

Description

The PNMDP3080K uses trench technology to provide excellent $R_{DS(on)}$ low gate charge. This device is suitable for power management and high efficiency applications at high switching frequencies applications.

MOSFET Product Summary

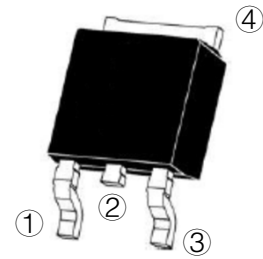
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)(Typ)$	$I_D(A)$
30	4.1 @ $V_{GS} = 10V$	85
	6.7 @ $V_{GS} = 4.5V$	

Feature

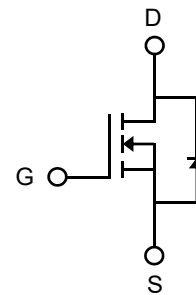
- Fast Switching Capability
- Lead free product is acquired.
- Avalanche Energy Tested

Applications

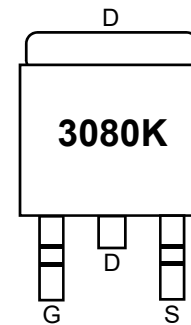
- PWM applications
- Load Switch
- Power Management
- DC-DC Converters



TO-252 (Top View)



Circuit Diagram



Marking (Top View)

Absolute maximum rating@25°C

Rating		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current-Continuous	$T_C=25^\circ C$	I_D	85	A
	$T_C=100^\circ C$		54	
Pulsed Drain Current		I_{DM}	340	A
Total Power Dissipation	$T_C=25^\circ C$	P_D	67	W
	$T_A=25^\circ C$		2.7	
Avalanche Current		I_{AS}	23.5	A
Avalanche Energy ²⁾		E_{AS}	138	mJ
Thermal Resistance , Junction-to-Case ³⁾		$R_{\theta JC}$	1.86	$^\circ C/W$
Thermal Resistance , Junction-to-Ambient ³⁾		$R_{\theta JA}$	46	$^\circ C/W$
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ C$

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	-	2.4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 20A$	-	4.1	5.5	m Ω
		$V_{GS} = 4.5V, I_D = 15A$	-	6.7	9.0	
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	-	2.0	-	Ω
Forward Transconductance	gfs	$V_{DS}=5V, I_D=20A$	-	22	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	-	1773	-	pF
Output Capacitance	C_{oss}		-	190	-	
Reverse Transfer Capacitance	C_{rss}		-	171	-	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 15V, V_{GS} = 10V,$ $I_D = 20A, R_G = 10\Omega$	-	13	-	ns
Turn-on Rise Time	t_r		-	72	-	
Turn-Off Delay Time	$t_{d(off)}$		-	78	-	
Turn-Off Fall Time	t_f		-	50	-	
Total Gate Charge	Q_g	$V_{DD} = 24V,$ $V_{GS}=0 \text{ to } 10V,$ $I_D = 20A$	-	40	-	nC
Gate-Source Charge	Q_{gs}		-	9.0	-	
Gate-Drain Charge	Q_{gd}		-	9.0	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 20A$	-	-	1.2	V
Continuous Diode Forward Current	I_S	-	-	-	85	A
Pulsed Diode Forward Current	I_{SM}	-	-	-	340	A
Reverse Recovery Time	t_{rr}	$I_F=15A, di/dt=100A/us,$ $V_{GS} = 0V$	-	19	-	ns
Reverse Recovery Charge	Q_{rr}		-	15	-	nC

Notes:

- The maximum current is limited by case temperature.
- Starting $T_C=25^\circ C$, $L=0.5mH$, $V_D=24V$.
- For surface-mounted devices, both $R_{\theta JC}$ and $R_{\theta JA}$ are measured with the device mounted on approximately 1"×1"FR-4 PCBs. In actual applications, many factors including the PCB material and layout, may affect the thermal resistance of the device-board assembly. For best results, characterize the thermal resistance directly in the application circuit.

