



40V N-Channel MOSFETs

General Description

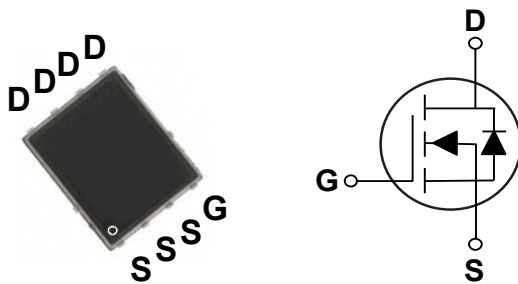
The advanced trench MOS technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and converter applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
40 V	1.7 mΩ	188 A

Features

- $R_{DS(ON)} \leq 1.7m\Omega @ V_{GS}=10V$
- Fast switching
- Improved dv/dt capability
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- Power Load Switch
- Battery Powered System

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ 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 ($T_C=25^\circ\text{C}$)	188	A
	Drain Current - Continuous ($T_C=100^\circ\text{C}$)	119	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	400	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	211	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	65	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	96	W
T_J	Operating Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
Marking Code		ND1P7	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	50	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.3	$^\circ\text{C}/\text{W}$



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} =36V, V _{GS} =0V	---	---	1	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	---	1.45	1.7	mΩ
		V _{GS} =4.5V, I _D =15A	---	1.8	2.3	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.5	2.0	V
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =10A	---	52.3	---	S

Dynamic and switching Characteristics (NOTE 4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _D =20A	---	180.6	---	nC
Q _{gs}	Gate-Source Charge		---	34.1	---	
Q _{gd}	Gate-Drain Charge		---	26.9	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =20V, V _{GS} =10V, R _{GEN} =6Ω, I _D =1A	---	14.2	---	nS
T _r	Rise Time		---	17	---	
T _{d(off)}	Turn-Off Delay Time		---	347.7	---	
T _f	Fall Time		---	110.5	---	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, F=1MHz	---	6228	---	pF
C _{oss}	Output Capacitance		---	605	---	
C _{rss}	Reverse Transfer Capacitance		---	453	---	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, F=1MHz	---	4.4	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{SD}	Diode Forward Voltage (NOTE 3)	V _{GS} =0V, I _S =10A	---	---	1.1	V
T _{rr}	Reverse Recovery Time	V _R =20V, I _F =10A,	---	32.7	---	nS
Q _{rr}	Reverse Recovery Charge	di/dt=100A/us	---	31.9	---	nC

NOTES :

1. Max. current is limited by bonding wire.
2. UIS tested and pulse width are limited by maximum junction temperature 150°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.



