



40V P-Channel MOSFETs

General Description

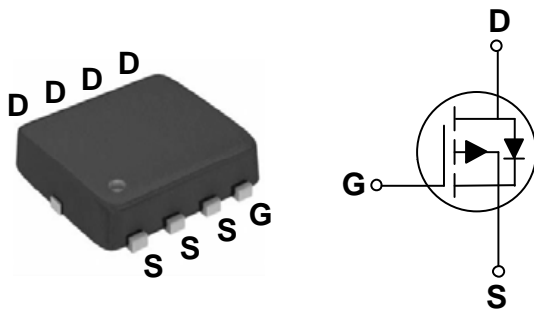
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	R_{DS(ON)}	I_D
-40 V	14 mΩ	-38 A

Features

- $R_{DS(ON)} \leq 14m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

PPAK3X3 Pin Configuration



Applications

- MB / VGA / V_{CORE}
- POL Applications
- LED Application
- Load Switch

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-40	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current - Continuous (T _C =25°C)	-38	A
	Drain Current - Continuous (T _C =100°C)	-24	A
I _{DM}	Drain Current - Pulsed (NOTE 1)	-152	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	130	mJ
IAS	Single Pulse Avalanche Current (NOTES 2)	51	A
P _D	Power Dissipation (T _C =25°C)	52	W
	Power Dissipation - Derate above 25°C	0.42	W/°C
T _J	Operating Junction Temperature Range	-50 to 150	°C
T _{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		PD014 , DC4903	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to Ambient	---	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	2.4	°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	-40	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -40V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} = -32V, 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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = -10V, I _D = -15A	---	11.3	14	mΩ
		V _{GS} = -4.5V, I _D = -8A	---	15.6	21	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-1.0	-1.6	-2.5	V
g _{fs}	Forward Transconductance	V _{DS} = -10V, I _D = -4A	---	11	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} = -32V, V _{GS} = -4.5V, I _D = -10A (NOTE 3 · 4)	---	22.2	40	nC
Q _{gs}	Gate-Source Charge		---	8.2	16	
Q _{gd}	Gate-Drain Charge		---	8.8	16	
T _{d(on)}	Turn-On Delay Time	V _{DD} = -20V, V _{GS} = -10V, R _G = 6Ω, I _D = -1A (NOTE 3 · 4)	---	23	40	nS
T _r	Rise Time		---	10	20	
T _{d(off)}	Turn-Off Delay Time		---	135	250	
T _f	Fall Time		---	46	90	
C _{iss}	Input Capacitance	V _{DS} = -25V, V _{GS} =0V, F=1MHz	---	2757	4000	pF
C _{OSS}	Output Capacitance		---	240	360	
C _{rSS}	Reverse Transfer Capacitance		---	137	200	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G = V _D = 0V, Force Current	---	---	-38	A
I _{SM}	Pulsed Source Current		---	---	-76	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = -1A, T _J =25°C	---	---	-1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=51A, R_G=25, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

