

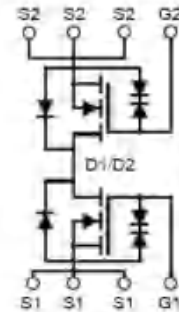
AP1805EQD

Dual-N-Channel Enhancement Mosfet

Feature

- 18V,15A
 $R_{DS(ON)} < 5.2m\Omega @ V_{GS}=4.5V$ TYP=3.8 m Ω
 $R_{DS(ON)} < 6.2m\Omega @ V_{GS}=2.5V$ TYP=4.8 m Ω
- Advanced Trench Technology
- Lead free product is acquired
- ESD >2KV

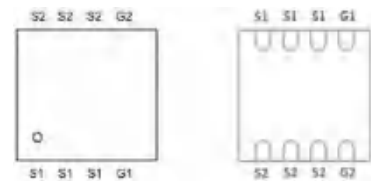
Equivalent Circuit



Application

- PWM applications
- Load Switch
- Power management

PDFN 3x3 Package



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
1805EQD	AP1805EQD	PDFN3X3	13 inch	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	18	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current ($T_a = 25^{\circ}C$)	I_D	15	A
Continuous Drain Current ($T_a = 100^{\circ}C$)	I_D	10	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	60	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	30	mJ
Power Dissipation	P_D	32	W
Thermal Resistance from Junction to Case ⁽⁴⁾	$R_{\theta JC}$	3.9	$^{\circ}C/W$
Junction Temperature	T_J	150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

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

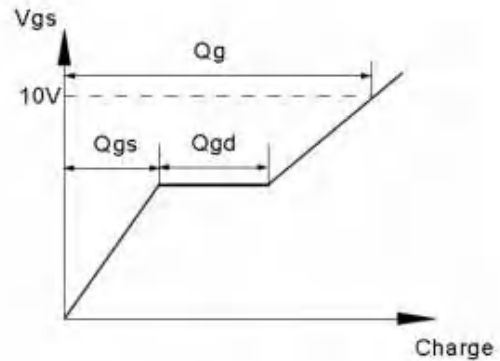
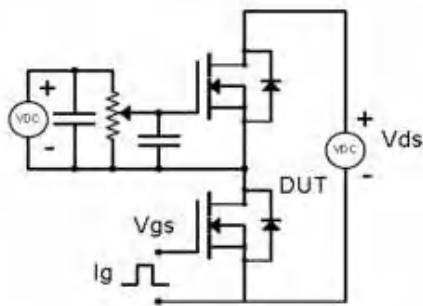
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	18	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 18V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 10V, V_{DS} = 0V$	-	-	± 10	μA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.5	0.7	0.9	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 3A$	-	3.8	5.2	m Ω
		$V_{GS} = 2.5V, I_D = 3A$	-	4.8	6.2	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	-	2610	-	pF
Output Capacitance	C_{oss}		-	344	-	
Reverse Transfer Capacitance	C_{rss}		-	320	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 3A,$ $V_{GS} = 4.5V, R_G = 3.3\Omega$	-	8	-	ns
Turn-on rise time	t_r		-	36	-	
Turn-off delay time	$t_{d(off)}$		-	378	-	
Turn-off fall time	t_f		-	201	-	
Total Gate Charge	Q_g	$V_{DS} = 10V, I_D = 3A,$ $V_{GS} = 4.5V$	-	36	-	nC
Gate-Source Charge	Q_{gs}		-	3	-	
Gate-Drain Charge	Q_{gd}		-	13.2	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V_{DS}	$V_{GS} = 0V, I_S = 3A$	-	-	1.2	V
Diode Forward current ⁽⁴⁾	I_S		-	-	15	A
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}, I_F = 3A, di/dt = 100A/\mu s$		21		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$T_J = 25^{\circ}, I_F = 3A, di/dt = 100A/\mu s$		9		nc

Notes:

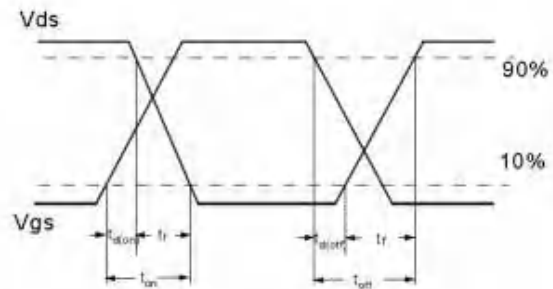
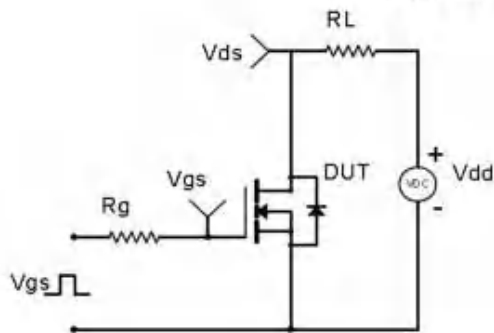
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = 10V, R_G = 25\Omega, L = 0.5\text{mH}$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t_s \leq 10\text{ sec}$

Test Circuit & Waveform

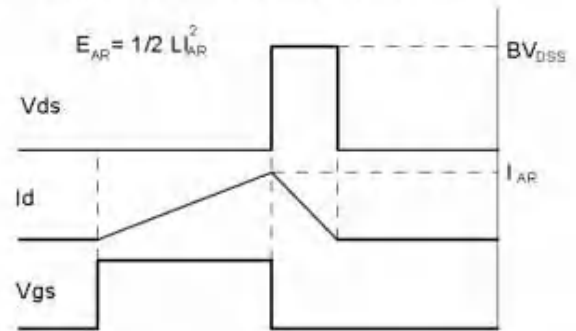
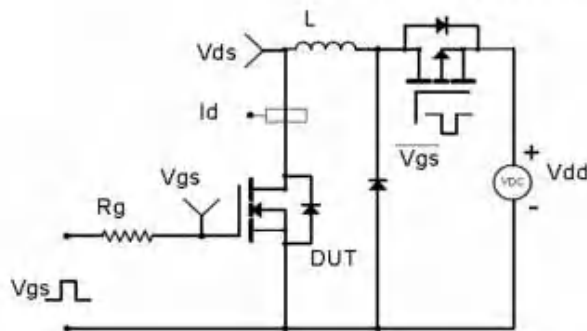
Gate Charge Test Circuit & Waveform



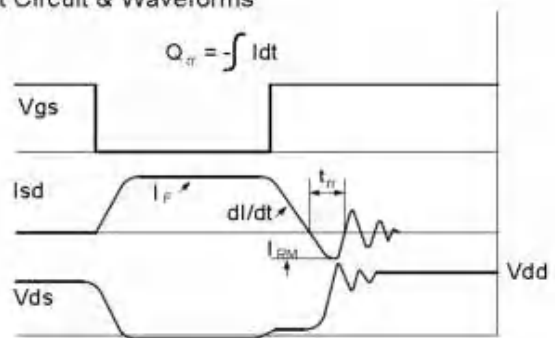
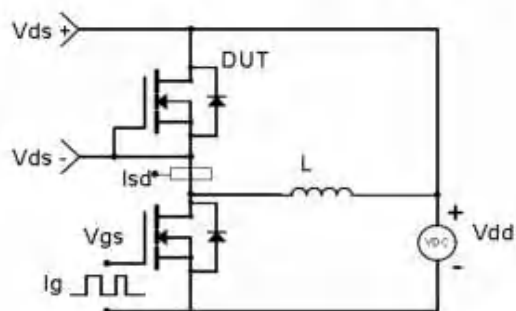
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Fig.1 Typical Output Characteristics