Typical Characteristics

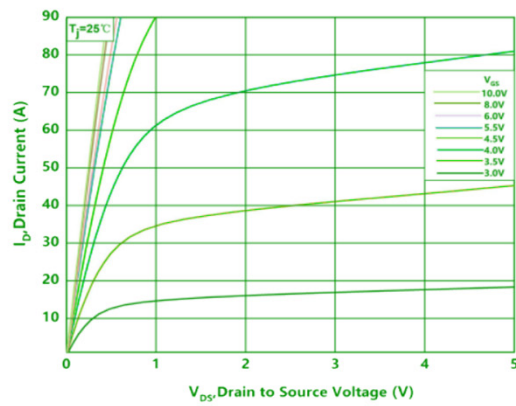


Fig1. Output Characteristics

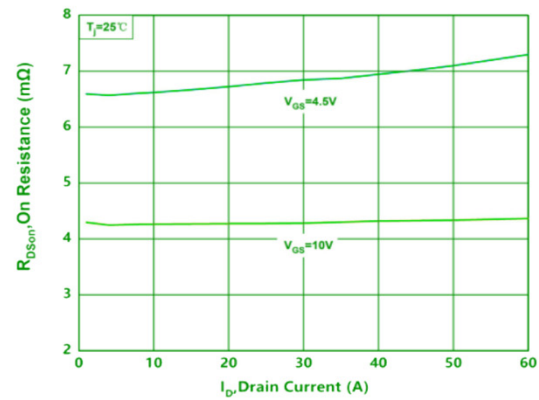


Fig2. Drain-Source On-Resistance vs Drain Current

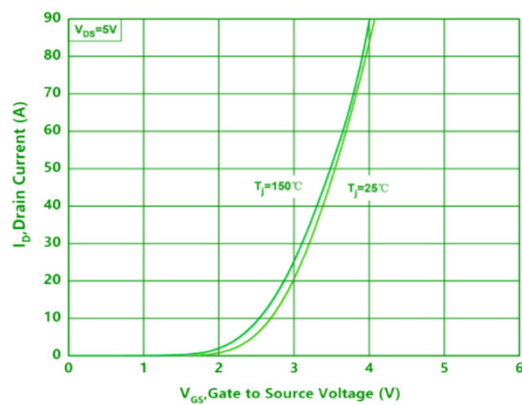


Fig3. Transfer Characteristic

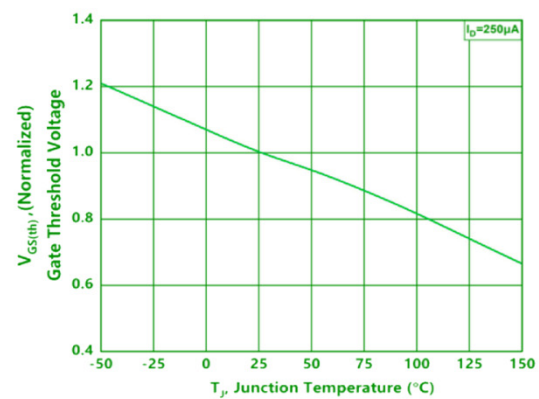


Fig4. Normalized Threshold Voltage vs Junction Temperature

