

Product Summary

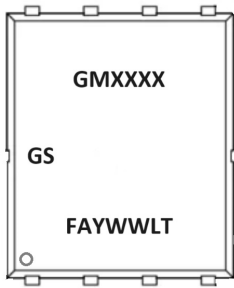
V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
-20	5.5@ $V_{GS} = -4.5V$	-50

Features

- ❖ Fast Switching
- ❖ Low On-Resistance
- ❖ Low Gate Charge

Application

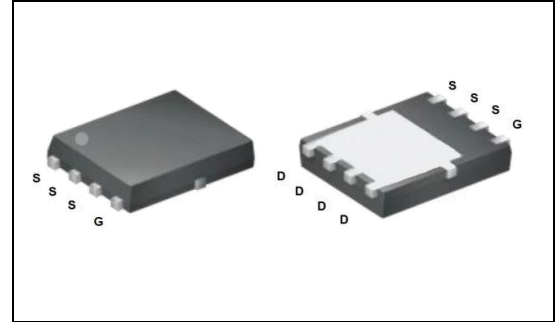
- ❖ Load Switch
- ❖ Battery protection
- ❖ Uninterruptible power supply



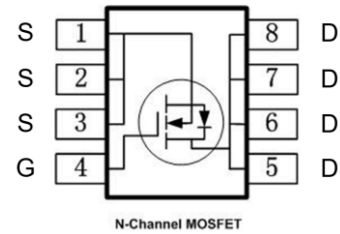
PDFN3333

NOTE:
 LOGO - GS
 GMXXXX- Part number code
 F - Fab location code
 A - Assembly location code
 Y - Year code
 WW - Week code
 L&T - Assembly lot code

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Equivalent circuit



Absolute Maximum Rating ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	-20	V
Gate-source voltage	V_{GS}	± 12	
Continuous drain current ($V_{GS}=-4.5V$) ⁽¹⁾	$T_A=25^\circ\text{C}$	I_D	A
	$T_A=70^\circ\text{C}$	-50 -18	
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	-100	
Power dissipation	$T_A=25^\circ\text{C}$	P_D	30 W
	$T_A=70^\circ\text{C}$		19 W
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Thermal Characteristic

Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	4.2	$^\circ\text{C/W}$
Thermal resistance, junction-to-ambient ⁽⁴⁾	$R_{\theta JA}$	75	

**Electrical characteristics (Ta=25°C ± 3°C)**

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter ⁽⁴⁾						
Drain to source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -250 μA	-20			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-0.45	-0.65	-0.9	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±12 V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = -20 V, V _{GS} = 0 V			-1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -15 A		4.8	5.5	mΩ
	R _{DS(on)}	V _{GS} = -2.5V, I _D = -15 A		6.1	6.5	mΩ
Forward transconductance	g _{fs}	V _{DS} = -5.0V, I _D = -8A		15		S
Gate resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz		5.9		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = -15V, I _D = -10A V _{GS} = -4.5V		59		nC
Gate-source charge	Q _{gs}			9		
Gate-drain charge	Q _{gd}			11.5		
Turn-on delay time	t _{d(on)}	V _{GS} = -4.5V, V _{DS} = -10V I _D = -10 A, R _{GEN} = 3.3Ω		16.4		ns
Rise time	t _r			73.7		
Turn-off delay time	t _{d(off)}			186		
Fall time	t _f			179		
Input capacitance	C _{iss}	V _{DS} = -15 V, V _{GS} = 0 V, f = 1 MHz		5576		pF
Output capacitance	C _{oss}			518		
Reverse transfer capacitance	C _{rss}			428		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	I _S = -2.0A, V _{GS} = 0V		-0.6	-1.0	V
Diode Forward Current	I _s	T _A = 25°C			-10.7	A
Reverse Recovery Time	t _{rr}	I _F =-10A , dI/dt=100A/μs , T _J =25°C		29		ns
Reverse Recovery Charge	Q _{rr}			18.6		nC

Notes

1. This current is chip limited, which is calculated based on R_{thjc} .
2. This current is calculated on single pulse with 10μs Pulse & Duty Cycle = 1%.
3. Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
4. Short duration pulse test used to minimize self-heating effect.
5. Defined by design, not subject to production.

