20V N-Channel MOSFETs

General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BVDSS	RDSON	ID
20V	5.4mΩ	65A

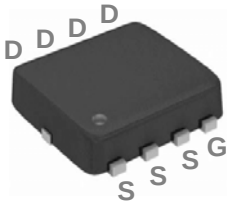
Features

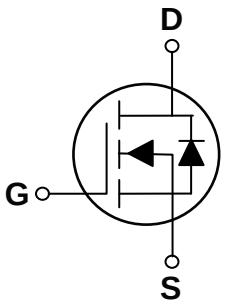
- *20V,65A, RDS(ON) =5.4mΩ@VGS = 4.5V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *MB / VGA / Vcore*
- *POL Applications*
- *SMPS 2nd SR*

PPAK3x3 Pin Configuration





Absolute Maximum Ratings (Tc=25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current – Continuous (Chip Limitation ,T_C=25℃)	65	A
	Drain Current – Continuous (Chip Limitation ,T_C=100℃)	41	A
I_{DM}	Drain Current – Pulsed[1]	260	A
P_D	Power Dissipation (T_C=25℃)	44.6	W
	Power Dissipation – Derate above 25℃	0.36	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2.8	℃/W

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Electrical Characteristics (T_J=25℃, unless otherwise noted)

Static State Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=± 12V , V_{DS}=0V	---	---	± 100	nA
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=20A	---	4.5	5.4	mΩ
		V_{GS}=2.5V , I_D=15A	---	5.5	6.8	mΩ
		V_{GS}=1.8V , I_D=10A		6.8	8.8	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.3	0.6	1	V
gfs	Forward Transconductance	V_{DS}=5V , I_D=5A	---	20	---	S

Dynamic Characteristics

Q_g	Total Gate Charge	V_{DS}=10V , V_{GS}=4.5V , I_D=6A	---	29.8	45	nC
Q_{gs}	Gate-Source Charge		---	2.7	6	
Q_{gd}	Gate-Drain Charge		---	9	14	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=10V , V_{GS}=4.5V , R_G=3.3Ω I_D=1A	---	13.5	26	ns
T_r	Rise Time		---	29	55	
$T_{d(off)}$	Turn-Off Delay Time		---	66.9	127	
T_f	Fall Time		---	19.2	36	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , F=1MHz	---	1920	2790	pF
C_{oss}	Output Capacitance		---	280	410	
C_{rss}	Reverse Transfer Capacitance		---	180	270	

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	65	A
I_{SM}	Pulsed Source Current[2]		---	---	130	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_S=1A , di/dt=100A/μs	---	---	---	ns
Q_{rr}	Reverse Recovery Charge	T_J=25℃	---	---	---	nC

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.

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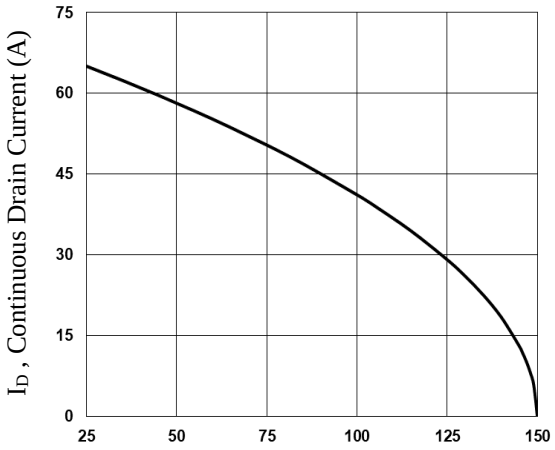