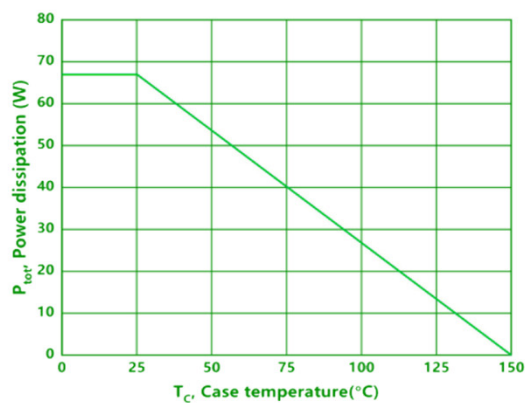


Fig5. Maximum Power Dissipation vs Case Temperature

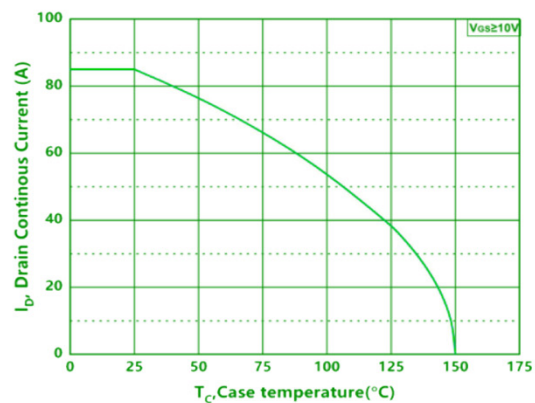


Fig6. Drain Current vs Case Temperature

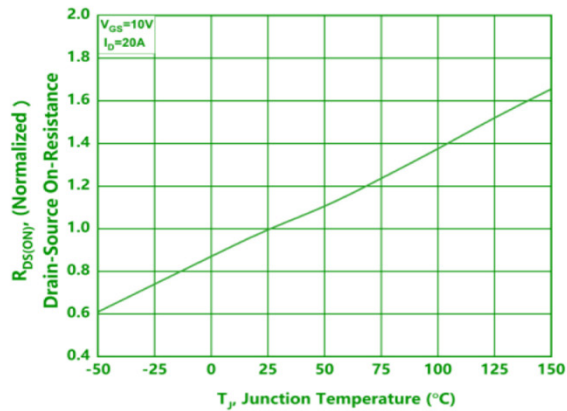


Fig7. Normalized On-Resistance vs Junction Temperature

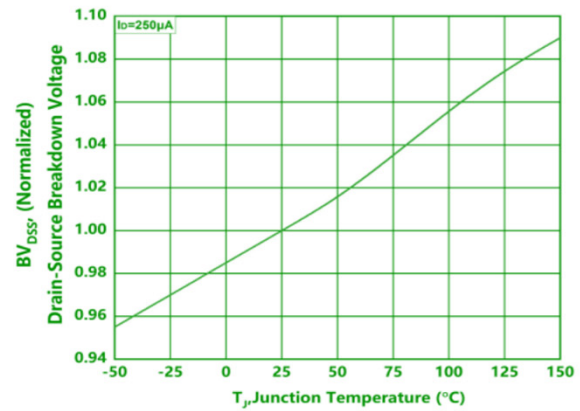


Fig8. Normalized Breakdown Voltage vs Junction Temperature

