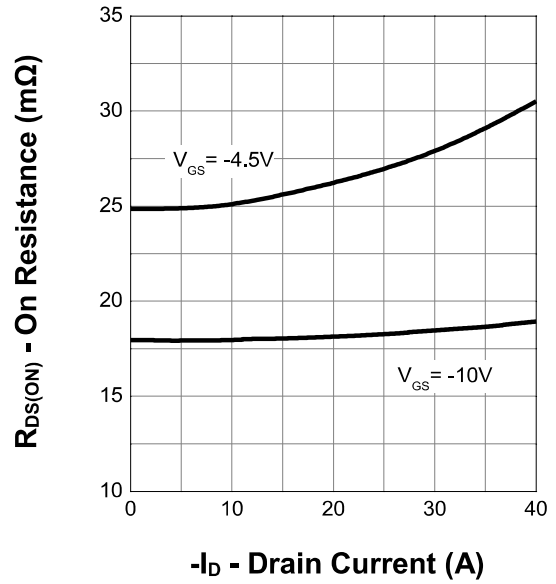


Typical Characteristics

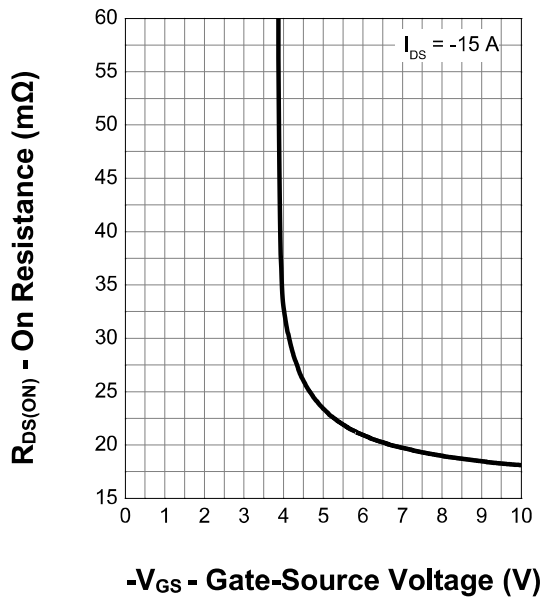
Output Characteristics



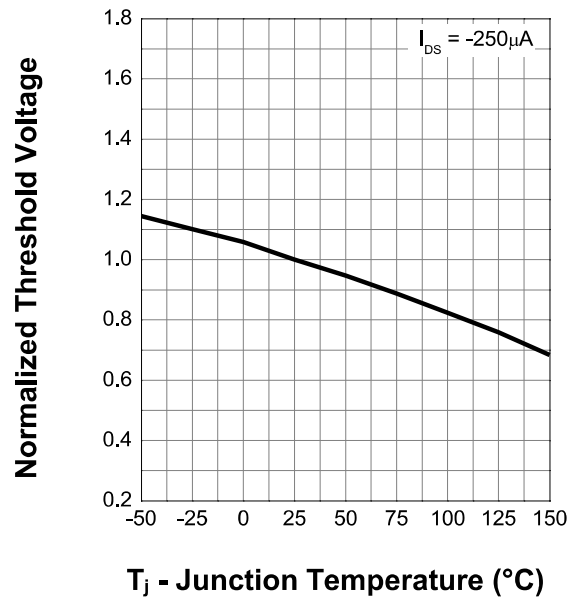
Drain-Source On Resistance



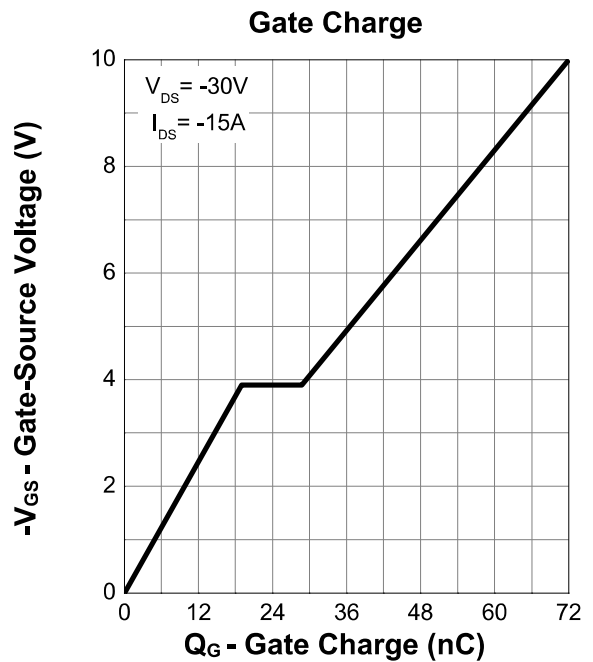
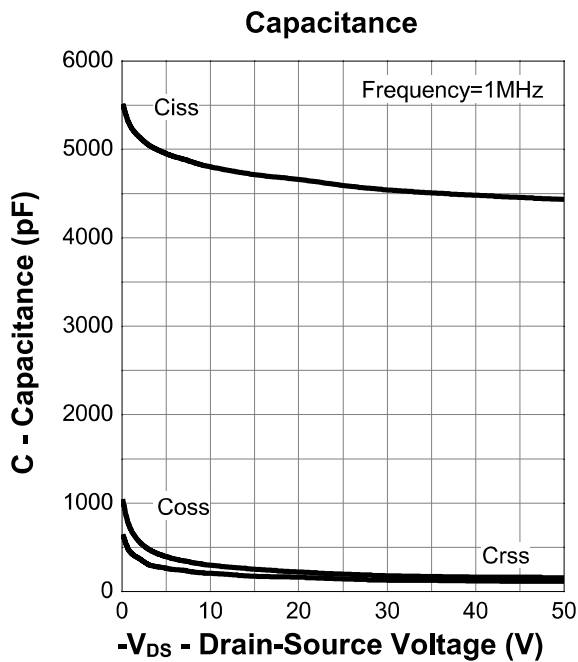
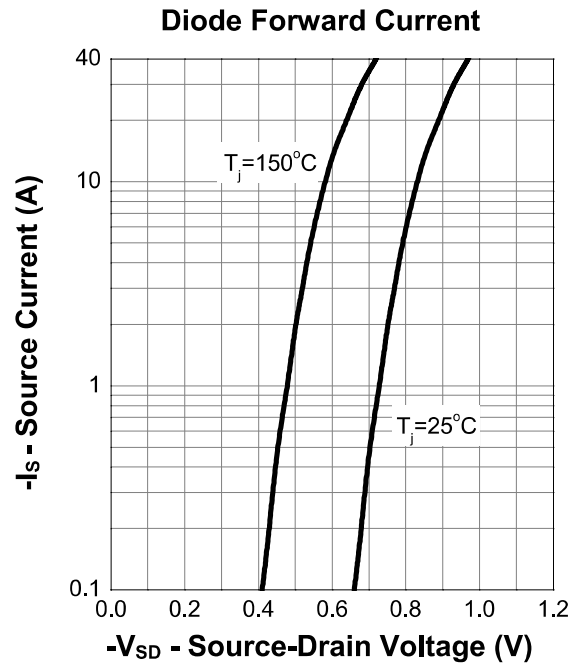
