

H50P06

P-Channel Power MOSFET

Product Summary

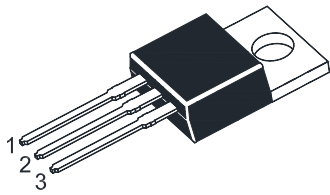
V_{DS}	-60 V
$R_{DS(on)max}$	29m Ω
I_D	-50A

Features

- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

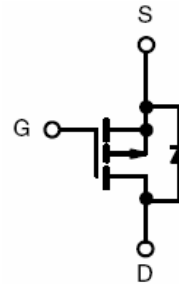
View and Internal Schematic Diagram

TO-220



1. GATE 2. DRAIN 3. SOURCE

Schematic diagram



Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-50	A
Drain Current-Continuous($T_C=100^{\circ}\text{C}$)	$I_D(100^{\circ}\text{C})$	-35	A
Pulsed Drain Current	I_{DM}	-150	A
Maximum Power Dissipation	P_D	95	W
Drain Source voltage slope	dv/dt	50	V/ns
Single pulse avalanche energy ^(Note 5)	E_{AS}	722	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.31	$^{\circ}\text{C/W}$
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Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =-250μA	-60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-60V,V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =-250μA	-1.0	-1.8	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-15A	-	23	29	mΩ
		V _{GS} =-4.5V, I _D =-10A	-	30	39	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-10V,I _D =-20A	-	25	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =-25V,V _{GS} =0V, F=1.0MHz	-	6460	-	PF
Output Capacitance	C _{OSS}		-	719	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	535	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-30V, R _L =1.5Ω, V _{GS} =-10V,R _G =3Ω	-	15	-	nS
Turn-on Rise Time	t _r		-	17	-	nS
Turn-Off Delay Time	t _{d(off)}		-	40	-	nS
Turn-Off Fall Time	t _f		-	45	-	nS
Total Gate Charge	Q _g	V _{DS} =-30,I _D =-20A, V _{GS} =-10V	-	75		nC
Gate-Source Charge	Q _{gs}		-	16		nC
Gate-Drain Charge	Q _{gd}		-	19		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =-20A	-		-1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	-50	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =- 20A di/dt = -100A/μs ^(Note3)	-	50		nS
Reverse Recovery Charge	Q _{rr}		-	59		nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: $T_J=25^{\circ}\text{C}, V_{DD}=-20V, V_G=-10V, L=1\text{mH}, R_g=25\Omega, I_{AS}=38A$

