

-30V P-Channel Advanced Power MOSFET

BVDSS	-30	V
ID	-60	A
$R_{DS(on)}@V_{GS}=-10V$	7.5	mΩ
$R_{DS(on)}@V_{GS}=-4.5V$	12.6	mΩ

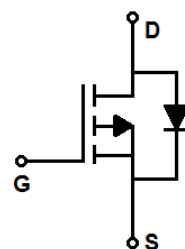
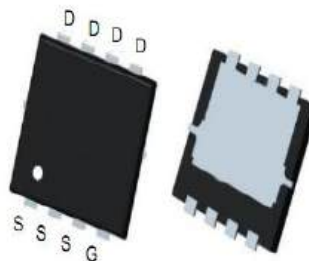
Features

- - 4.5V Logic Level Control
- PDFN 5x6 SMD Package

Applications

- Load Switch
- Battery Switch
- Optimized for Power Management Applications for Portable Products, such as Aeromodelling, Power bank, Brushless motor, Main board , and Others

PDFN5X6-8L



Order Information

Product	Package	Marking	Packing
M03P60J	PDFN5x6	PTN60P03	5000PCS/Reel

Absolute Maximum Ratings

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Symbol	Parameter	Rating	Unit	
Common Ratings (T _J =25°C Unless Otherwise Noted)				
V _{GS}	Gate-Source Voltage	±25	V	
V _{(BR)DSS}	Drain-Source Breakdown Voltage	-30	V	
T _J	Maximum Junction Temperature	150	°C	
T _{STG}	Storage Temperature Range	-55 to 175	°C	
Mounted on Large Heat Sink				
I _{DM}	Pulse Drain Current Tested①	T _C =25°C	-240	A
I _D	Continuous Drain Current	T _C =25°C	-60	A
P _D	Maximum Power Dissipation	T _C =25°C	54	W
EAS	Avalanche energy, single pulsed ②		110	mJ
R _{θJC}	Thermal Resistance-Junction to Case		2.3	°C/W

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-30	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(T _C =25°C)	V _{DS} =-30V, V _{GS} =0V	--	--	-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.0		-2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance③	V _{GS} =-10V, I _D =-30A	--	5.8	7.5	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance③	V _{GS} =-4.5V, I _D =-20A	--	9.0	12.6	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	--	4650	--	pF
C _{oss}	Output Capacitance		--	550	--	pF
C	Reverse Transfer Capacitance		--	486	--	pF
Q _g	Total Gate Charge	V _{DS} =-15V I _D =-20A, V _{GS} =-10V	--	45.0	--	nC
Q _{gs}	Gate Source Charge		--	8.0	--	nC
Q _{gd}	Gate Drain Charge		--	12.0	--	nC
Switching Characteristics @ T _J = 25°C (unless otherwise stated)						
t _{d(on)}	Turn on Delay Time	V _{DD} =-15V, I _D =-30A, R _G =2.5Ω, V _{GS} =-10V	--	19	--	ns
t _r	Turn on Rise Time		--	15	--	ns
t _{d(off)}	Turn Off Delay Time		--	65	--	ns
t _f	Turn Off Fall Time		--	36	--	ns
Source Drain Diode Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage③	I _{SD} =-30A,V _{GS} =0V	--	-0.8	-1.2	V

Notes: ① Pulse width limited by maximum allowable junction temperature

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.3mH, R_G = 25Ω, I_{AS} = 22A, V_{GS} = 10V. Part not recommended for use above this value

