

30V N-Channel MOSFETs

General Description

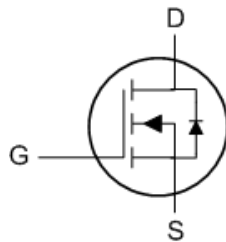
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
30V	5.5mΩ	80A

Features

- 30V,80A, $R_{DS(ON)} = 5.5m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

PPAK5x6 Pin Configuration



Applications

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

Absolute Maximum Ratings (Tc=25°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°C)	80	A
	Drain Current – Continuous (T _C =100°C)	51	A
I _{DM}	Drain Current – Pulsed ¹	320	A
EAS	Single Pulse Avalanche Energy ²	88	mJ
IAS	Single Pulse Avalanche Current ²	42	A
P _D	Power Dissipation (T _C =25°C)	74	W
	Power Dissipation – Derate above 25°C	0.59	W/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	1.7	°C/W

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

Static State Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to $25\text{ }^\circ\text{C}$, $I_D=1mA$	---	0.04	---	V/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25\text{ }^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=125\text{ }^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(ON)}$	Static Drain-Source On-Resistance ³	$V_{GS}=10V, I_D=20A$	---	4.6	5.5	m Ω
		$V_{GS}=4.5V, I_D=10A$	---	6.5	8.5	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/ $^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=10V, I_D=10A$	---	18	---	S

Dynamic Characteristics

Q_g	Total Gate Charge ^{3,4}	$V_{DS}=15V, V_{GS}=4.5V, I_D=20A$	---	11.1	---	nC
Q_{gs}	Gate-Source Charge ^{3,4}		---	1.85	---	
Q_{gd}	Gate-Drain Charge ^{3,4}		---	6.8	---	
$T_{d(on)}$	Turn-On Delay Time ^{3,4}	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega$ $I_D=15A$	---	7.5	---	ns
T_r	Rise Time ^{3,4}		---	14.5	---	
$T_{d(off)}$	Turn-Off Delay Time ^{3,4}		---	35.2	---	
T_f	Fall Time ^{3,4}		---	9.6	---	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1MHz$	---	1160	---	pF
C_{oss}	Output Capacitance		---	200	---	
C_{riss}	Reverse Transfer Capacitance		---	180	---	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	2.5	---	Ω

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	$V_{DD}=25V, L=0.1mH, I_{AS}=20A$	20	---	---	mJ

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	80	A
I_{SM}	Pulsed Source Current ³		---	---	320	A
V_{SD}	Diode Forward Voltage ³	$V_{GS}=0V, I_S=1A, T_J=25\text{ }^\circ\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_S=1A, di/dt=100A/\mu s$	---	---	---	ns
Q_{rr}	Reverse Recovery Charge	$T_J=25\text{ }^\circ\text{C}$	---	---	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=42A, R_G=25\Omega$, Starting $T_J=25\text{ }^\circ\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

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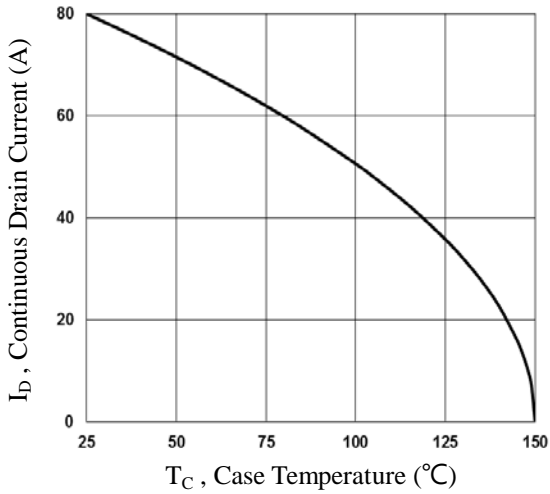