Typical Characteristics

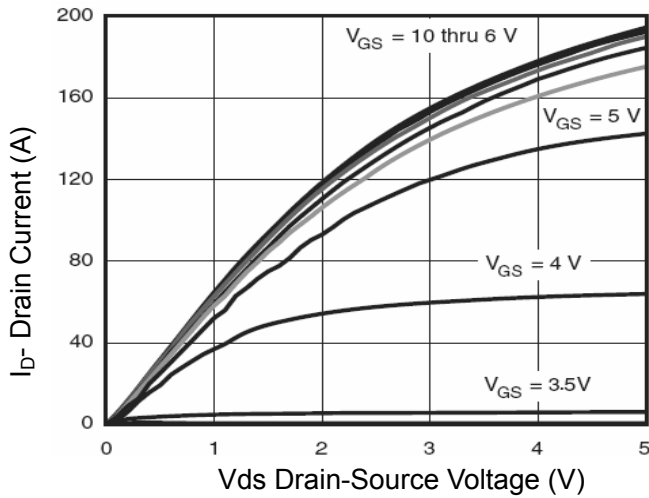


Figure 1 Output Characteristics

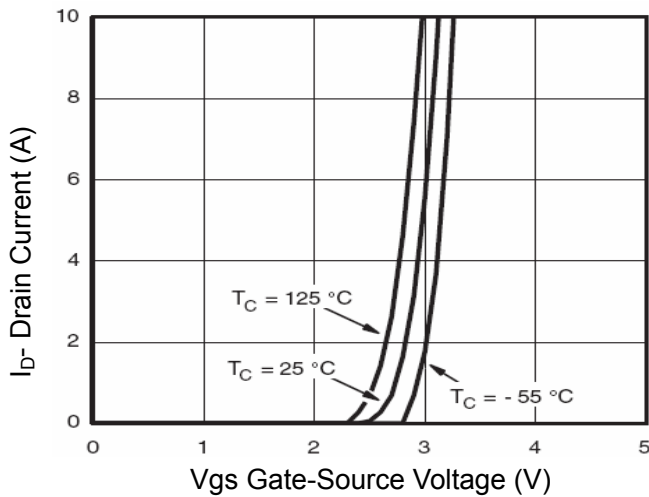


Figure 2 Transfer Characteristics

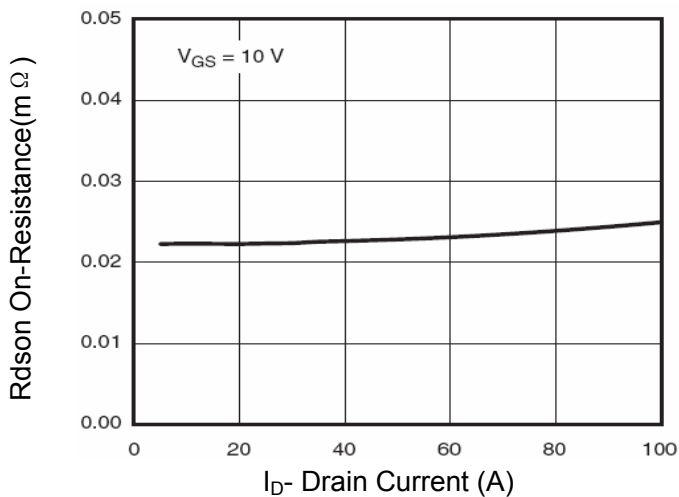


Figure 3 $R_{DS(on)}$ - Drain Current

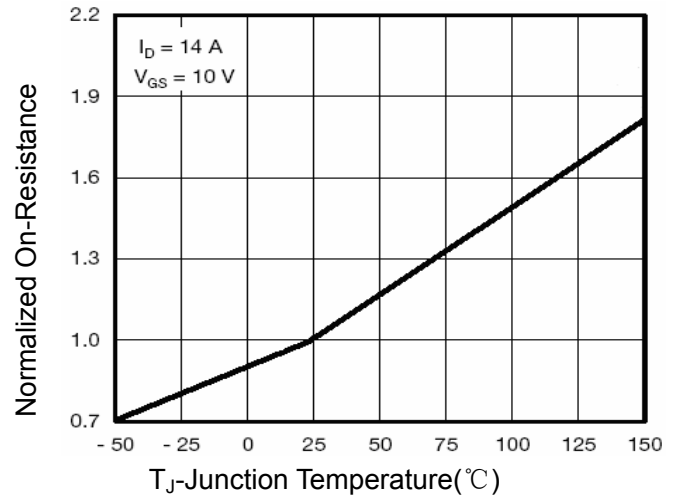