③ Pulse width ≤ 300μs; duty cycles ≤ 2%

Typical Performance Characteristics

Figure 1: Output Characteristics

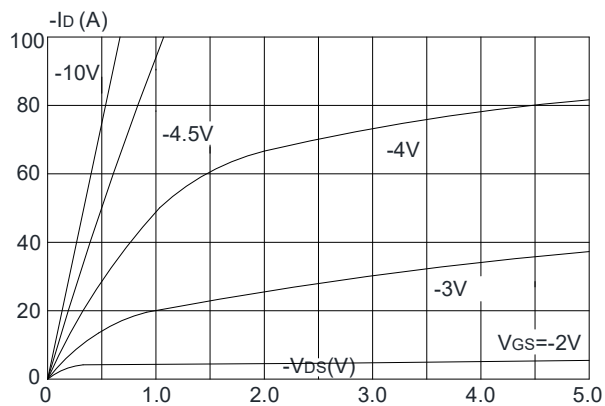


Figure 2: Typical Transfer Characteristics

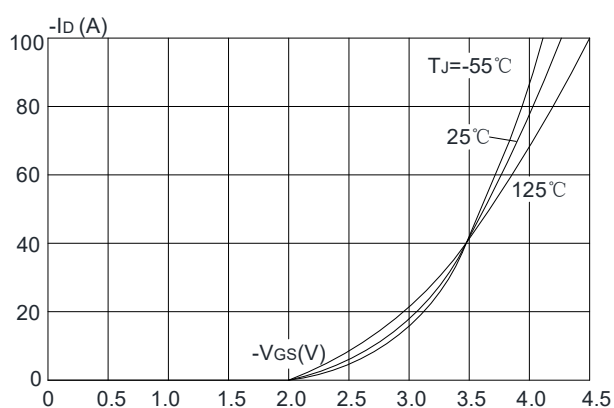


Figure 3: On-resistance vs. Drain Current

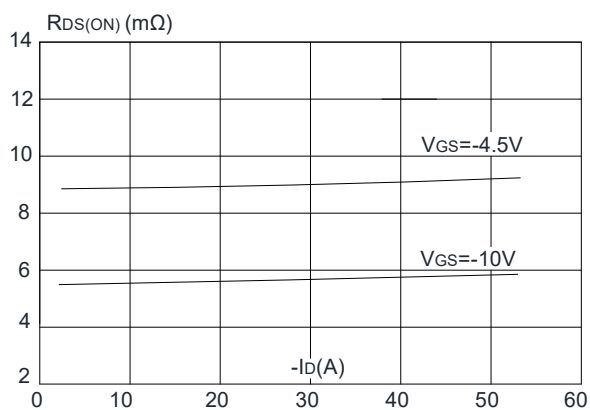


Figure 4: Body Diode Characteristics

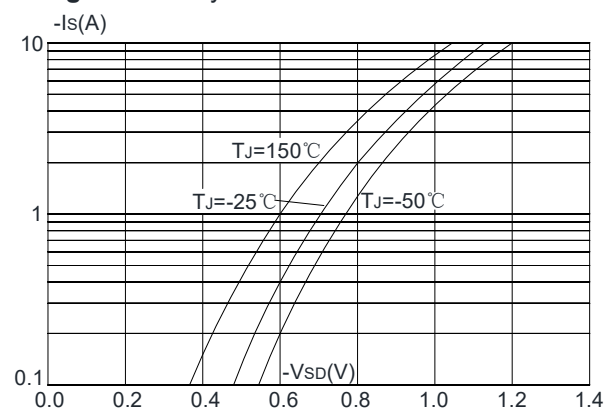


Figure 5: Gate Charge Characteristics