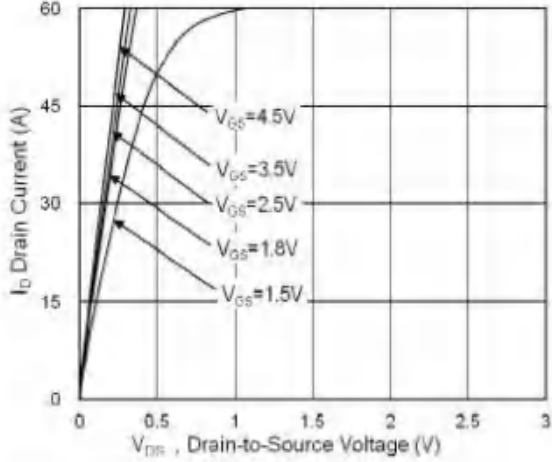


Fig.2 On-Resistance vs. Gate-Source

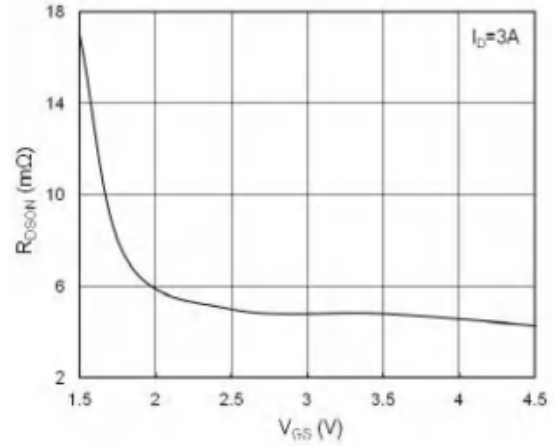


Fig.3 Forward Characteristics Of Reverse

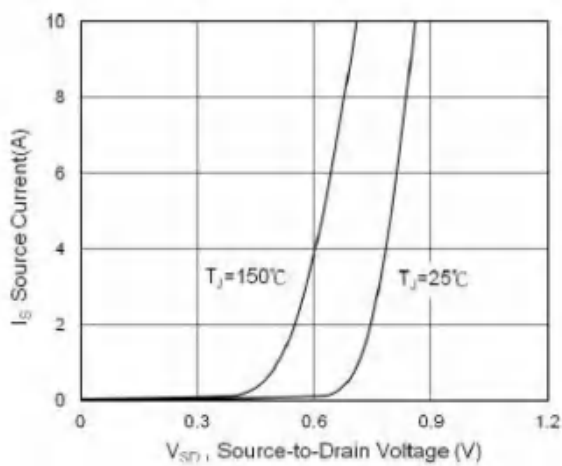


Fig. 4 Gate Charge Characteristics

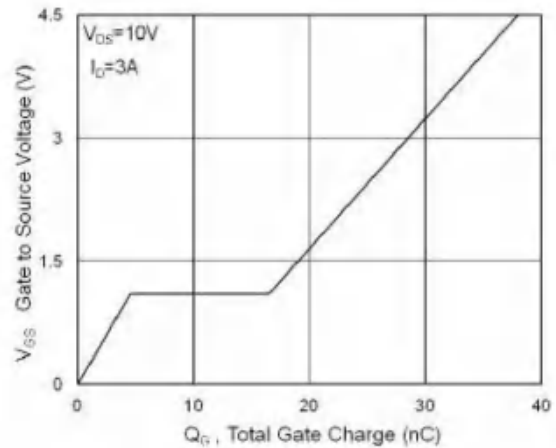


Fig.5 $V_{GS(th)}$ vs. T_J

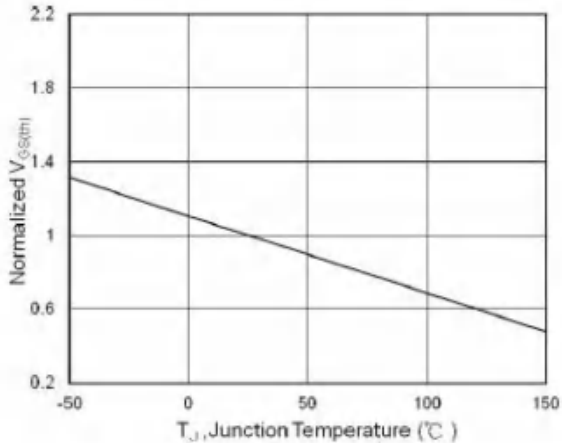