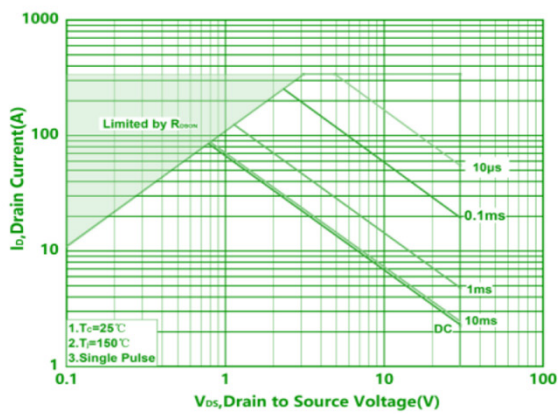


Fig9. Safe Operation Area

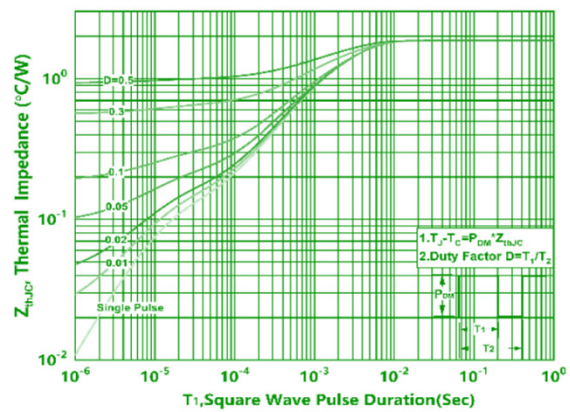


Fig10. Transient Thermal Impedance

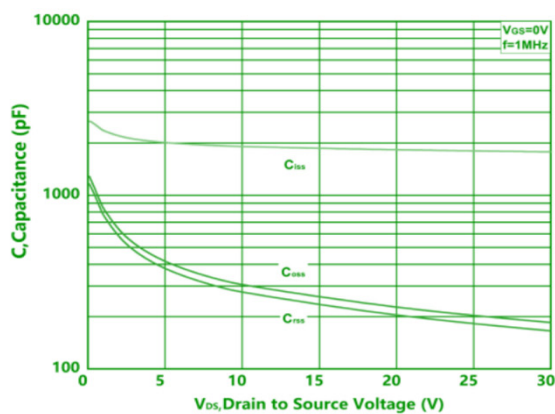


Fig11. Capacitance

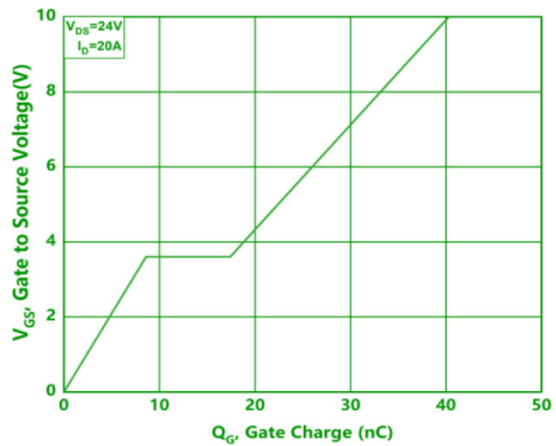


Fig12. Gate Charge

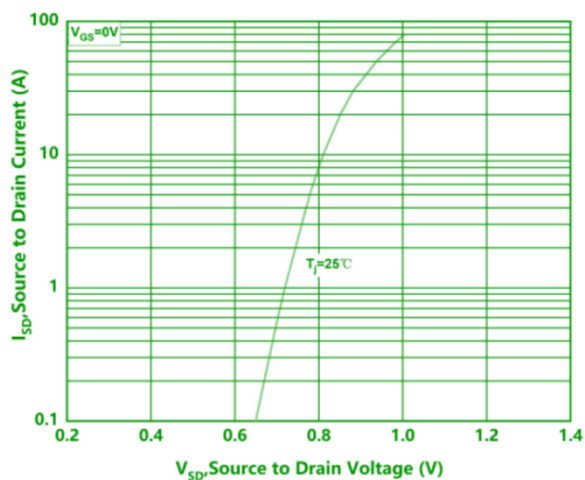
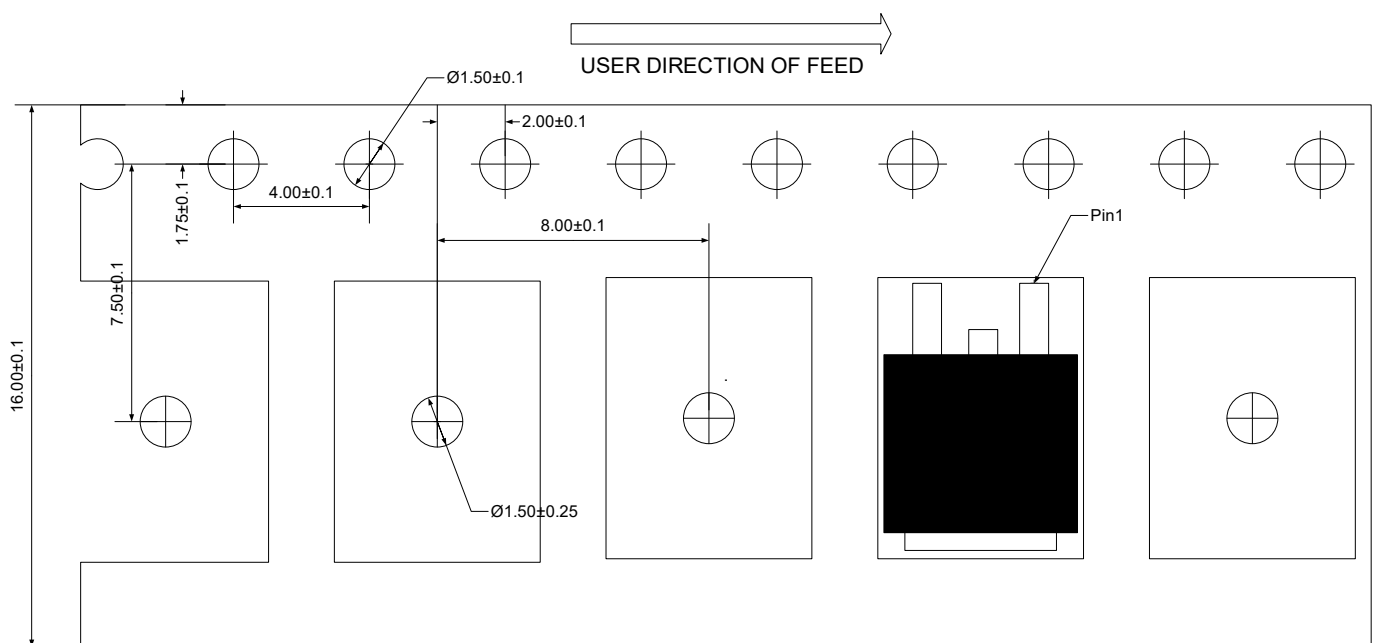


