

### General Description

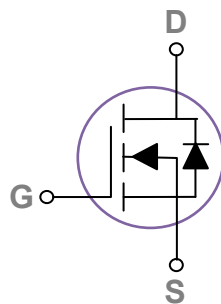
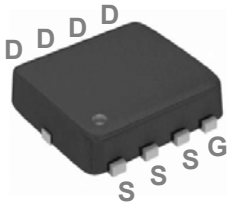
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDS(ON)	ID
20V	3.5mΩ	80A

### Features

- 20V,80A,  $R_{DS(ON)} = 3.5m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### PPAK3x3 Pin Configuration



### Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2<sup>nd</sup> SR

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current – Continuous (Chip Limitation, $T_c=25^\circ\text{C}$ )	80	A
	Drain Current – Continuous (Chip Limitation, $T_c=100^\circ\text{C}$ )	51	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	320	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	66	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.53	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2	$^\circ\text{C}/\text{W}$

**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	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	$\mu A$
		$V_{DS}=16V, V_{GS}=0V, T_J=125^\circ C$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=4.5V, I_D=15A$	---	2.8	3.5	$m\Omega$
		$V_{GS}=2.5V, I_D=10A$	---	3.5	4.5	$m\Omega$
		$V_{GS}=1.8V, I_D=6A$	---	5	7	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.3	0.65	1	V
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=5A$	---	35	---	S

**Dynamic Characteristics**

$Q_g$	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=5A$	---	52	100	nC
$Q_{gs}$	Gate-Source Charge		---	6.6	12	
$Q_{gd}$	Gate-Drain Charge		---	13.8	28	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=10V, V_{GS}=4.5V, R_G=3.3\Omega$ $I_D=1A$	---	20.2	40	ns
$T_r$	Rise Time		---	31.2	60	
$T_{d(off)}$	Turn-Off Delay Time		---	68.5	120	
$T_f$	Fall Time		---	21.2	42	
$C_{iss}$	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, F=1MHz$	---	3870	5500	pF
$C_{oss}$	Output Capacitance		---	580	850	
$C_{rss}$	Reverse Transfer Capacitance		---	340	600	
$R_g$	Gate resistance		$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	1.3	

**Drain-Source Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	80	A
$I_{SM}$	Pulsed Source Current <sup>2</sup>		---	---	160	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1	V
$t_{rr}$	Reverse Recovery Time	$V_{GS}=0V, I_S=1A, di/dt=100A/\mu s$	---	---	---	ns
$Q_{rr}$	Reverse Recovery Charge	$T_J=25^\circ C$	---	---	---	nC

Note :