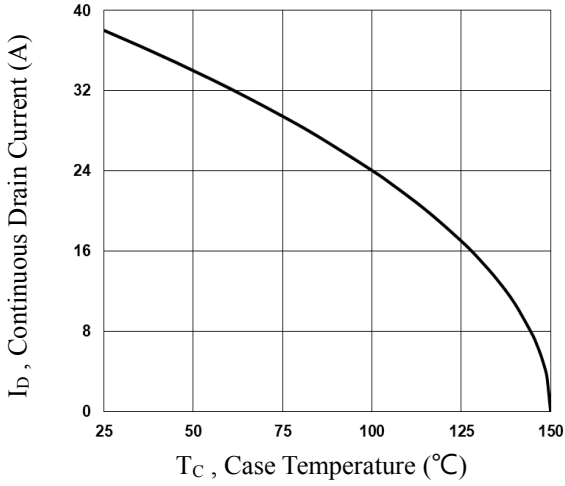


Fig.1 Continuous Drain Current vs. T_C

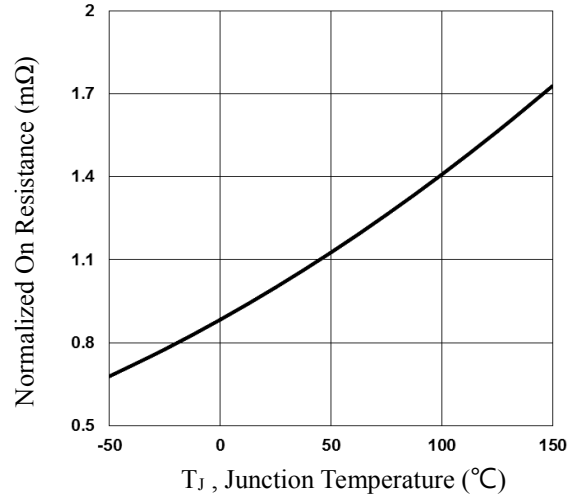


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

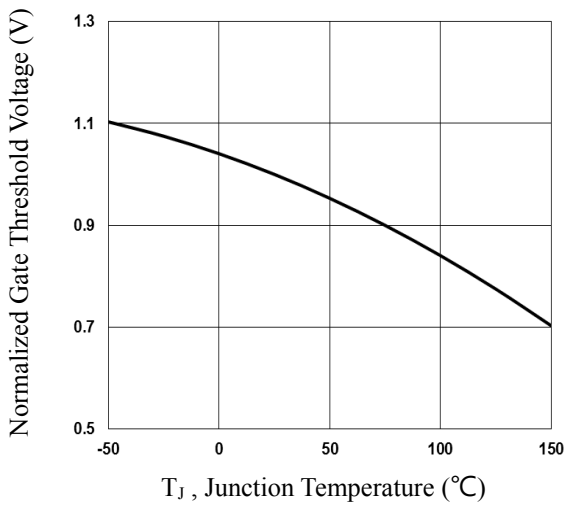


Fig.3 Normalized V_{th} vs. T_J

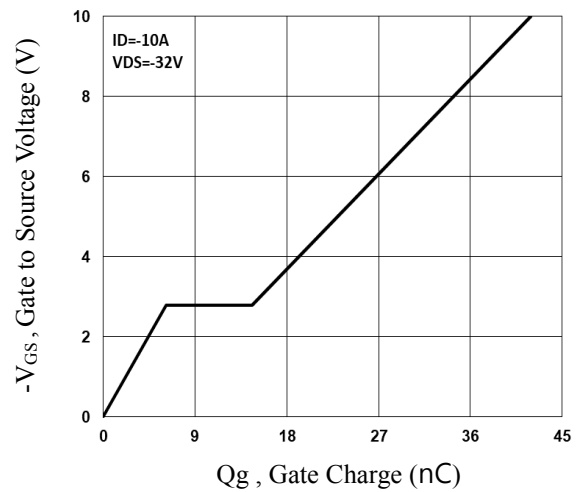


Fig.4 Gate Charge Waveform

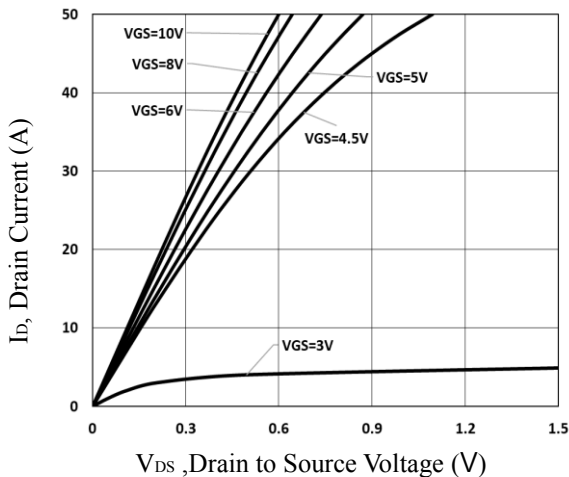


