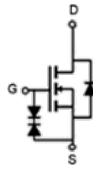


FBP1006

Symbol


Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(ON)-Max}$	420	m Ω
I_D	1	A

Key Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- ESD Protection

Applications

- Portable Equipment
- Battery Powered System
- Load Switch

Ordering Information

Ordering part Number	Marking code	Package	Form
VPLMDF7176	7176	FBP1006	Tape & Reel

Absolute Maximum Ratings ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 12	V
Maximum Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Diode Continuous Forward Current	I_S	0.6	A
Pulse Drain Current Tested	$I_{DM}^{(1)}$	2.5	A
Continuous Drain Current	I_D	$T_A = 25^\circ\text{C}$	1
		$T_A = 70^\circ\text{C}$	0.8
Maximum Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.69
		$T_A = 70^\circ\text{C}$	0.44
Avalanche Current, Single pulse	$I_{AS}^{(2)}$	1.8	A
Avalanche Energy, Single pulse	$E_{AS}^{(2)}$	0.16	mJ

Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance-Junction to Ambient	$R_{\theta JA}^{(3)}$	180	$^\circ\text{C/W}$

- (1) Max. current is limited by junction temperature.
- (2) UIS tested and pulse width are limited by maximum junction temperature 150°C
- (3) Surface Mounted on 1in^2 FR-4 board with 1oz.

Electrical Characteristics ($T_j = 25^\circ\text{C}$, unless otherwise specified)

Static Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30	-	-	V	$V_{GS}=0V, I_{DS}=250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=24V, V_{GS}=0V$
Gate Threshold Voltage	$V_{GS(th)}$	0.6	0.95	1.3	V	$V_{DS}=V_{GS}, I_{DS}=250\mu A$
Gate Leakage Current	I_{GSS}	-	-	± 10	μA	$V_{GS}=\pm 12V, V_{DS}=0V$
Drain-Source On-state Resistance	$R_{DS(ON)}^{(4)}$	-	350	420	m Ω	$V_{GS}=4.5V, I_{DS}=0.5A$
		-	435	565		$V_{GS}=2.5V, I_{DS}=0.3A$
		-	740	850		$V_{GS}=1.8V, I_{DS}=0.1A$
Forward Transconductance	g_{fs}	-	1.2	-	S	$V_{DS}=5V, I_{DS}=0.25A$

Dynamic Characteristics⁽⁵⁾

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate Resistance	R_G	-	194	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ Freq.=1MHz
Input Capacitance	C_{iss}	-	38.1	-	pF	$V_{GS}=0V, V_{DS}=15V,$ Freq.=1MHz
Output Capacitance	C_{oss}	-	4.8	-		
Reverse Transfer Capacitance	C_{rss}	-	3.4	-		
Turn-on Delay Time	$t_{d(ON)}$	-	5.3	-	nS	$V_{GS}=4.5V, V_{DS}=15V,$ $I_D=1A, R_{GEN}=6\Omega$
Turn-on Rise Time	t_r	-	20.2	-		
Turn-off Delay Time	$t_{d(OFF)}$	-	34.5	-		
Turn-off Fall Time	t_f	-	30.3	-		

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Total Gate Charge	Q_g	-	0.85	-	nC	$V_{GS}=4.5V, V_{DS}=15V,$ $I_D=1A$
Gate-Source Charge	Q_{gs}	-	0.29	-		
Gate-Drain Charge	Q_{gd}	-	0.16	-		

Source Drain Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Diode Forward Voltage	$V_{SD}^{(4)}$	-	0.9	1.1	V	$I_{SD}=0.25A, V_{GS}=0V$
Reverse Recovery Time	t_{rr}	-	24.1	-	nS	$I_F=0.25A, V_R=20V$ & $di_F/dt=100A/\mu s$
Reverse Recovery Charge	Q_{rr}	-	3.2	-	nC	

- ⁽⁴⁾ Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).
- ⁽⁵⁾ Guaranteed by design, not subject to production testing.