Fig.1 Continuous Drain Current vs. T_c

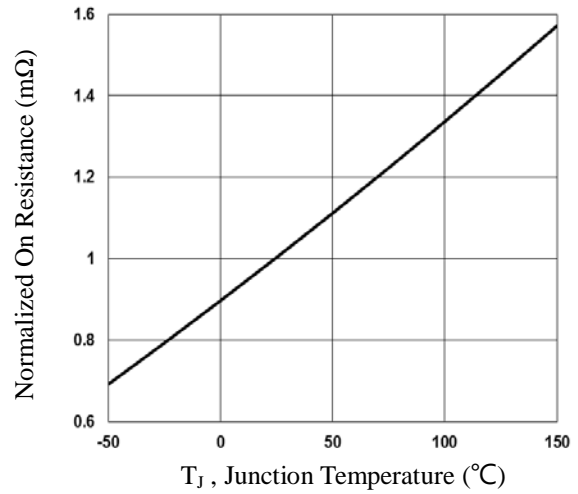


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

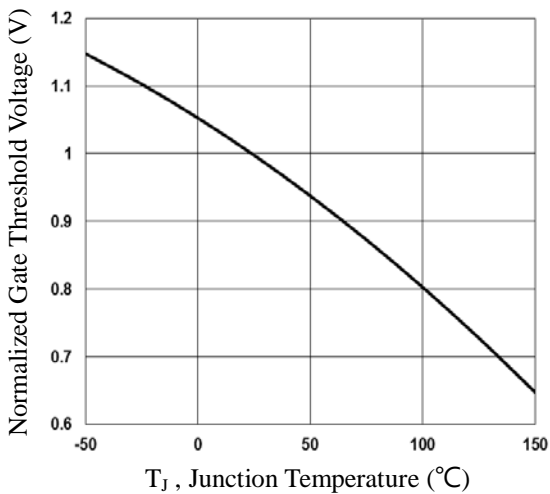


Fig.3 Normalized V_{th} vs. T_j

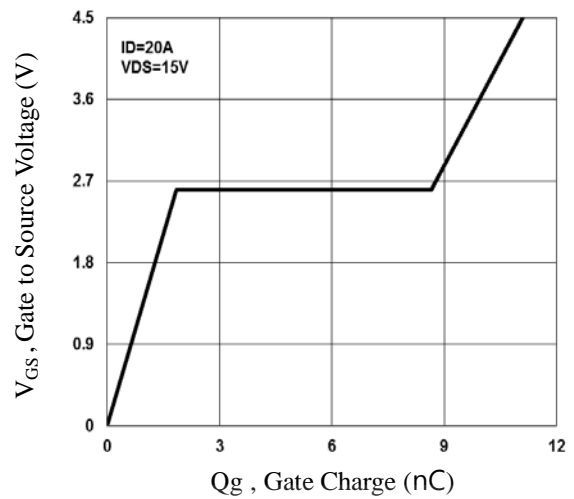


Fig.4 Gate Charge Waveform

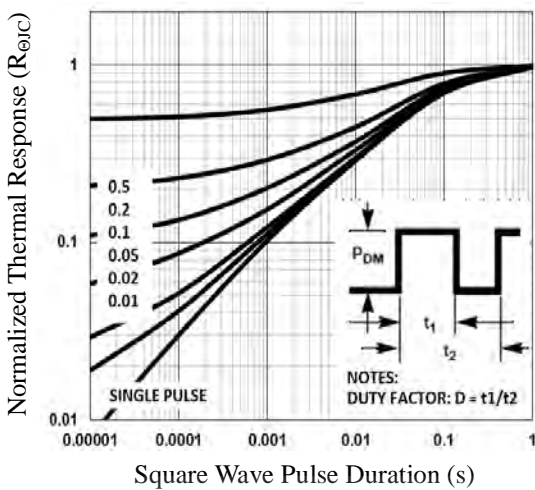


Fig.5 Normalized Transient Impedance

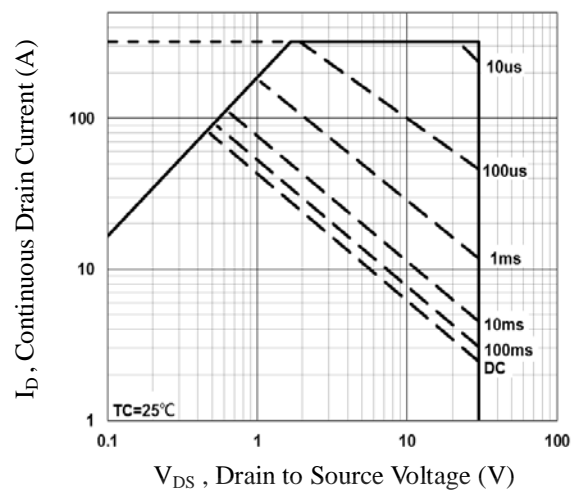


Fig.6 Maximum Safe Operation Area

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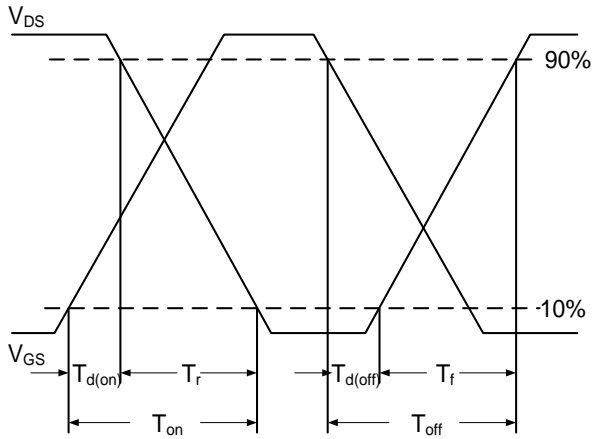