Characteristics Curves

FIG. 1-On-Resistance vs. I_D

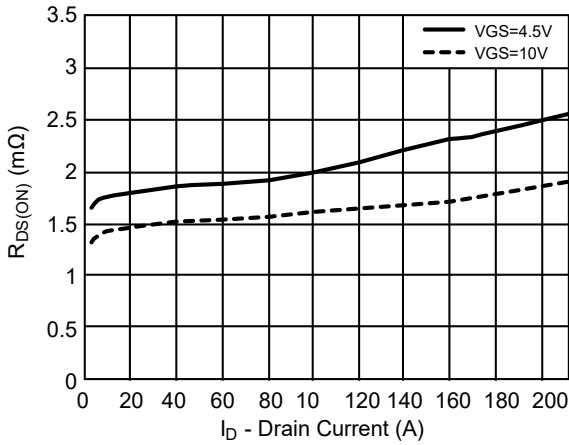


FIG. 2-On-Resistance vs. V_{GS}

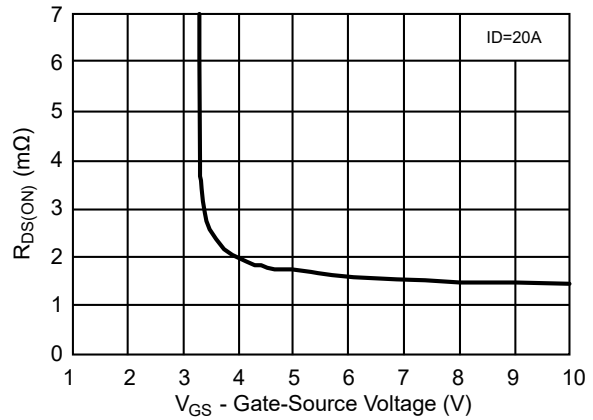


FIG. 3-Normalized V_{th} vs. T_J

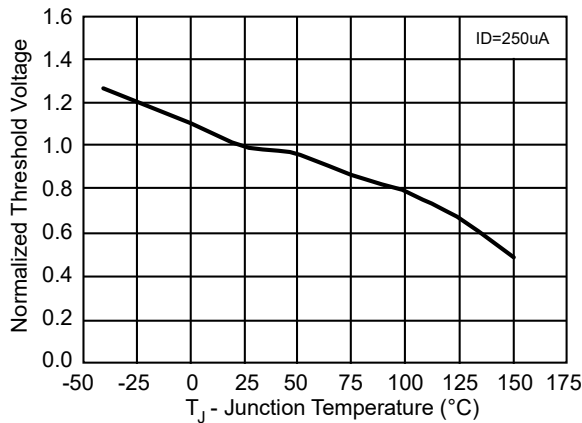


FIG. 4-Normalized $R_{DS(ON)}$ vs. T_J

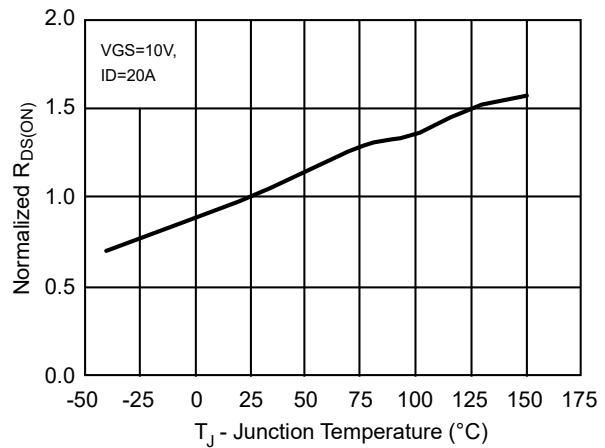


FIG. 5-Source-Drain Diode Forward

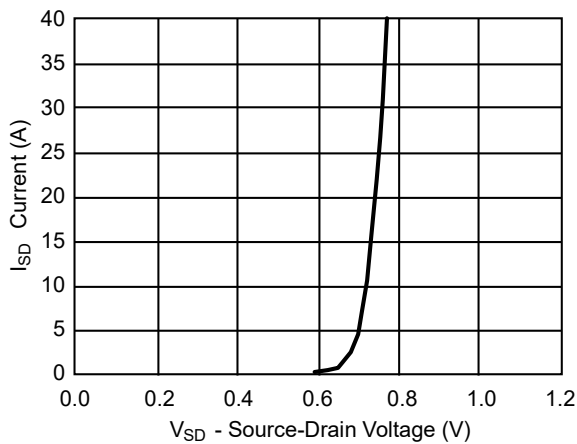
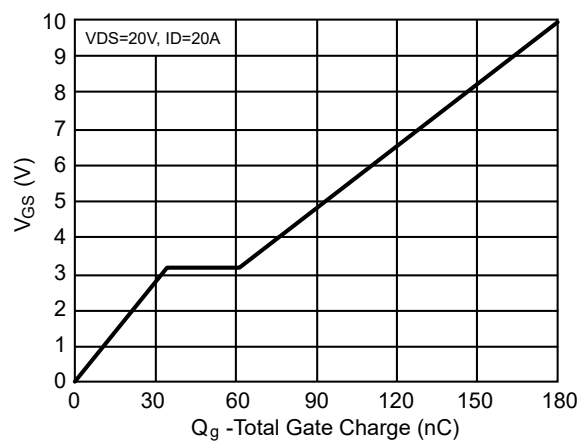