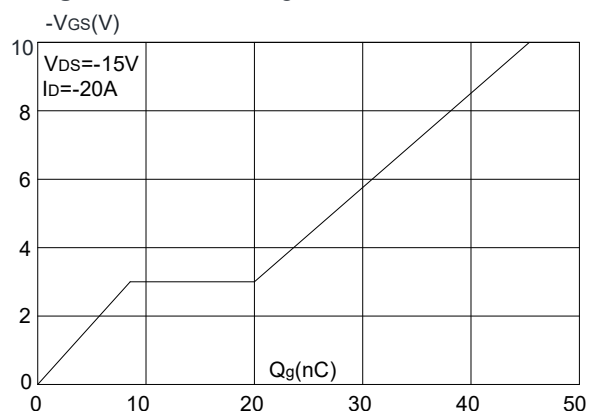


Figure 6: Capacitance Characteristics

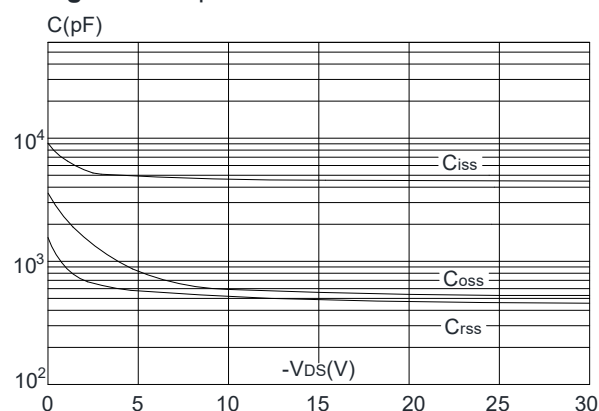


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

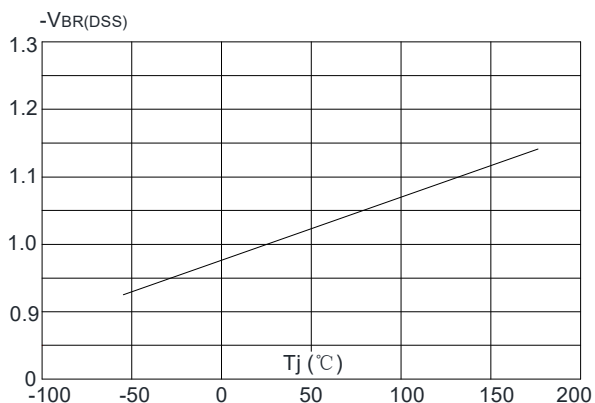


Figure 8: Normalized on Resistance vs. Junction Temperature

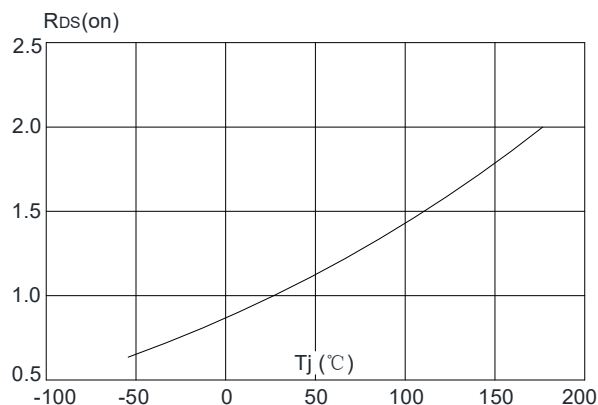


Figure 9: Maximum Safe Operating Area

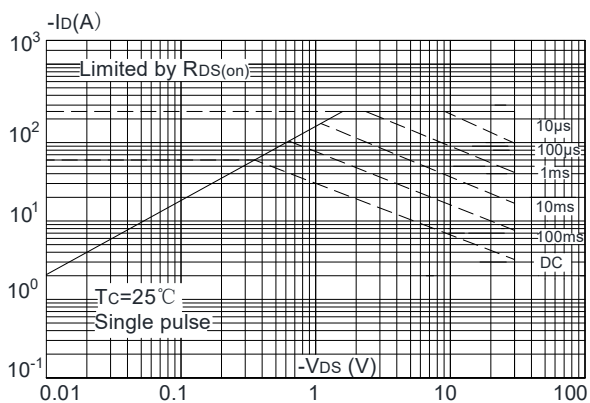
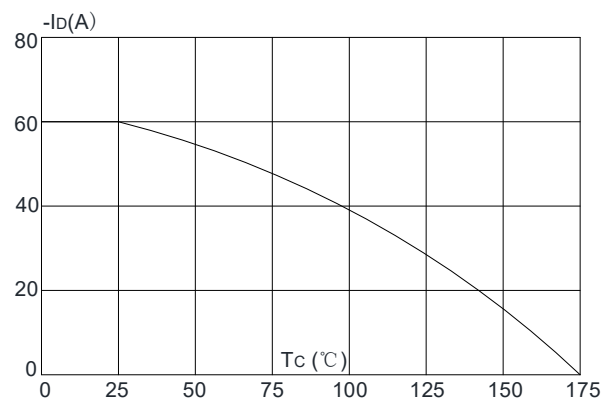
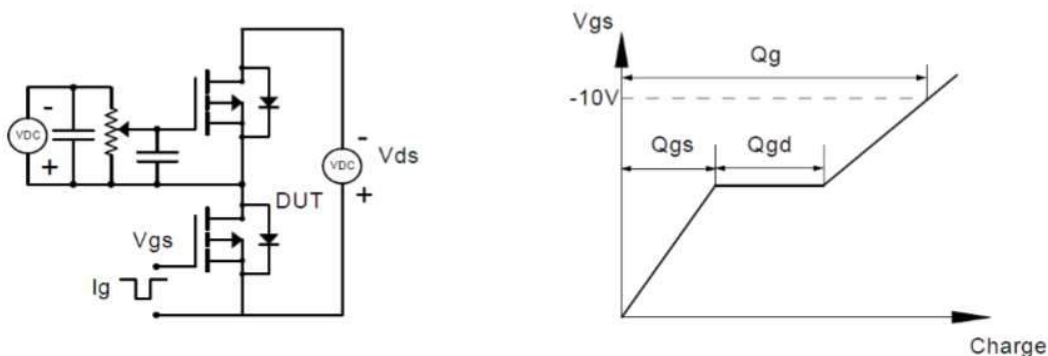


