



40V N-Channel MOSFETs

General Description

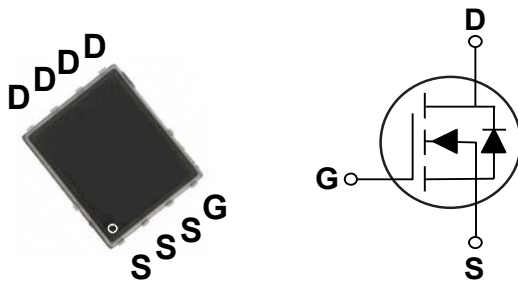
The advanced trench MOS technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and converter applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
40 V	3.2 m Ω	114 A

Features

- $R_{DS(ON)} \leq 3.2m\Omega @ V_{GS}=10V$
- Low Gate Charge
- Low $R_{DS(ON)}$
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- Power Management in Desktop Computer or DC/DC Converters.
- Isolated DC/DC Converters in Telecom and Industrial

Absolute Maximum Ratings $T_C=25^\circ C$ 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 ($T_C=25^\circ C$)	114	A
	Drain Current – Continuous ($T_C=100^\circ C$)	72	A
I_{DM}	Drain Current – Pulsed (NOTE 1)	240	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	145	mJ
IAS	Avalanche Current	54	A
P_D	Power Dissipation ($T_C=25^\circ C$) (NOTE 3)	73.5	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	55	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.7	$^\circ C/W$



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} =40V, V _{GS} =0V, T _J =55°C	---	---	5	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 =20A	---	---	3.2	mΩ
		V _{GS} =4.5V, I _D =15A	---	---	5.3	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.7	2.2	V
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =20A	---	75	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge (4.5V)	V _{DS} =20V, V _{GS} =4.5V, I _D =20A	---	22.7	---	nC
Q _{gs}	Gate-Source Charge		---	7.5	---	
Q _{gd}	Gate-Drain Charge		---	5.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =20V, V _{GS} =10V, R _G =3Ω, I _D =20A	---	10	---	nS
T _r	Rise Time		---	5	---	
T _{d(off)}	Turn-Off Delay Time		---	33	---	
T _f	Fall Time		---	6.5	---	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, F=1MHz	---	2648	---	pF
C _{oss}	Output Capacitance		---	899	---	
C _{rss}	Reverse Transfer Capacitance		---	71	---	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	1.5	---	Ω

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	---	---	30	A
V _{SD}	Diode Forward Voltage (NOTE 1)	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

NOTES :

1. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
2. The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=54A.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