Fig.5 Typical Output Characteristics

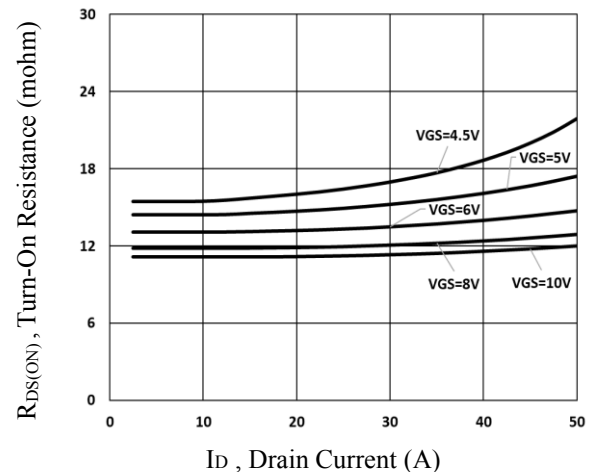


Fig.6 Turn-On Resistance vs. I_D



Characteristics Curves

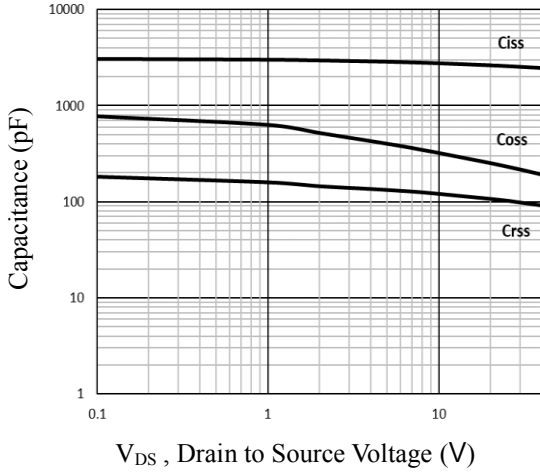


Fig.7 Capacitance Characteristics

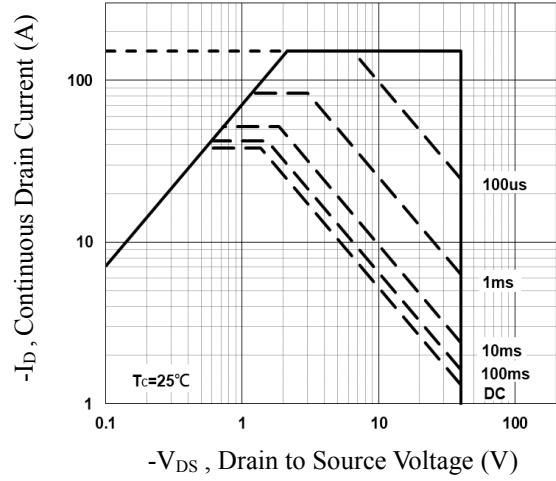


Fig.8 Maximum Safe Operation Area

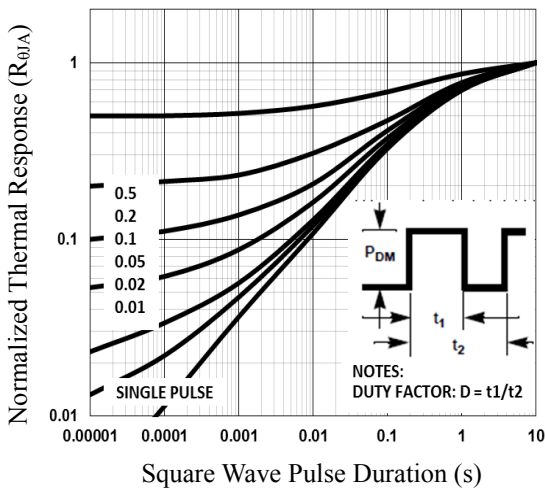


