

DFN3x3 Plastic-Encapsulate MOSFETS

Features

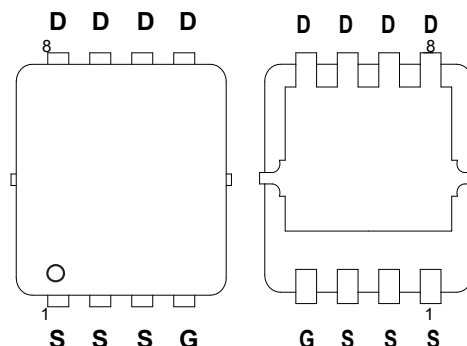
- ◆ -30V,-25A,RDS(ON)=16mΩ@VGS=-10V
- ◆ Fast switching
- ◆ Green Device Available
- ◆ Suit for -4.5V Gate Drive Applications

Applications

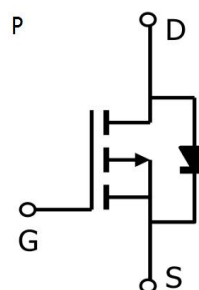
- ◆ MB / VGA / Vcore
- ◆ POL Applications
- ◆ Load Switch
- ◆ LED Application

DFN3x3

RoHS
COMPLIANT



Equivalent Circuit



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_c=25^\circ\text{C}$)	-25	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	-15	A
I_{DM}	Drain Current – Pulsed ¹	-100	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	25	W
	Power Dissipation – Derate above 25°C	0.22	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4.6	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-30	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.03	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-27V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =125°C	---	---	-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-8A	---	16	20	mΩ
		V _{GS} =-4.5V, I _D =-6A	---	24	30	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.6	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	4	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-8A	---	6.8	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2, 3}	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-5A	---	11	---	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	3.4	---	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	4.2	---	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =-15V, V _{GS} =-10V, R _G =6Ω I _D =-1A	---	5.8	---	ns
T _r	Rise Time ^{2, 3}		---	18.8	---	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	46.9	---	
T _f	Fall Time ^{2, 3}		---	12.3	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, F=1MHz	---	1250	---	pF
C _{oss}	Output Capacitance		---	160	---	
C _{rss}	Reverse Transfer Capacitance		---	90	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	-25	A
I _{SM}	Pulsed Source Current		---	---	-50	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