Electrical Characteristic Diagrams

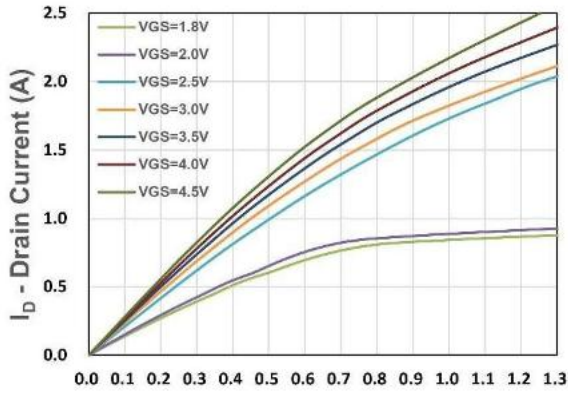


Figure 1. Output Characteristics

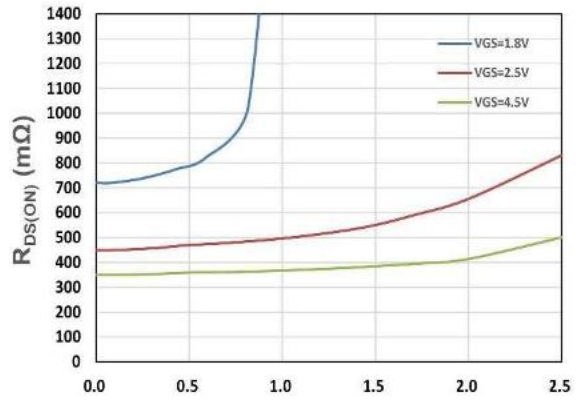


Figure 2. On-Resistance vs. ID

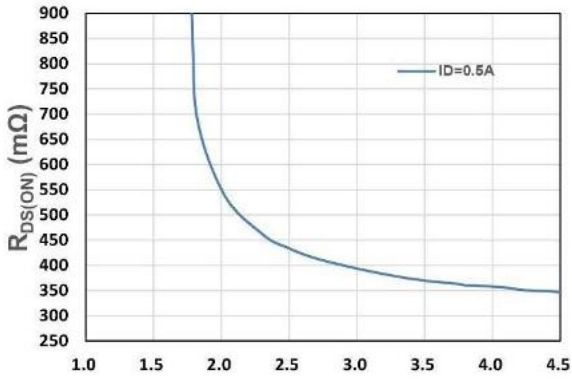


Figure 3. On-Resistance vs. VGS

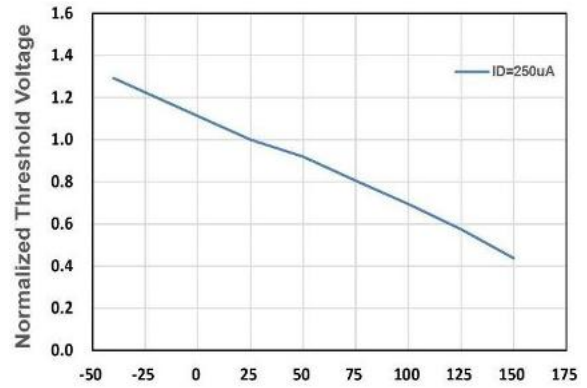


Figure 4. Gate Threshold Voltage

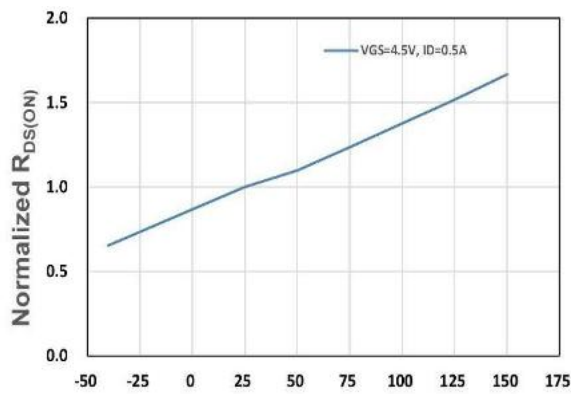


Figure 5. Drain-Source On Resistance

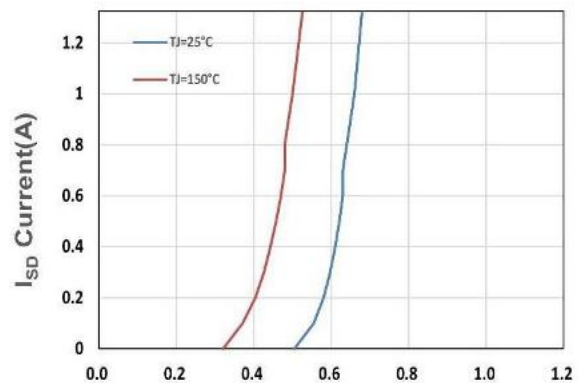


Figure 6. Source-Drain Diode Forward

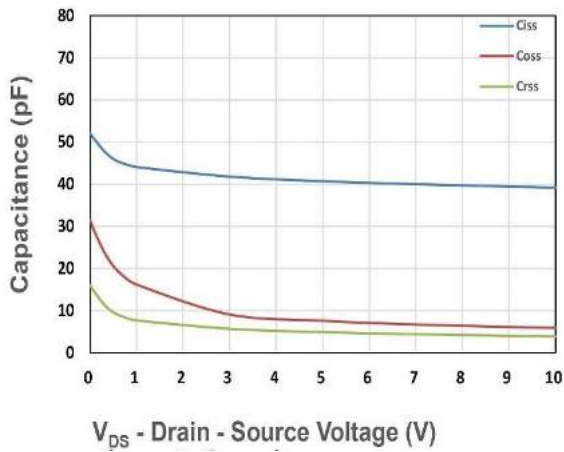