Fig.1 Continuous Drain Current vs. T_C

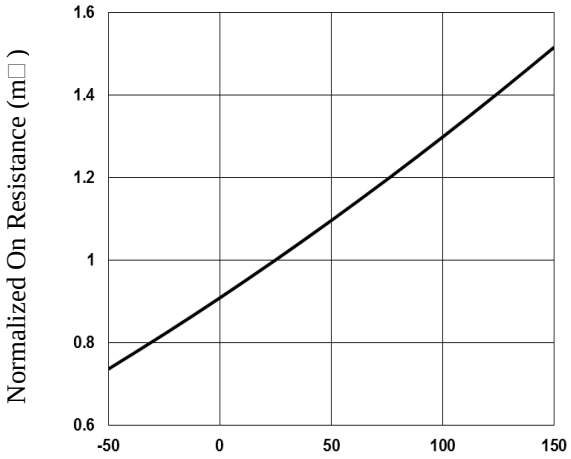

Fig.2 Normalized RDSON vs. T_J

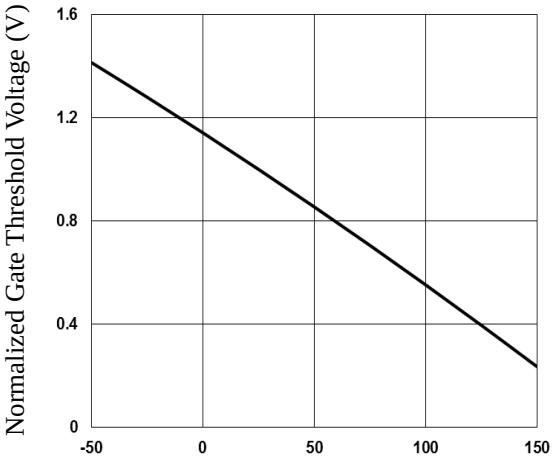

Fig.3 Normalized V_{th} vs. T_J

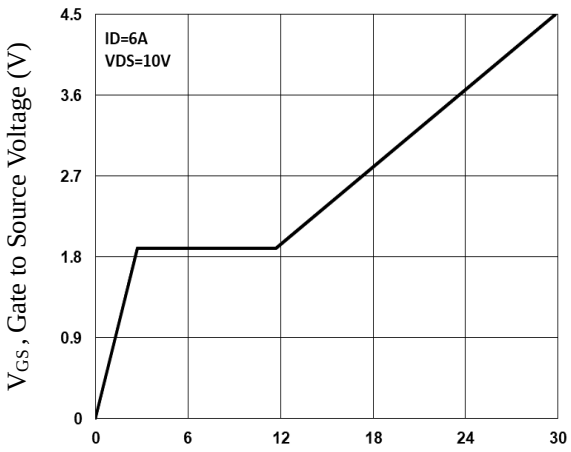

Fig.4 Gate Charge Waveform

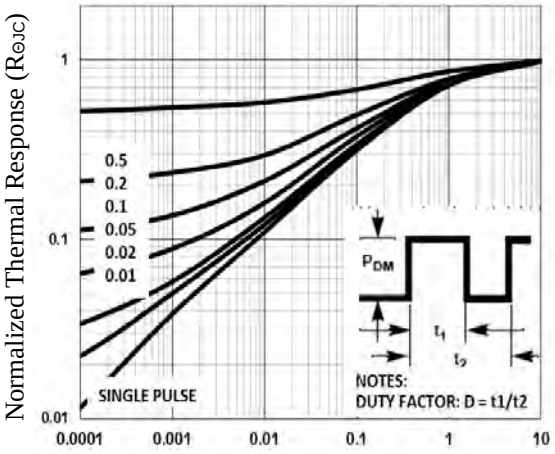

Fig.5 Normalized Transient Response

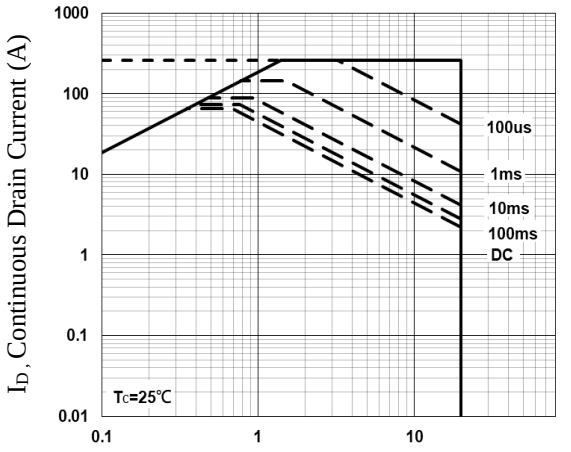

Fig.6 Maximum Safe Operation Area

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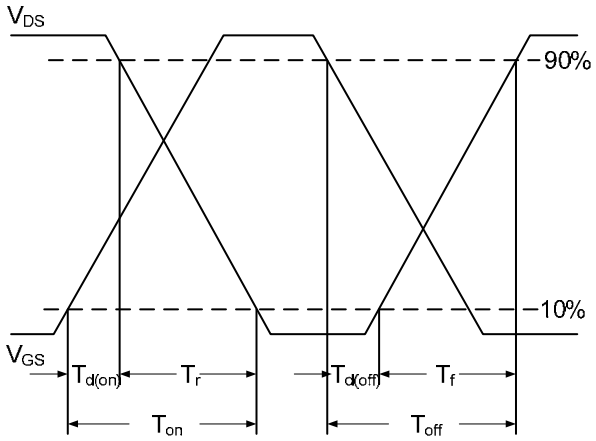