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

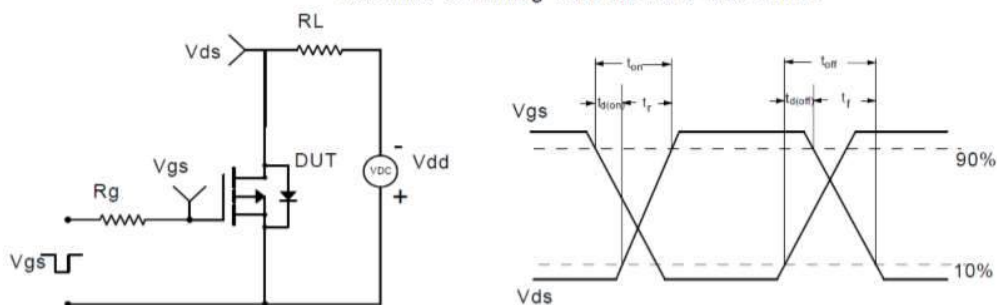


Test Circuit

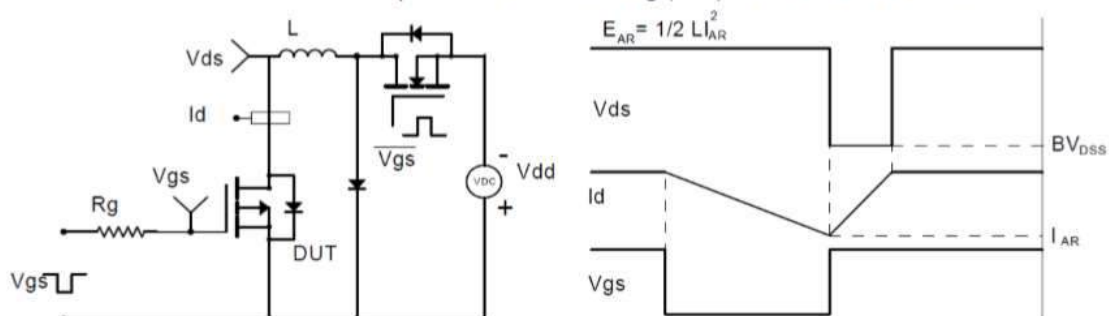
Gate Charge Test Circuit & Waveform



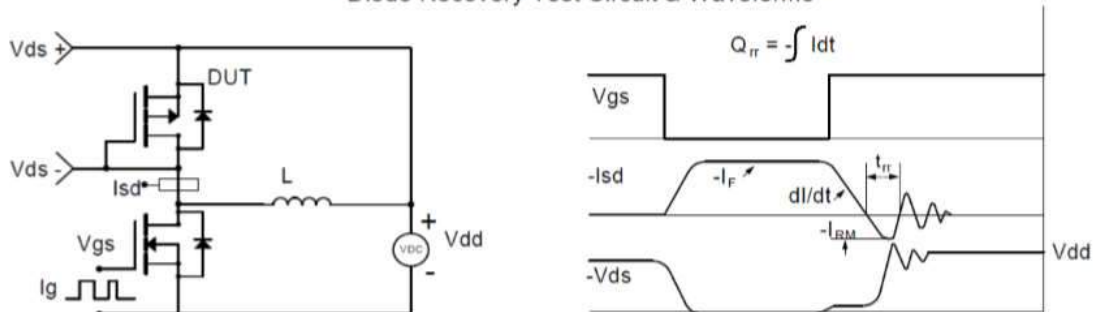
Resistive Switching Test Circuit & Waveforms