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

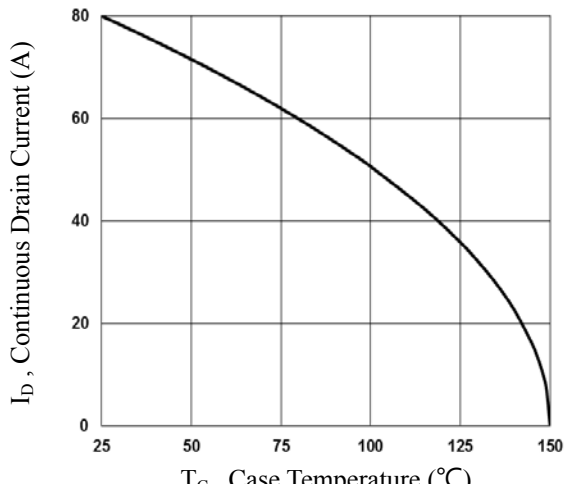


Fig.1 Continuous Drain Current vs.  $T_c$

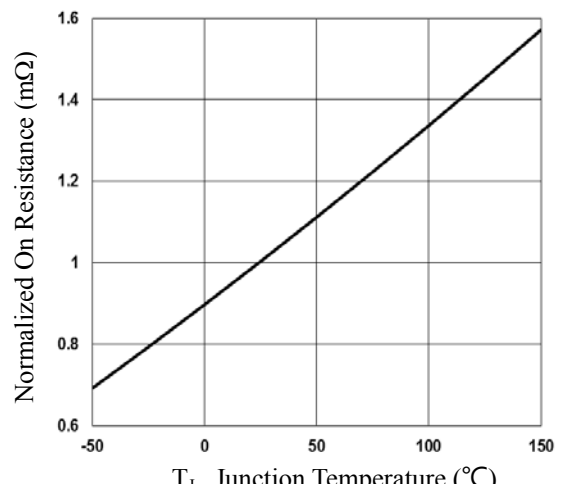


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

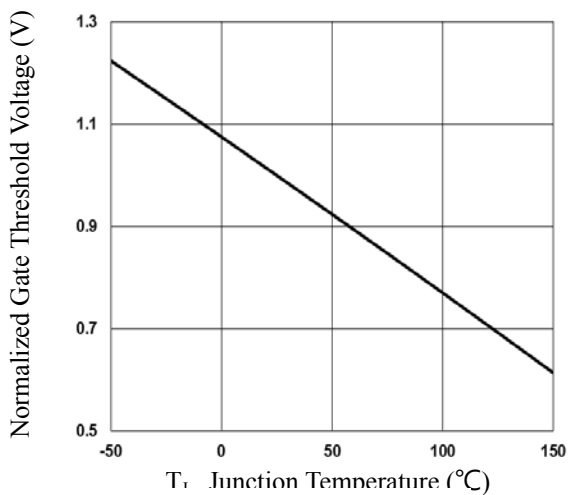


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

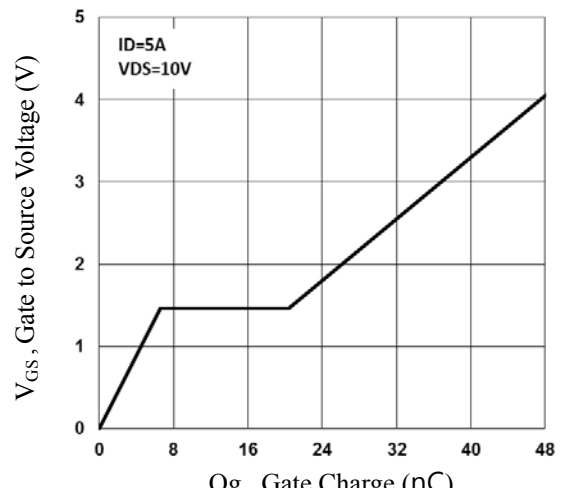


Fig.4 Gate Charge Waveform