Figure 7. Capacitance

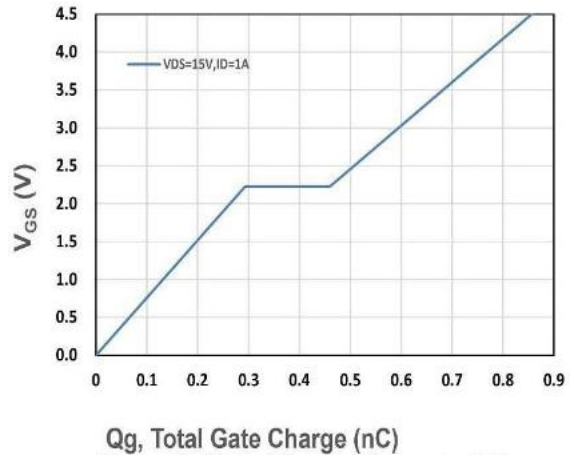


Figure 8. Gate Charge Characteristics

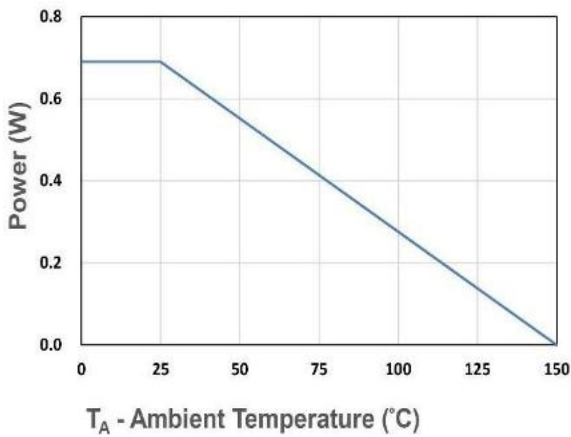


Figure 9. Power Dissipation

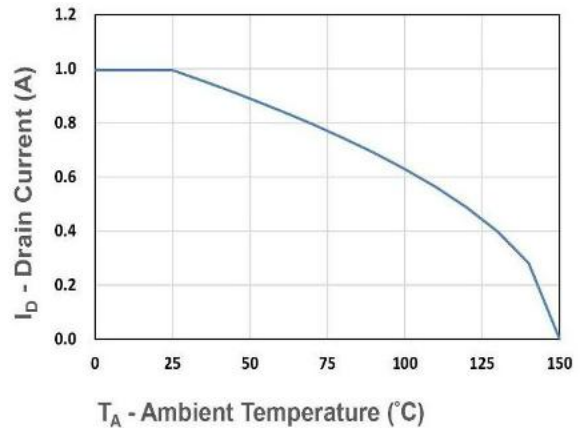


Figure 10. Drain Current

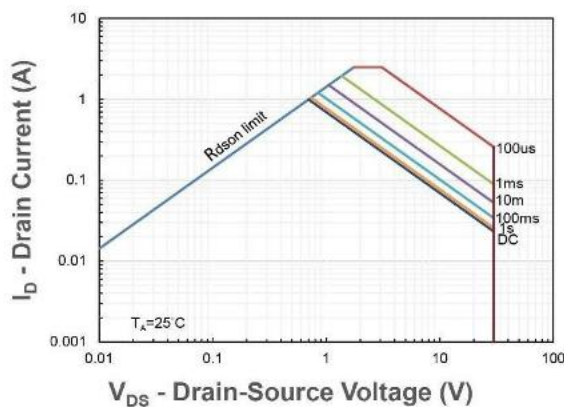


Figure 11. Safe Operating Area

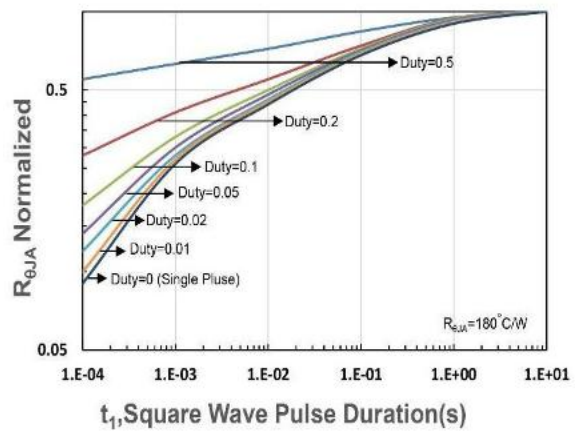
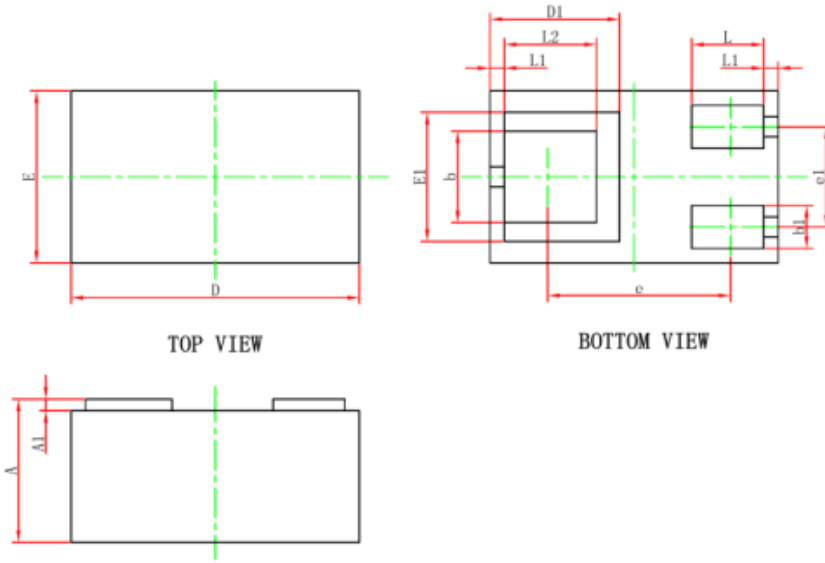


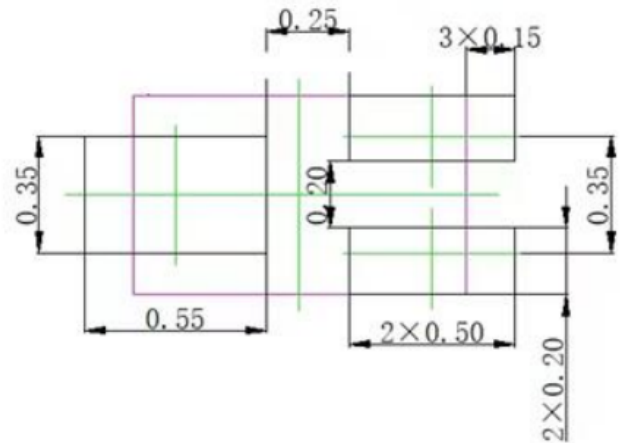
Figure 12. $R_{\theta JA}$ Transient Thermal Impedance

Package Information (FBP1006)



Outline dimensions in mm

Unit:mm	Min	Typ	Max
A	0.450	/	0.550
A1	0.010	/	0.100
D	0.950	/	1.050
E	0.550	/	0.650
D1	/	0.45 REF.	/
E1	/	0.45 REF.	/
b	0.270	/	0.370
b1	0.100	/	0.200
e	/	0.635 REF.	/
e1	0.300	/	0.400
L	0.200	/	0.300
L1	/	0.050 REF.	/
L2	0.270	/	0.370



Suggested Pad Layout (Unit:mm)
Land Pattern (Only for Reference)

Disclaimer

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Contact Information

indiaVP Semiconductor Pvt. Ltd.

Email: sales@ivpsemi.com

Website: www.ivpsemi.com