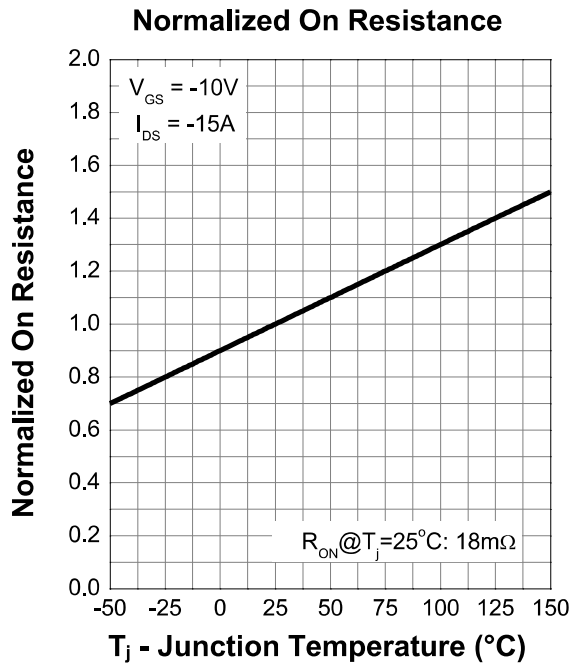
Transfer Characteristics



Normalized Threshold Voltage



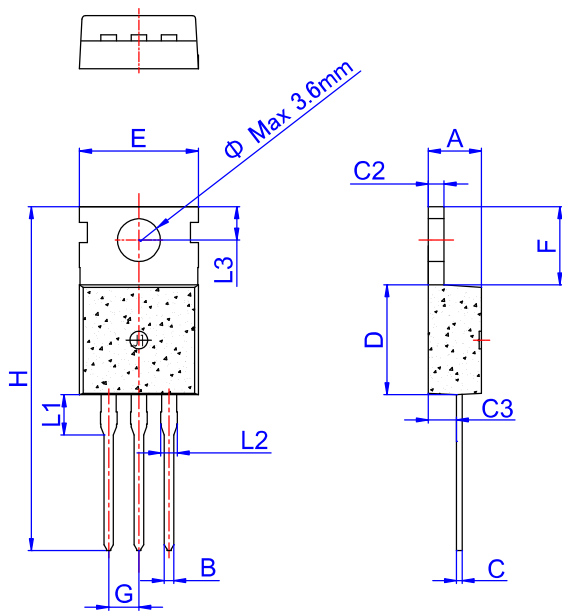
Typical Characteristics



AP50P06

P-Channel Enhancement Mosfet

TO-220 Package Information



TO-220

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	