Fig13. Typical Body Diode Characteristics

Ordering Information

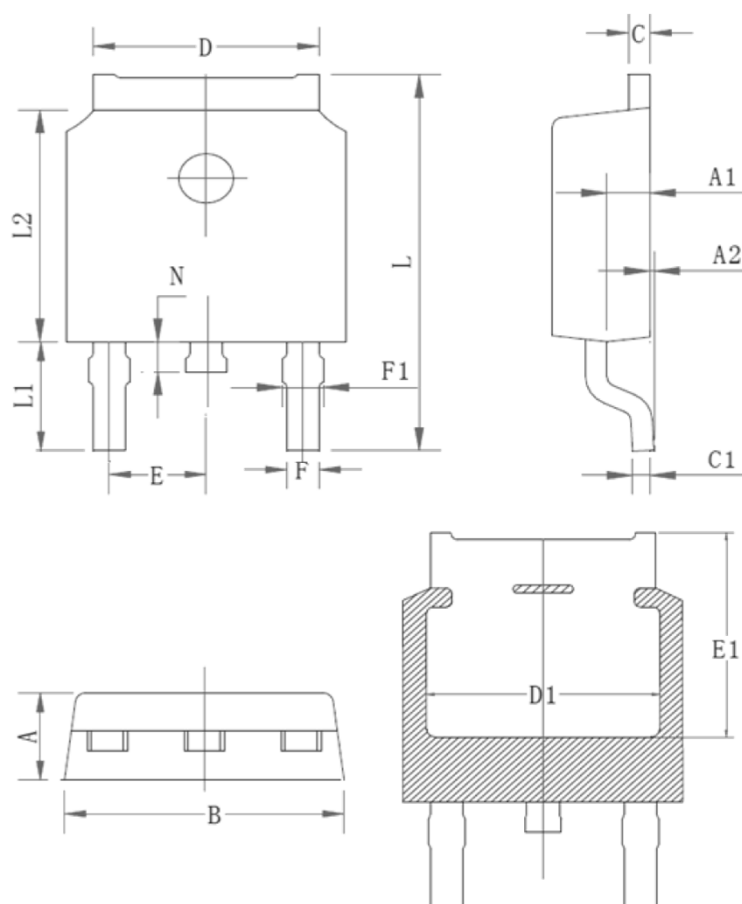
Package	Reel	Shipping
TO-252	13"	2500 / Tape & Reel

Load With Information



Unit:mm

Product Dimension (TO-252)



Dim	Millimeters		Inches		Dim	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	2.20	2.40	0.087	0.094	E	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044	E1	4.95	5.35	0.195	0.211
A2	-	0.25	-	0.010	F	0.66	0.86	0.026	0.034
B	6.50	6.70	0.256	0.264	F1	0.70	0.95	0.028	0.037
C	0.40	0.60	0.016	0.024	L	9.70	10.10	0.382	0.398
C1	0.40	0.60	0.016	0.024	L1	2.67	3.07	0.105	0.121
D	5.15	5.45	0.203	0.215	L2	6.00	6.20	0.236	0.244
D1	5.10	5.40	0.201	0.213	N	0.60	1.00	0.024	0.039

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