Figure 4 $R_{DS(on)}$ -Junction Temperature

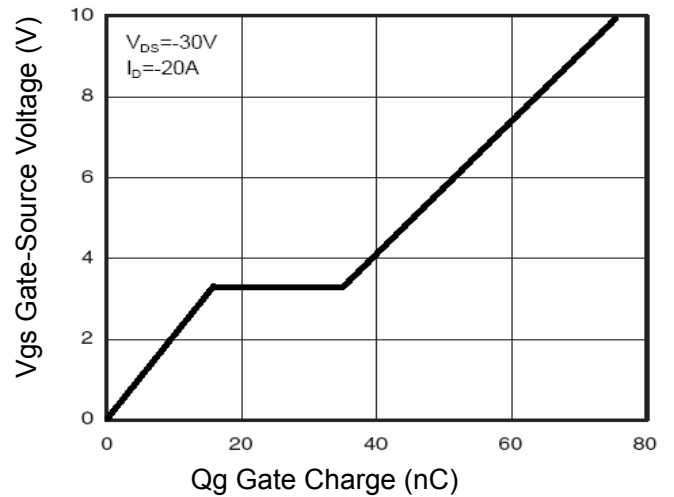


Figure 5 Gate Charge

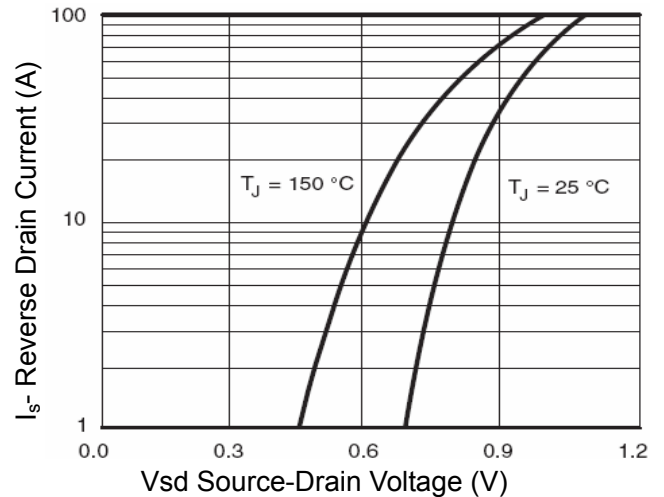


Figure 6 Source- Drain Diode Forward

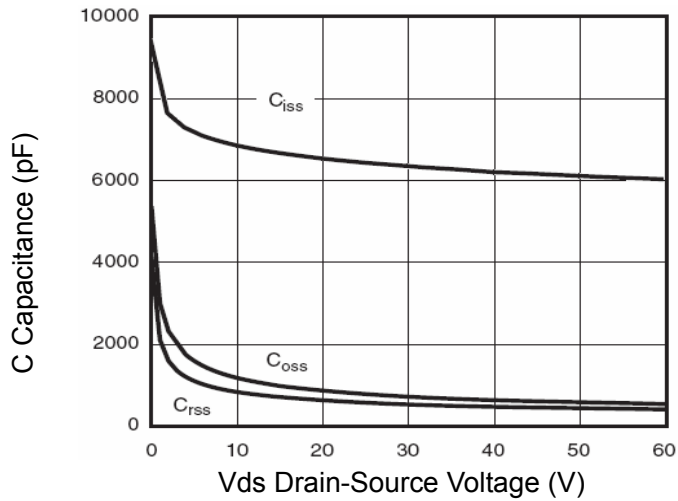


Figure 7 Capacitance vs Vds

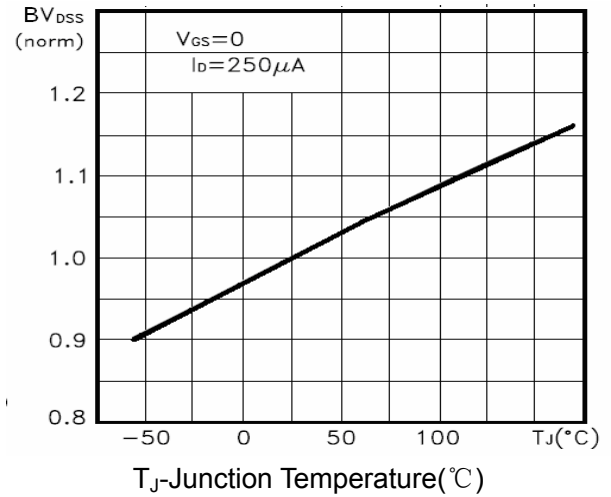