Fig.9 Normalized Transient Impedance

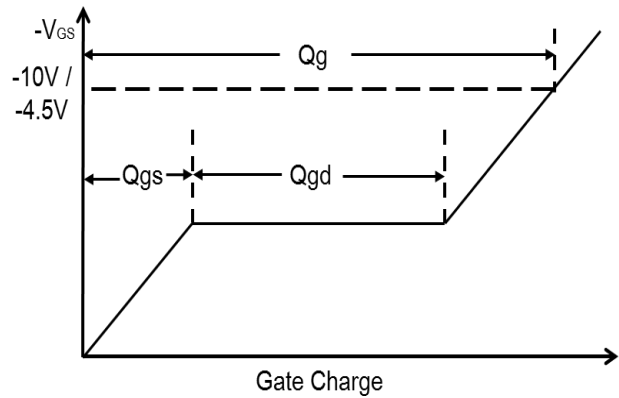


Fig.10 Gate Charge Waveform

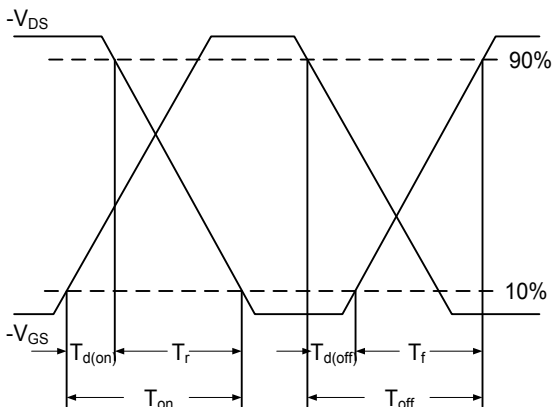
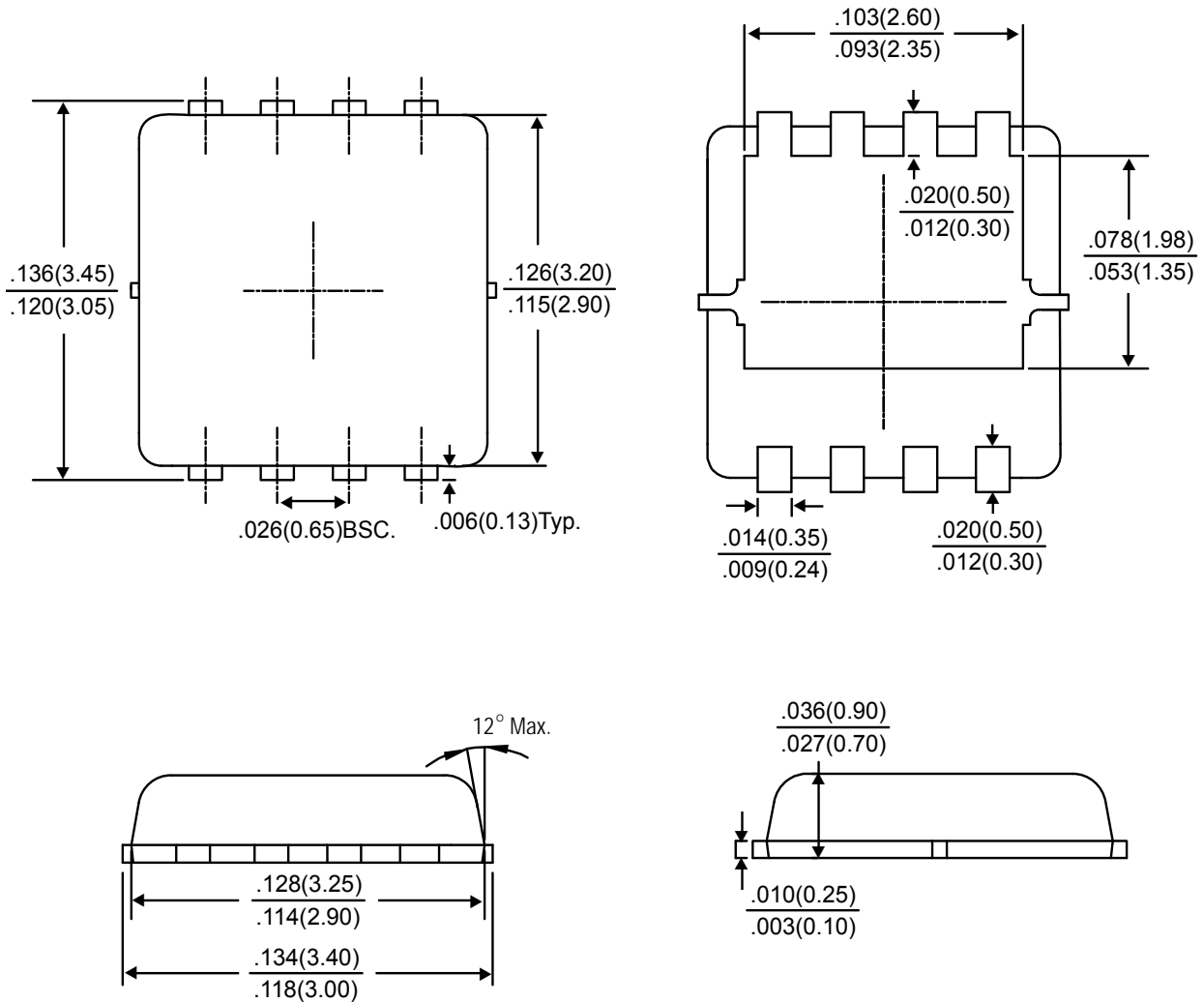


Fig.11 Switching Time Waveform



Package Outline Dimensions



PPAK3X3

Dimensions in inches and (millimeters)



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