FIG. 6-Gate Charge Characteristics





Characteristics Curves

FIG. 7-Safe Operation Area

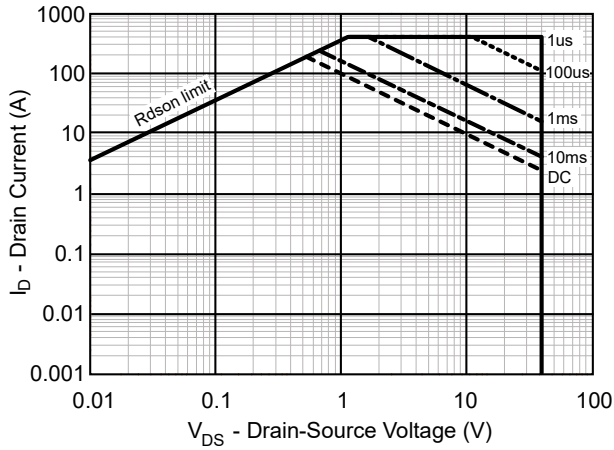
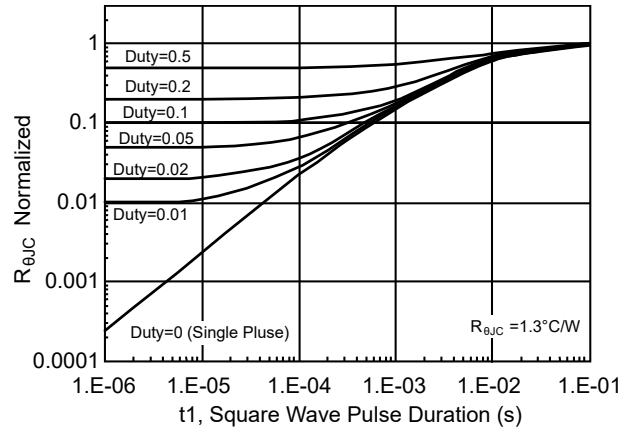
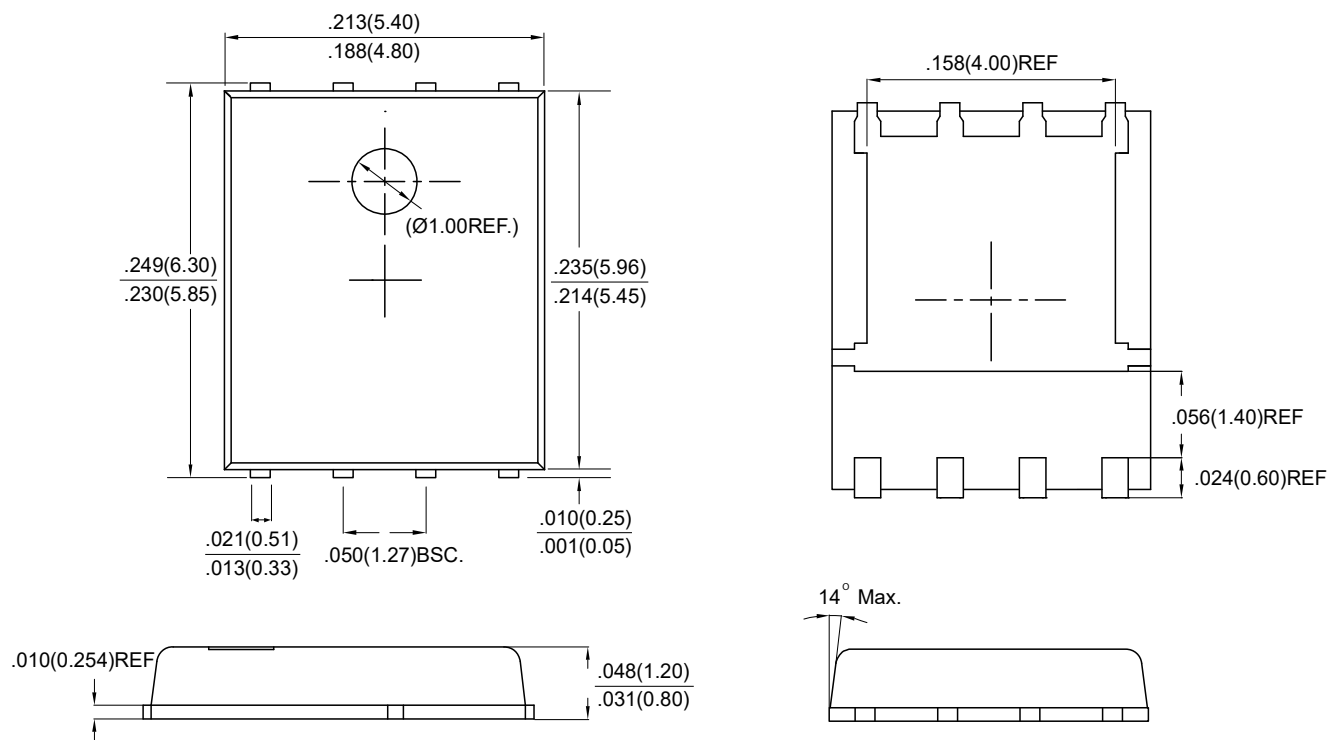


FIG. 8-R_{θJC} Transient Thermal Impedance



Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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