Electrical characteristics diagrams

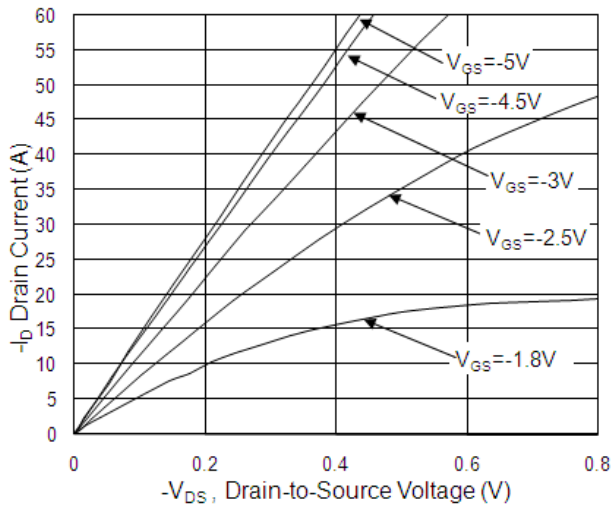


Fig.1 Typical Output Characteristics

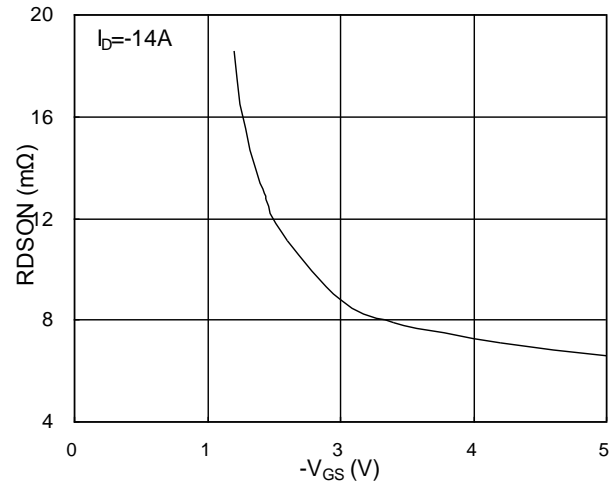


Fig.2 On-Resistance vs. G-S Voltage

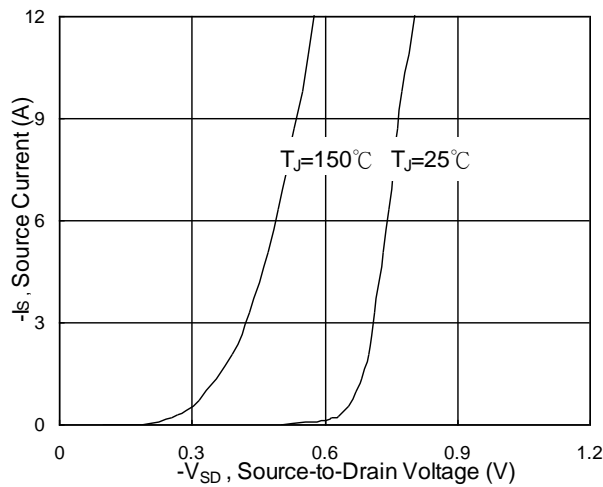


Fig.3 Forward Characteristics of Reverse

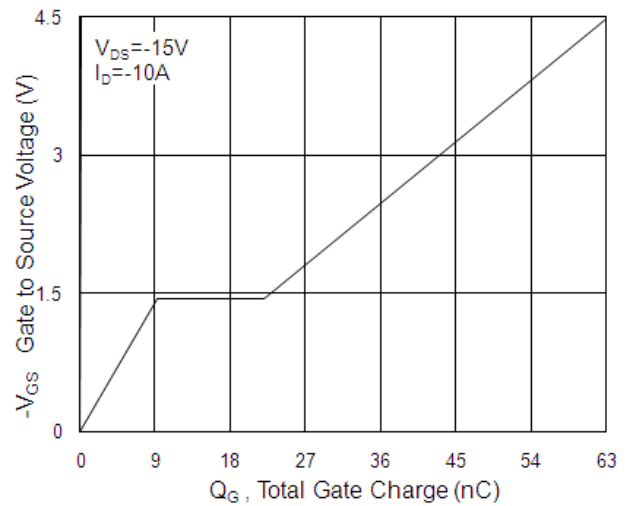


Fig.4 Gate-charge Characteristics

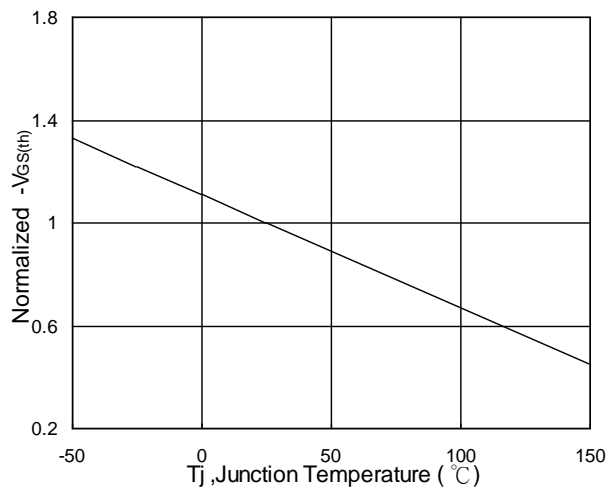