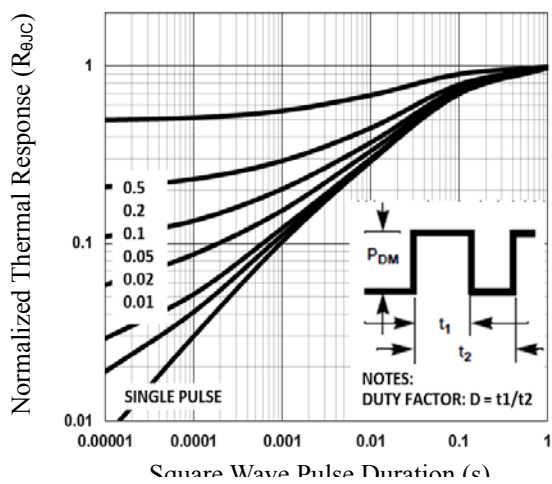


Fig.5 Normalized Transient Impedance

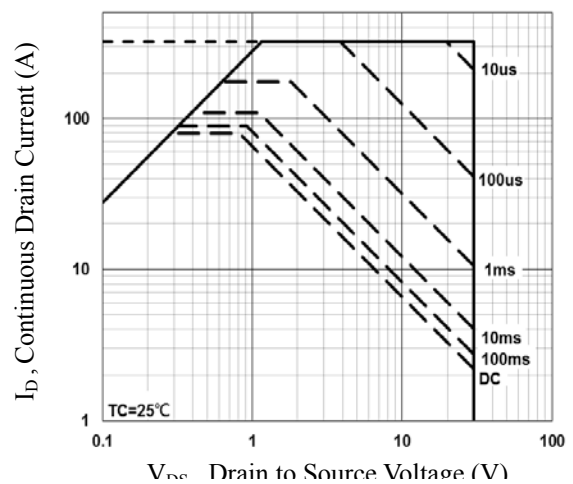


Fig.6 Maximum Safe Operation Area

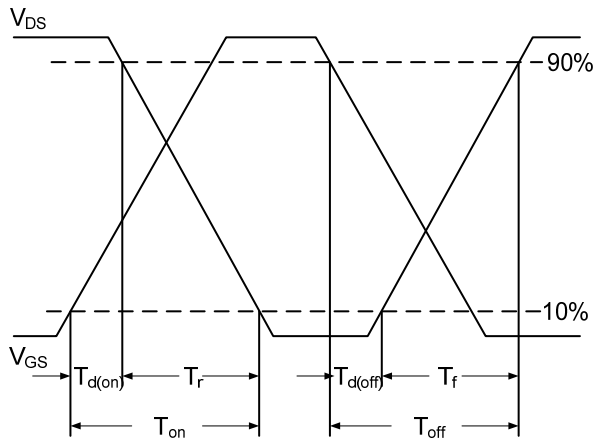


Fig.7 Switching Time Waveform

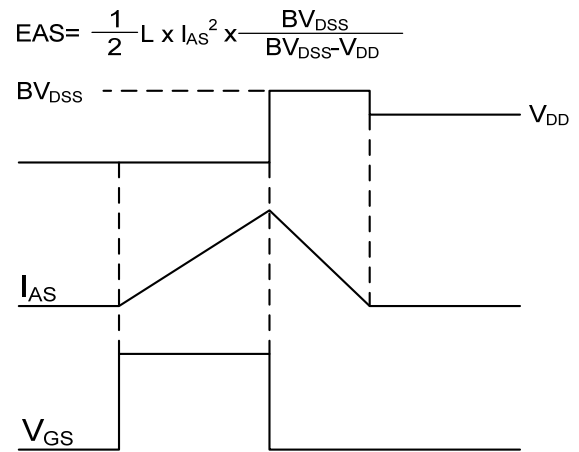
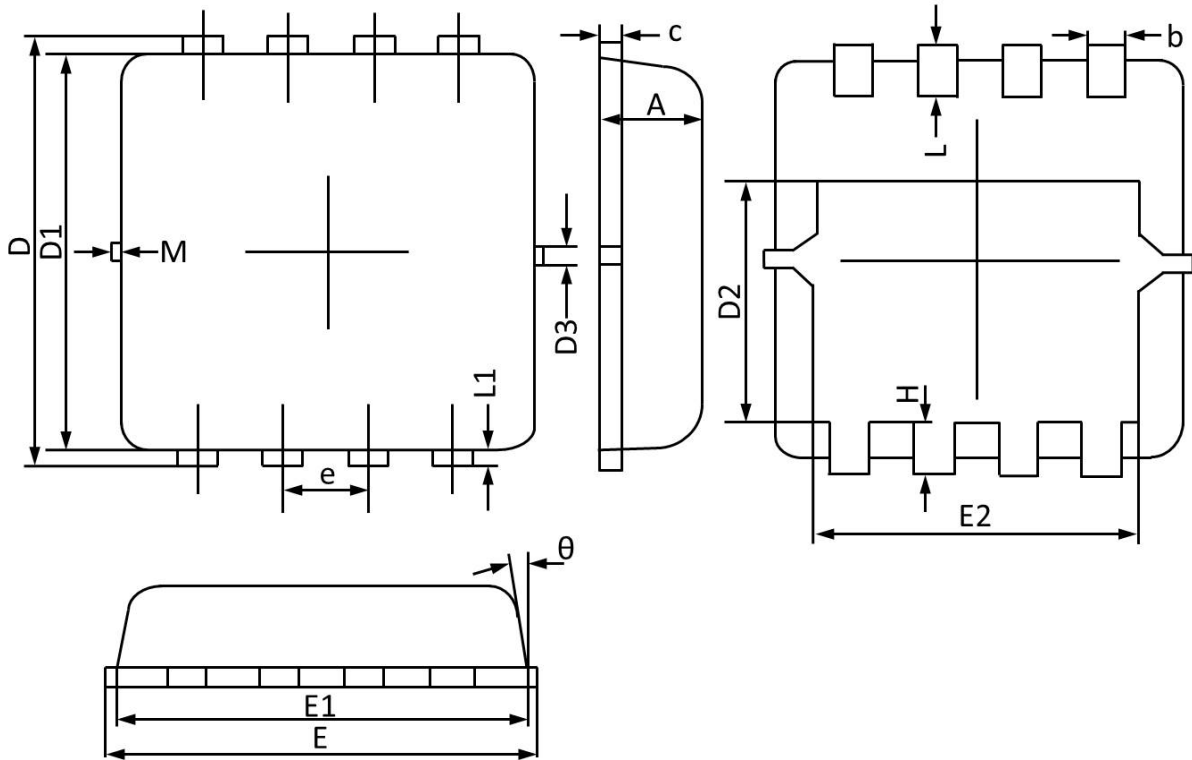


Fig.8 EAS Waveform

### 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	