Fig.7 Switching Time Waveform

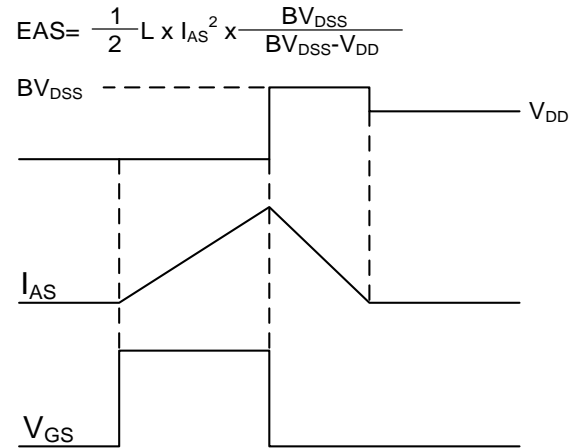
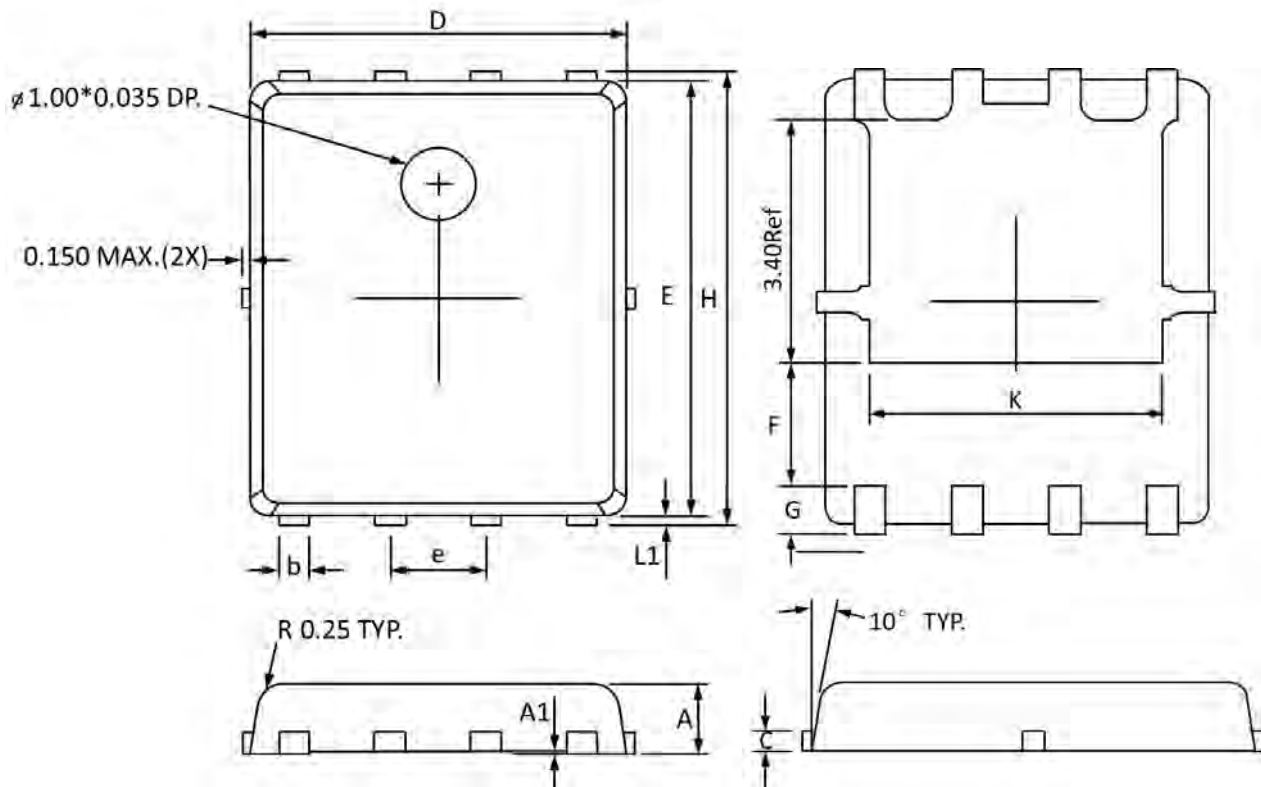


Fig.8 EAS Waveform

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PPAK5x6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.400 Ref		1.400 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	4.000 Ref		4.000 Ref	