Characteristics Curves

FIG.1-Typical Output Characteristics

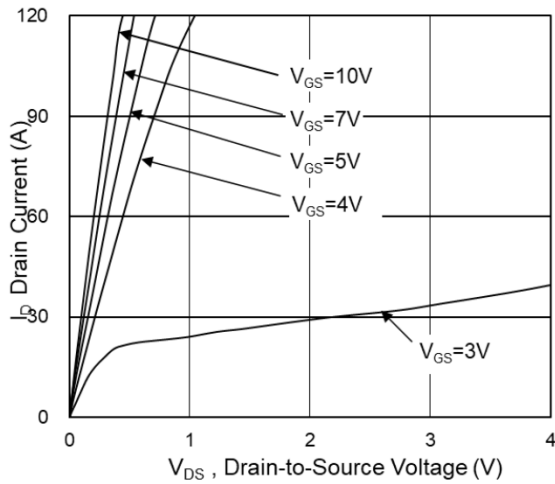


FIG.2-On-Resistance vs. G-S Voltage

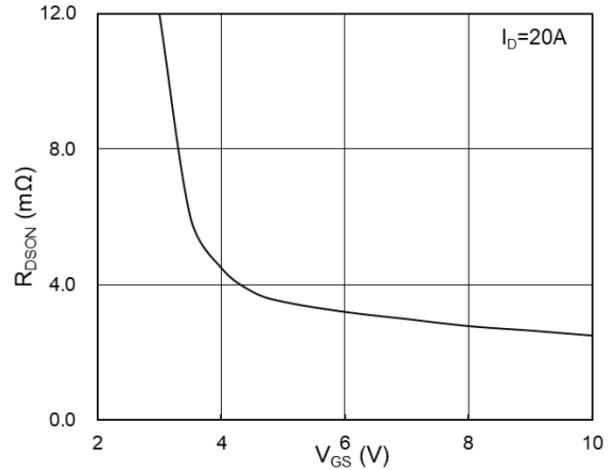


FIG.3-Source Drain Forward Characteristics

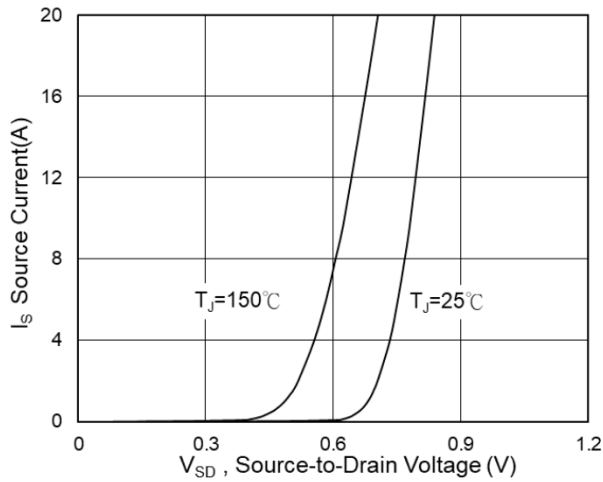


FIG.4-Gate Charge Characteristics

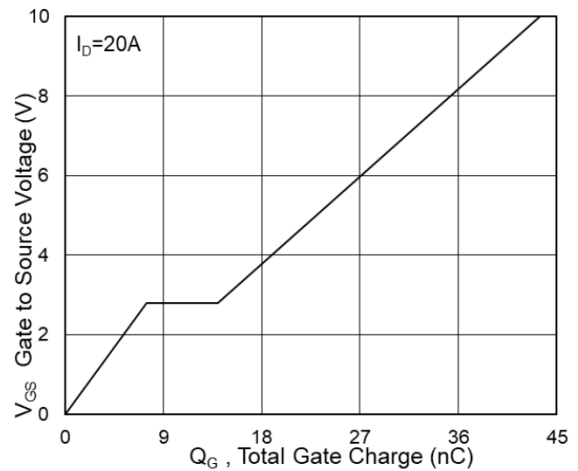


FIG.5-Normalized $V_{GS(th)}$ vs. T_J

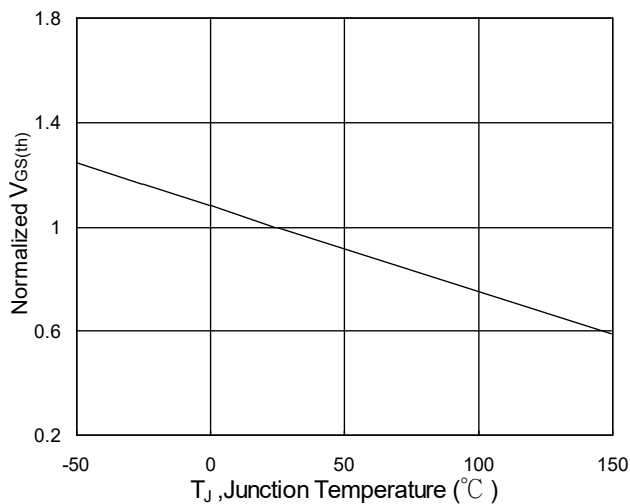
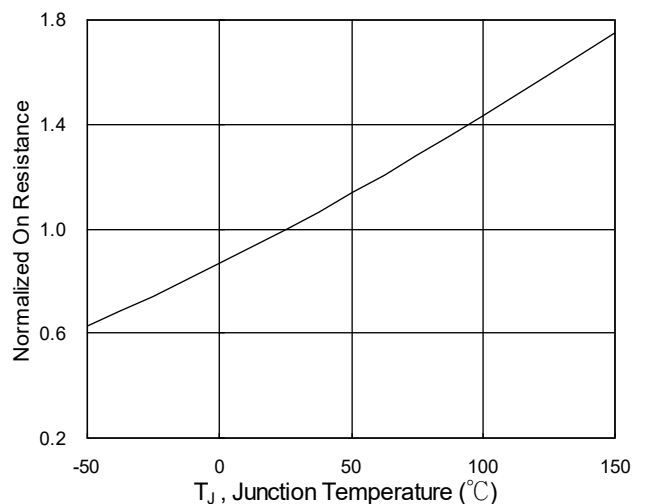