Fig.7 Switching Time Waveform

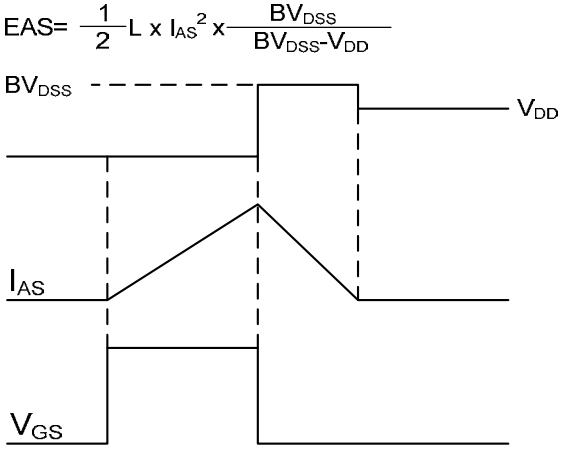

Fig.8 EAS Waveform

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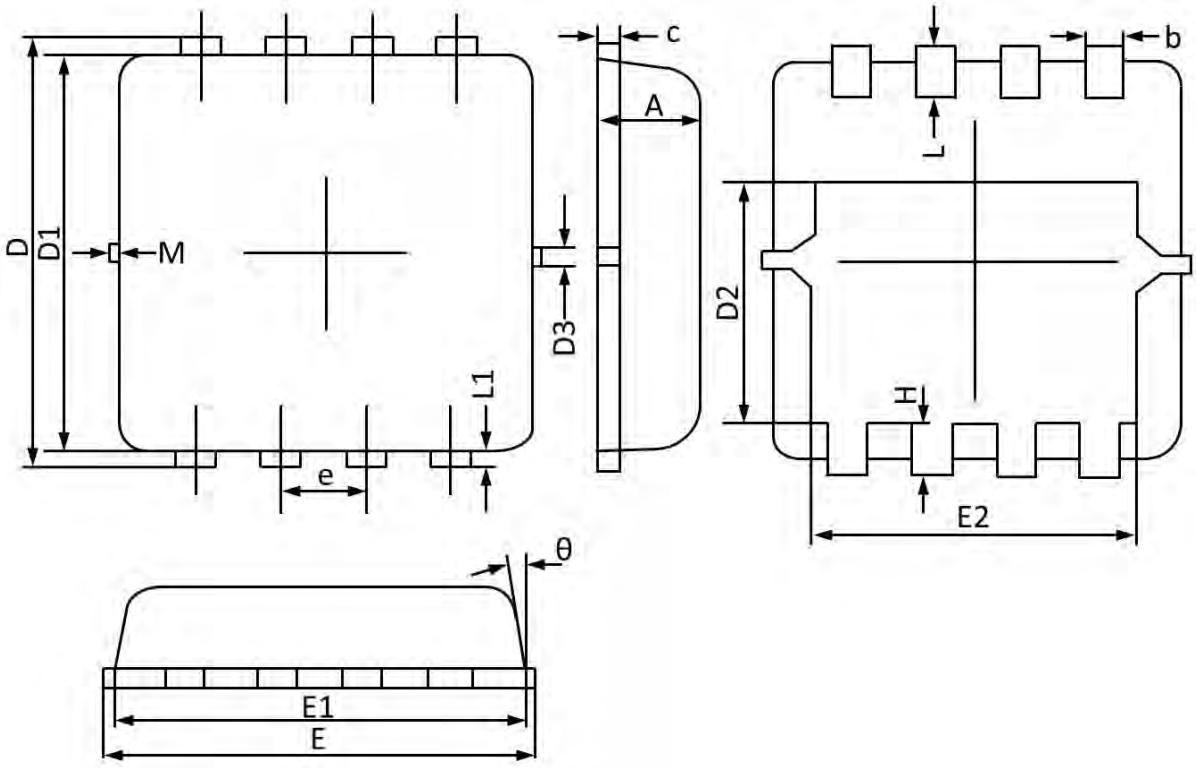
PPAK3x3 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 REF		0.005 REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 REF		0.005 REF	
θ	0°	12°	0°	12°
M	0.150 REF		0.006 REF	