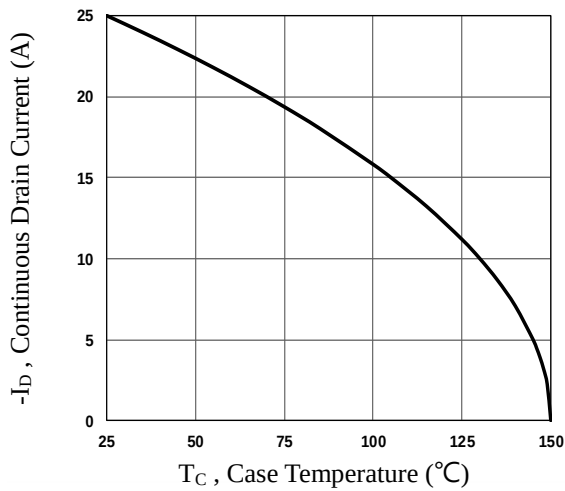


Fig.1 Continuous Drain Current vs. T_c

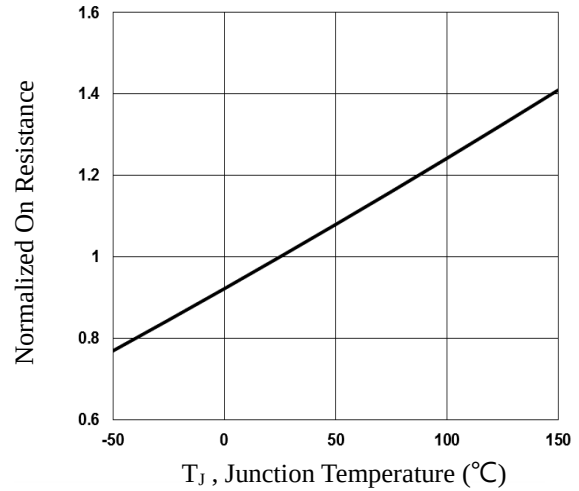


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

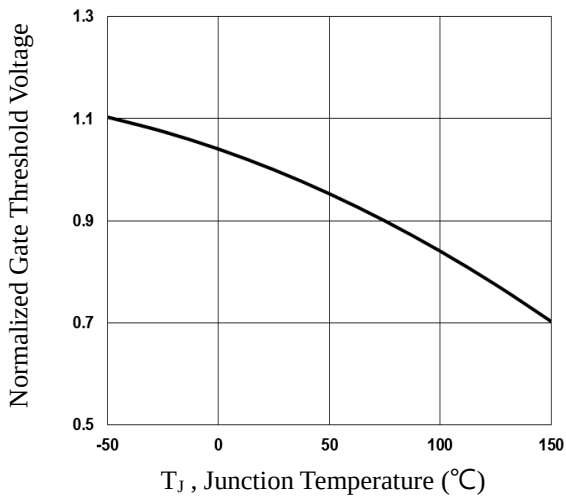


Fig.3 Normalized V_{th} vs. T_J

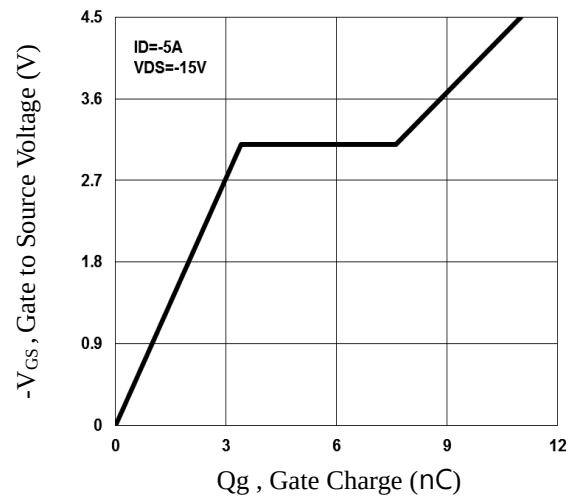


Fig.4 Gate Charge Waveform

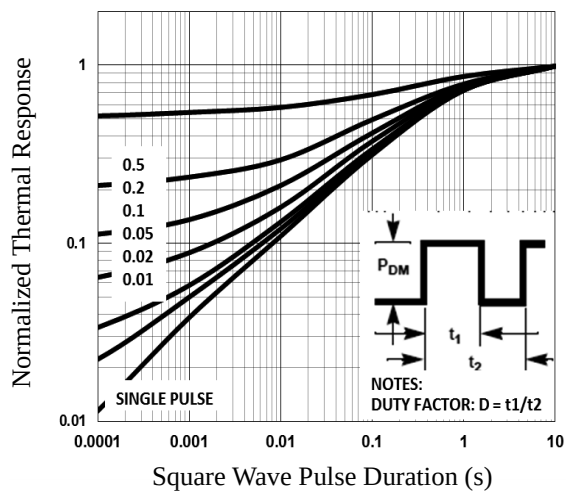


Fig.5 Normalized Transient Impedance

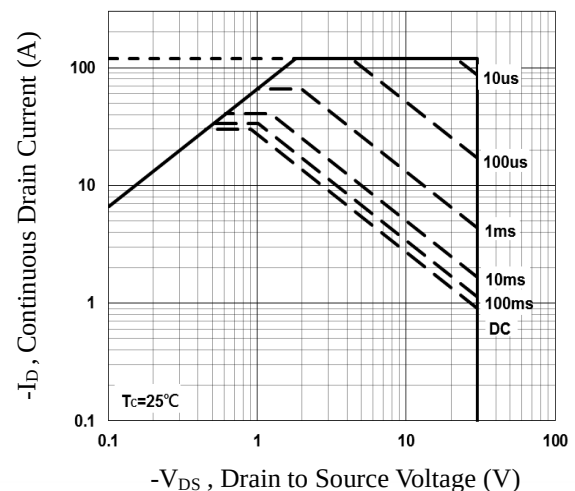


Fig.6 Maximum Safe Operation Area

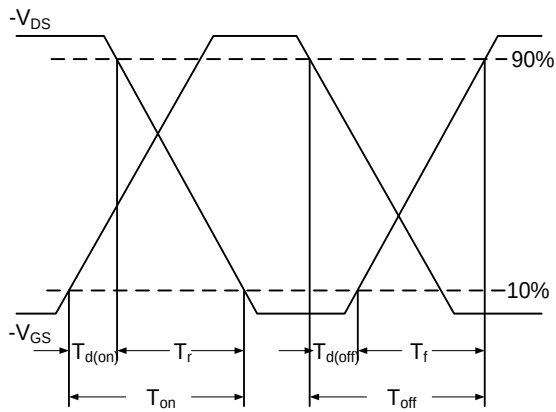


Fig.7 Switching Time Waveform

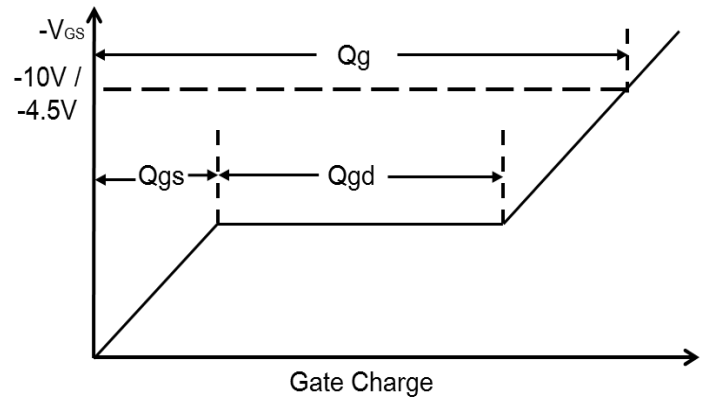
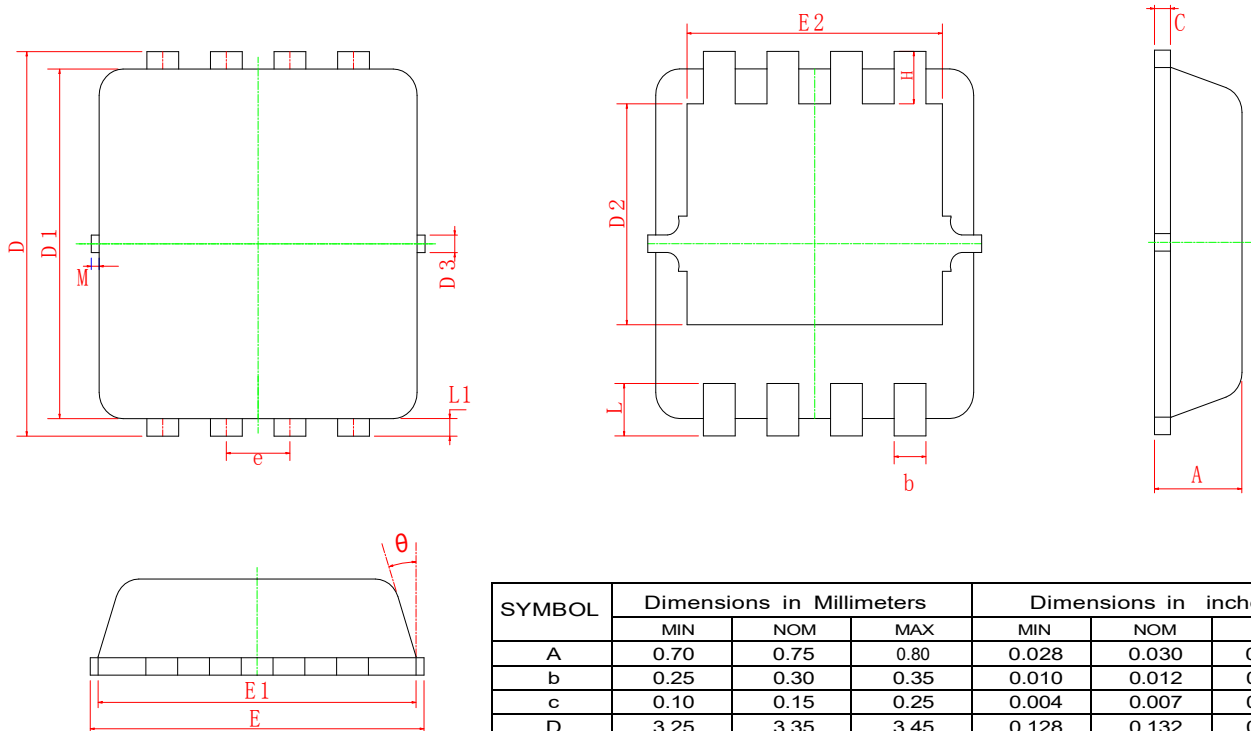


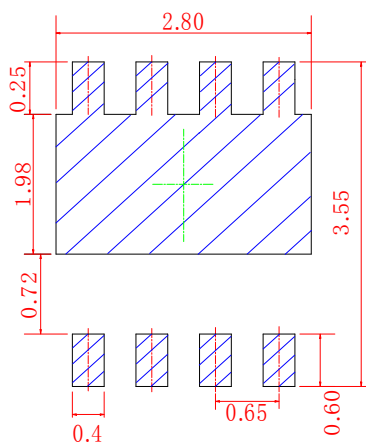
Fig.8 Gate Charge Waveform

DFN3x3 Package Outline Dimensions



SYMBOL	Dimensions in Millimeters			Dimensions in inches		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.10	0.15	0.25	0.004	0.007	0.010
D	3.25	3.35	3.45	0.128	0.132	0.136
D1	3.00	3.10	3.20	0.118	0.122	0.126
D2	1.78	1.88	1.98	0.070	0.074	0.078
D3	-	0.13	-	-	0.005	-
E	3.20	3.30	3.40	0.126	0.130	0.134
E1	3.00	3.15	3.20	0.18	0.122	0.126
E2	2.39	2.49	2.59	0.094	0.098	0.102
e	0.65 BSC			0.026 BSC		
H	0.30	0.40	0.50	0.012	0.016	0.020
L	0.30	0.40	0.50	0.012	0.016	0.020
L1	-	0.13	-	-	0.005	-
M	-	-	0.15	-	-	0.006
θ	-	10°	12°	-	10°	12°

Suggested Pad Layout



Note:

1. Controlling dimension: in/millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.