FIG.6-Normalized R_{DSON} vs. T_J





Characteristics Curves

FIG.7-Switching Time Waveform

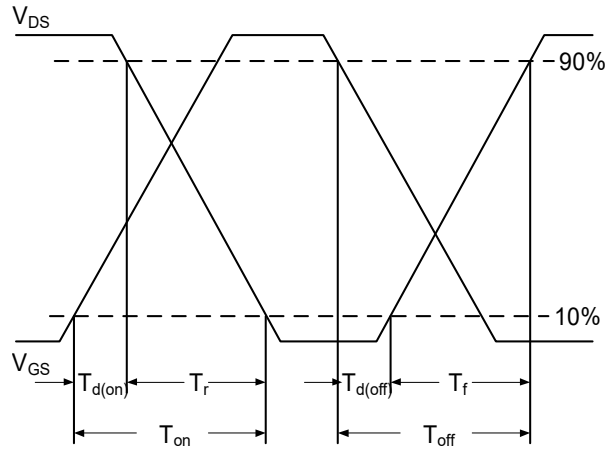
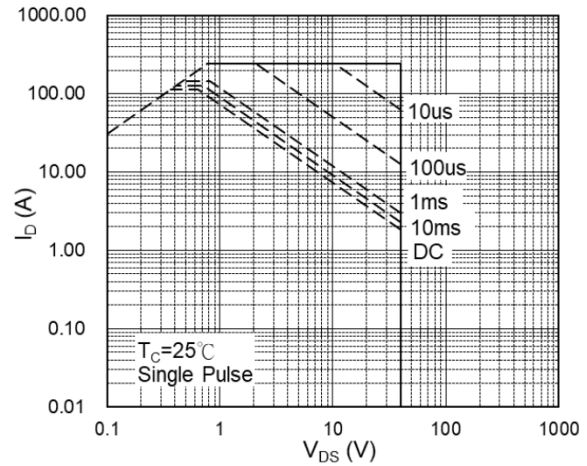
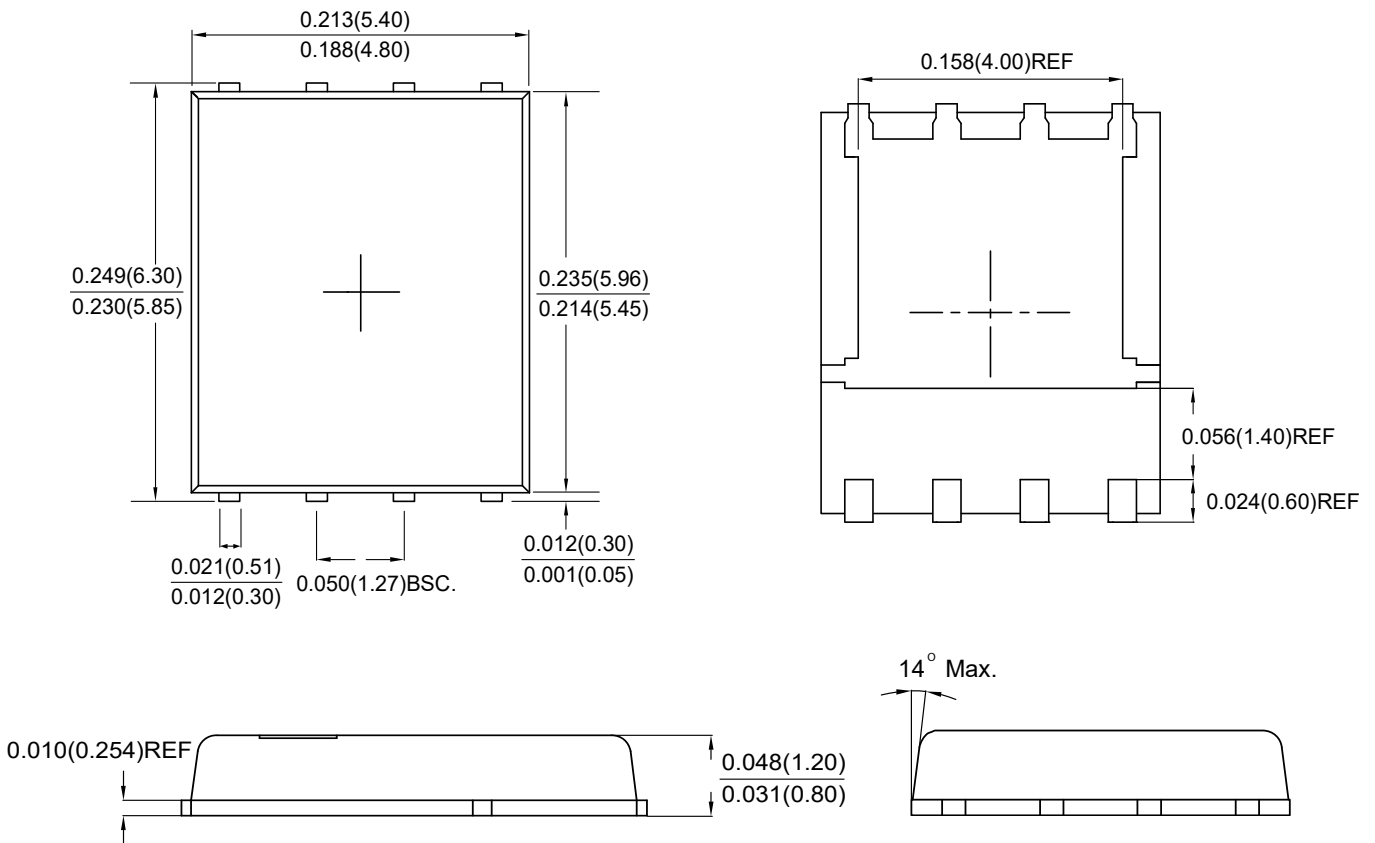


FIG.8-Safe Operating Area



Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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