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

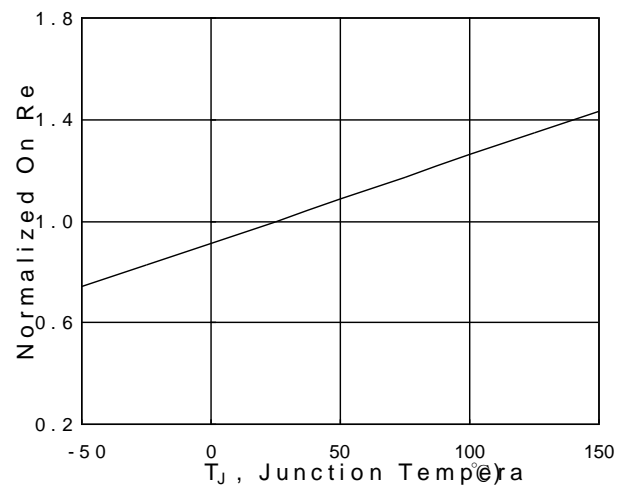


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

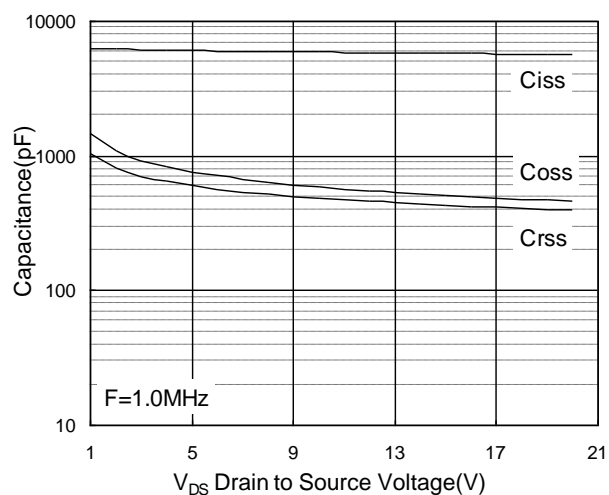


Fig.7 Capacitance

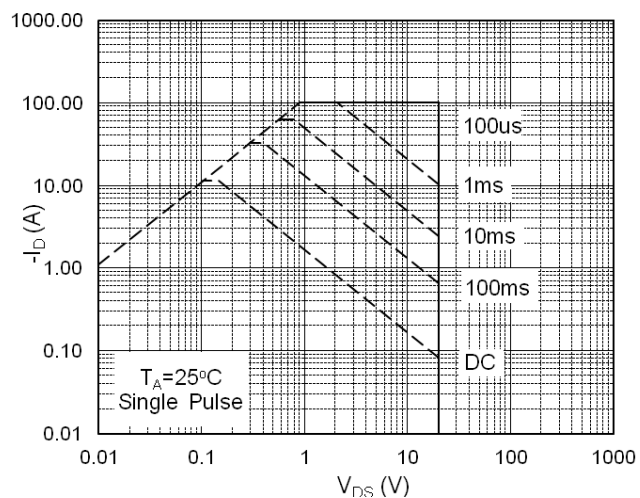


Fig.8 Safe Operating Area

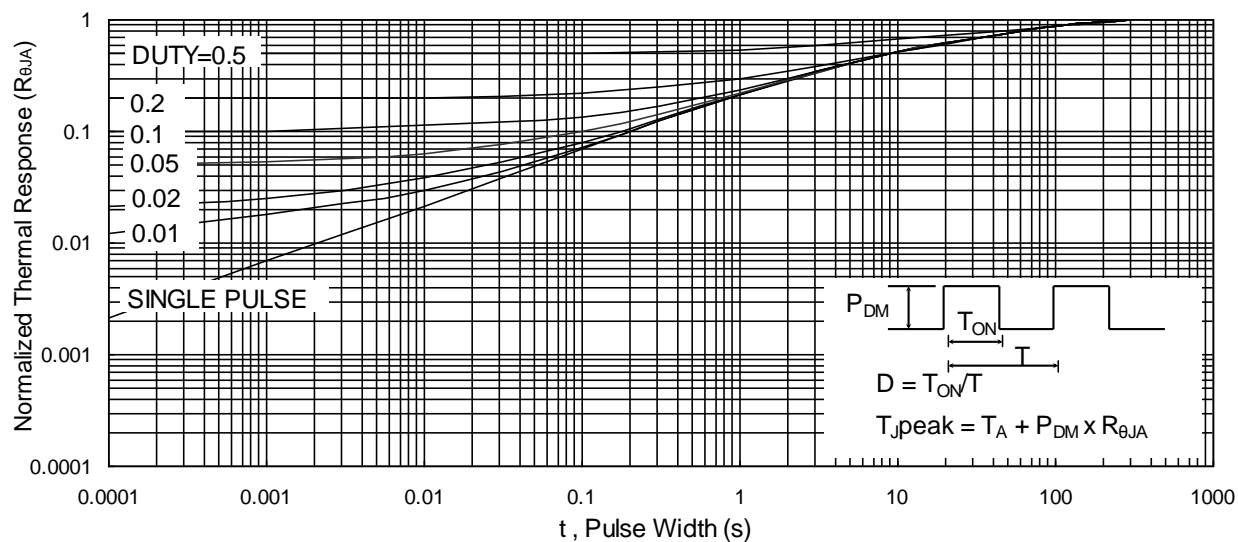
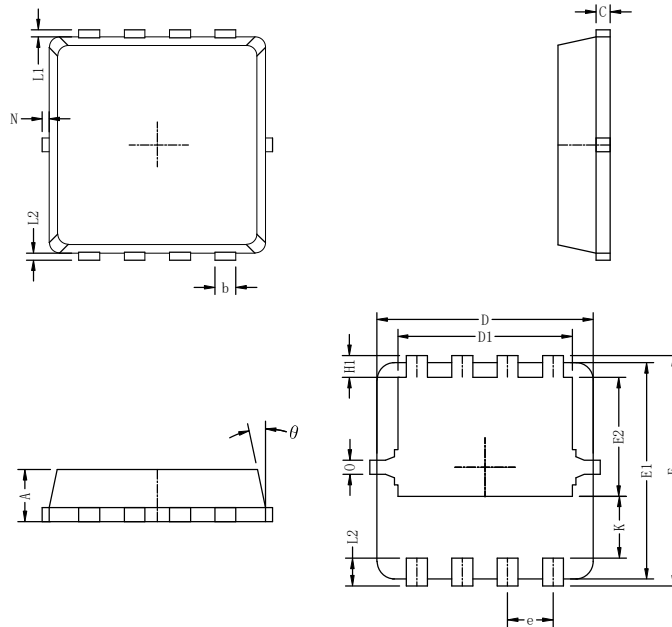


Fig.9 Normalized Maximum Transient Thermal Impedance

Package outline dimensions PDFN3333



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.25	0.30	0.35
C	0.15	0.20	0.25
D	3.00	3.10	3.20
D1	2.40	2.50	2.60
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.60	1.70	1.80
e	0.65 BSC.		
H1	0.21	0.31	0.41
H2	0.30	0.40	0.50
K	0.78	0.88	0.98
L1/L2	0.10 REF.		
θ	11°	12°	13°
N	0	-	0.15
0	0.2 REF.		

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