Fig. 6 Normalized $R_{DS(on)}$ vs. T_J

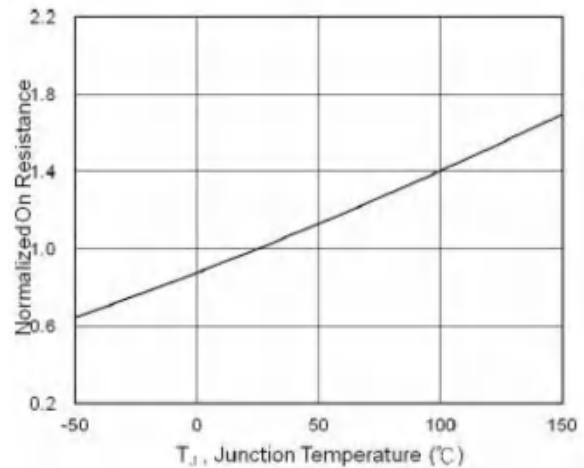


Fig.7 Capacitance

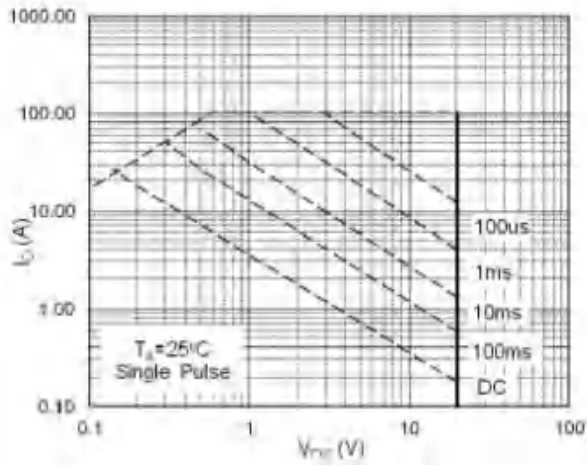


Fig.8 Safe Operating Area

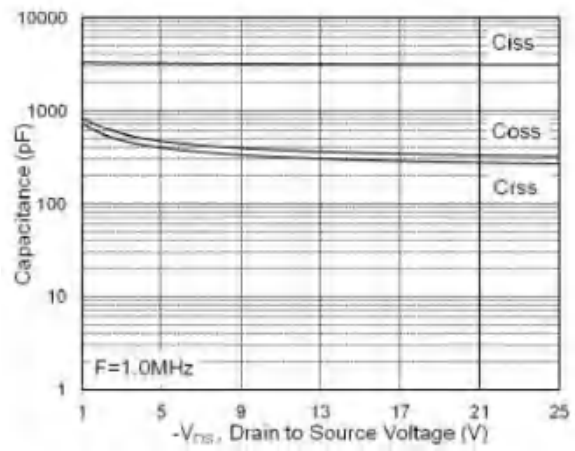
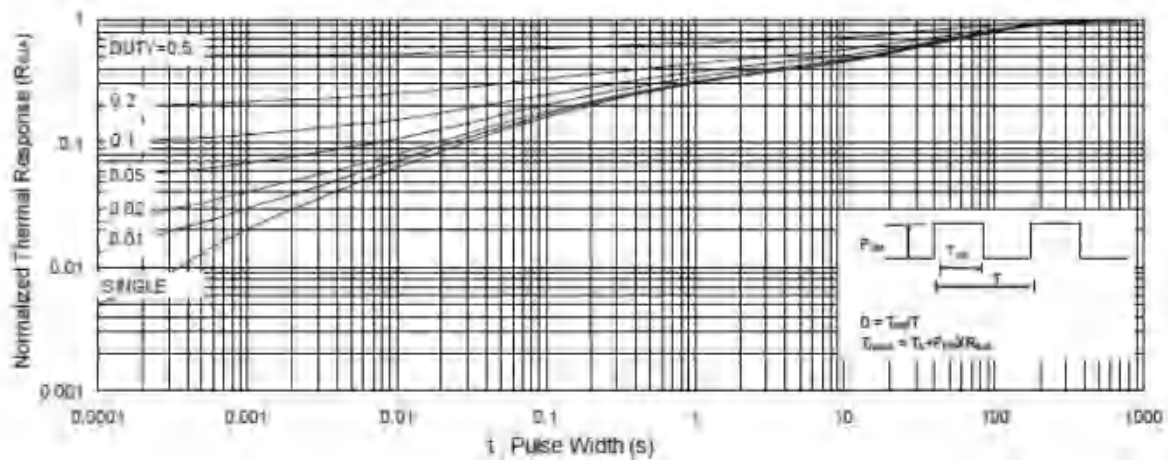
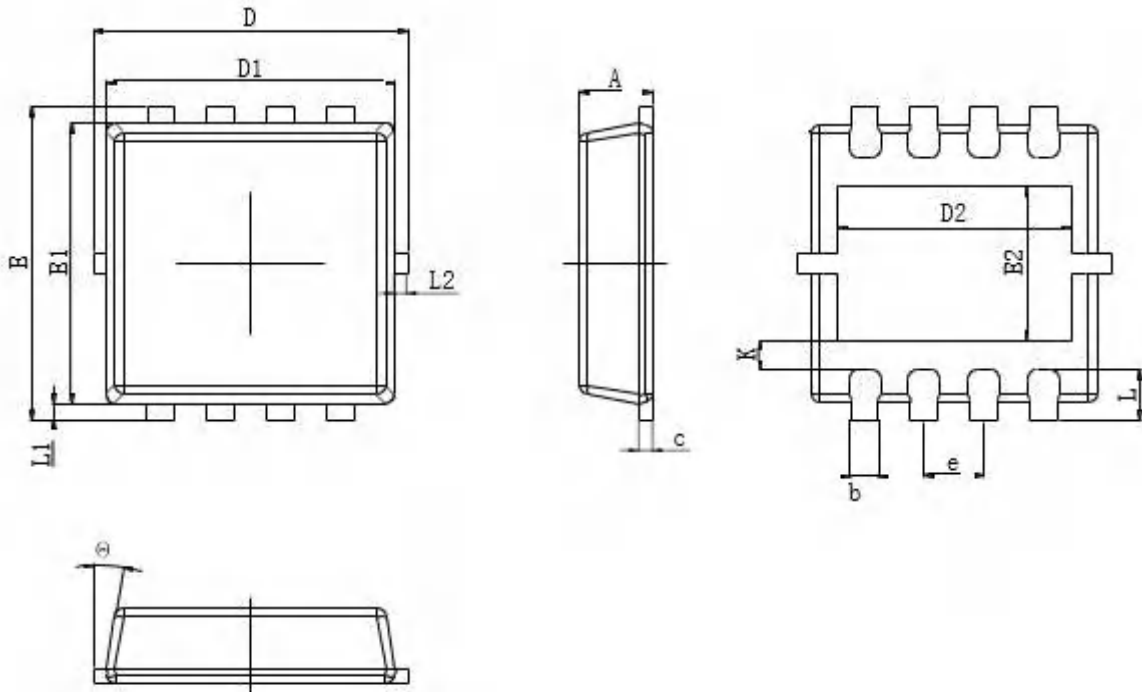


Fig. 9 Normalized Maximum Transient Thermal Impedance



PDFN3X3 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

Symbol	Min.	Nom	Max.
A	0.700	0.800	0.900
b	0.250	0.300	0.350
c	0.140	0.150	0.200
D	0.320	3.300	3.400
D1	3.050	3.150	3.250
D2	2.450	2.550	2.650
e	0.65 (BSC)		
E	3.250	3.350	3.450
E1	2.900	3.000	3.100
E2	1.550	1.650	1.750
K	0.265	0.315	0.365
L	0.400	0.500	0.600
L1	0.050	0.150	0.250
L2	-	-	0.150
e	8°	10°	12°