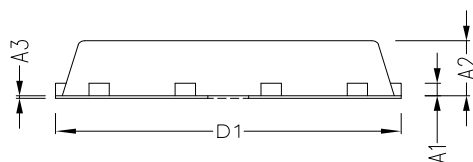
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



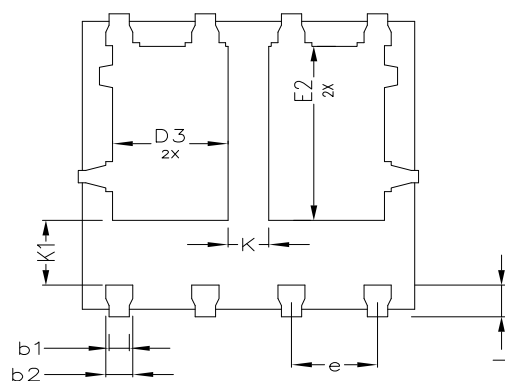
Diode Recovery Test Circuit & Waveforms



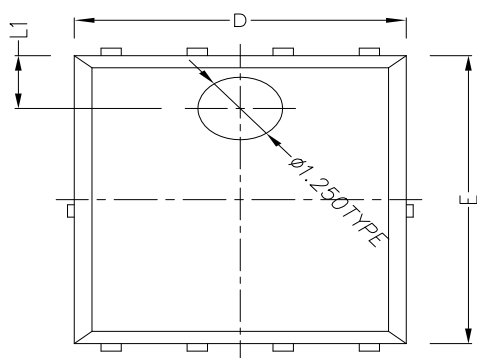
PDFN5X6 Package Outline Dimensions (Units: mm)



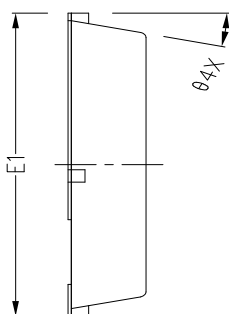
SIDE VIEW



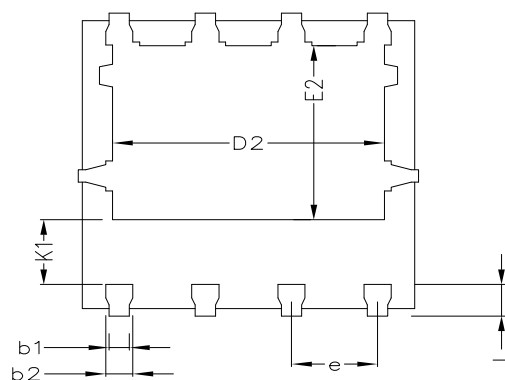
BOTTOM VIEW
OPTION 1



TOP VIEW



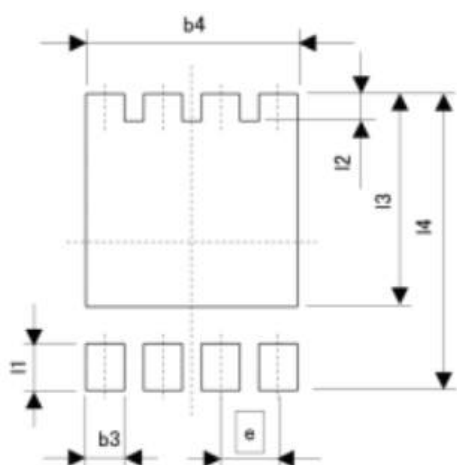
SIDE VIEW



BOTTOM VIEW
OPTION 2

COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	0.254 BSC		
A2	1.000	1.100	1.200
A3	0.005	-	0.020
b1	0.250	0.300	0.350
b2	0.350	0.400	0.450
D	4.800	4.900	5.000
D1	5.000	5.100	5.200
D2	3.910	4.010	4.110
D3	1.605	1.705	1.805
E	5.650	5.750	5.850
E1	5.950	6.050	6.150
E2	3.375	3.475	3.575
e	1.270 TYPE		
L	0.530	0.630	0.730
L1	1.00 REF		
K	0.600 REF		
K1	1.235 REF		

Suggested Pad Layout



DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b3	-	0.68	-	0.027
b4	-	4.06	-	0.160
l1	-	0.81	-	0.032
l2	-	0.71	-	0.028
l3	-	4.49	-	0.177
l4	-	6.20	-	0.244