Figure 9 BV_{DSS} vs Junction Temperature

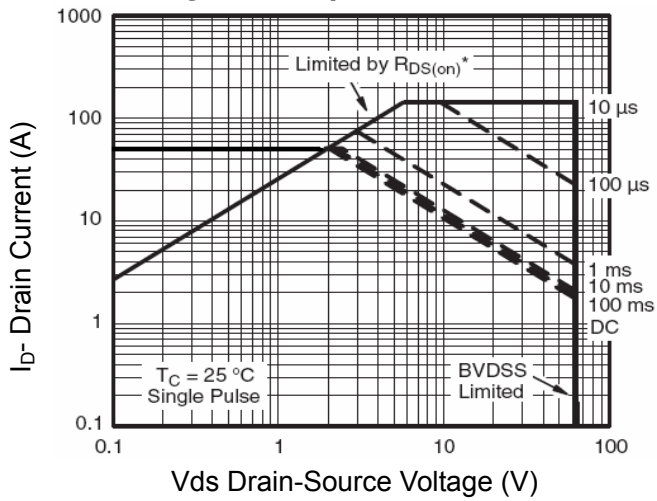


Figure 8 Safe Operation Area

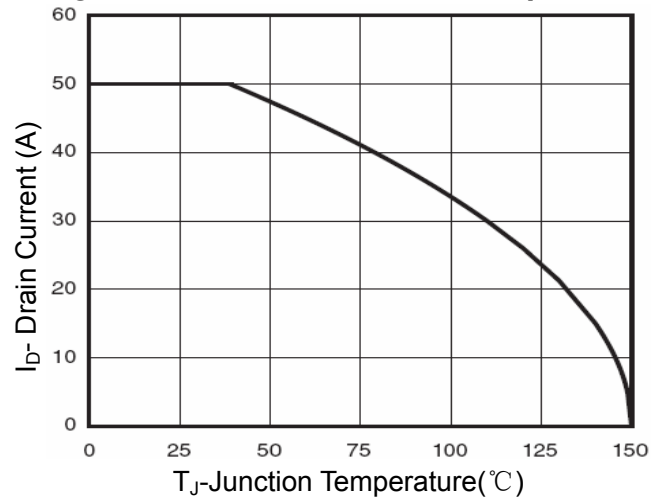


Figure 10 I_D Current Derating vs Junction Temperature

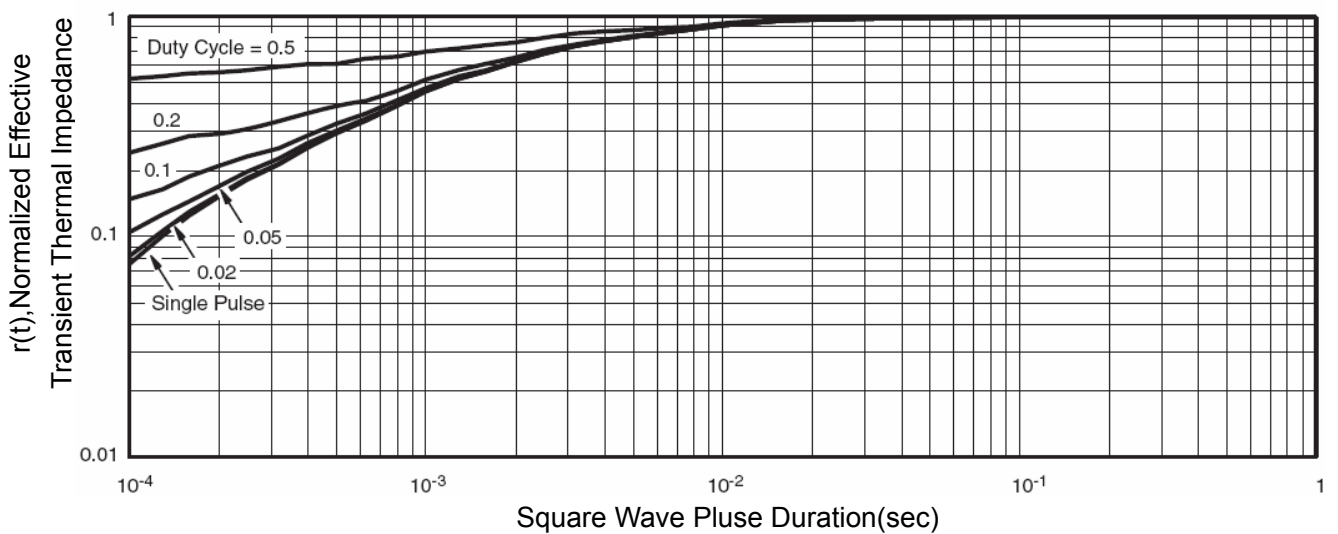
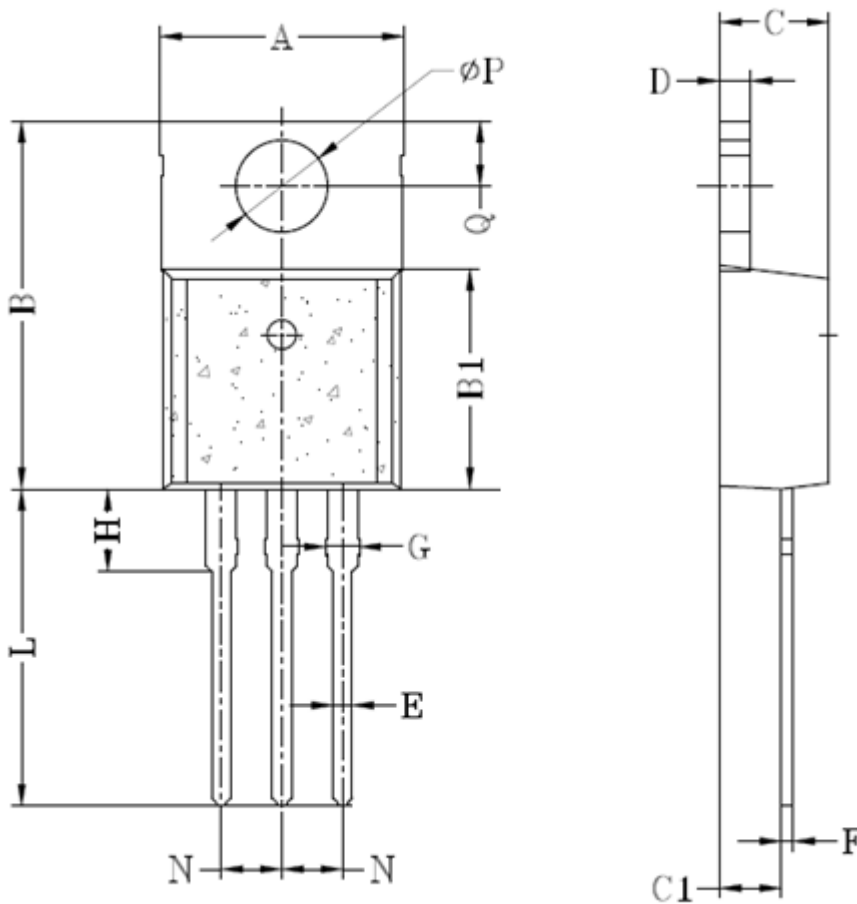


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220 Package Information



Symbol	unit(mm)	
	MIN	MAX
A	10.0	10.4
B	15.2	15.6
B1	9.00	9.60
C	4.47	4.67
C1	2.28	2.88
D	1.20	1.40
E	0.70	0.90
F	0.40	0.60
G	1.27	1.47
H	3.20	3.70
L	12.95	13.55
N	2.34	2.74
Q	2.44	3.04
Ø P	3.74	3.94

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