Prisemi®

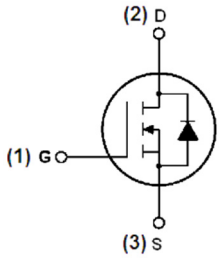
PNMDP60V22

N-Channel MOSFET

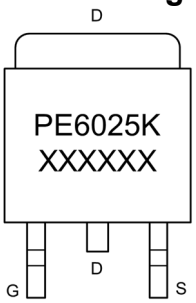
Description

The PNMDP60V22 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

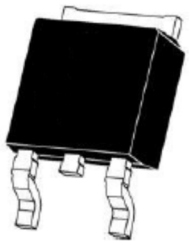
MOSFET Product Summary		
V_{DS}(V)	$R_{DS(on)}$(mΩ)	I_D(A)
60	40@ V_{GS} = 10V	22



Schematic diagram



Marking (Top View)



TO-252-2L (Top View)

Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute maximum rating@25℃

Rating		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	T_A=25℃	I_D	22	A
	T_A=100℃		15	
Pulsed Drain Current		IDM	60	A
Maximum Power Dissipation		PD	45	W
Derating factor			0.3	W/℃
Single pulse avalanche energy [5]		E_{AS}	85	mJ
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 175	℃
Thermal Resistance, Junction-to-Case [2]		$R_{\theta JC}$	3.3	℃/W

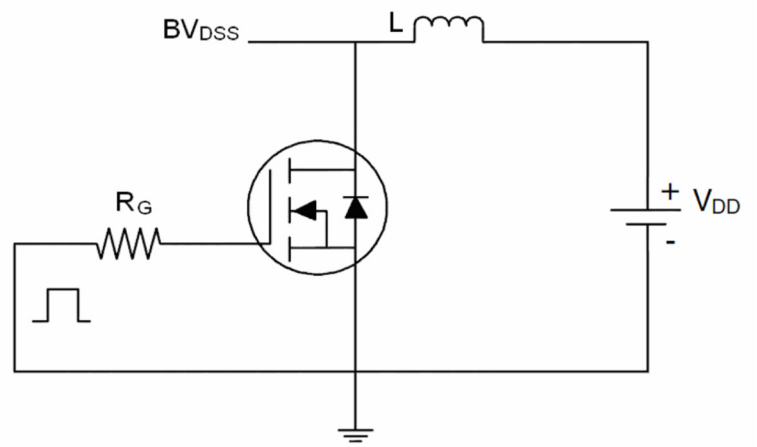
Electrical characteristics per line@25℃ (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V,I_D = 250μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V,V_{GS} = 0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±20V,V_{DS} = 0V	-	-	±100	nA
On Characteristics[3)]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS},I_D = 250μA	1.2	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V,I_D = 20A	-	32	40	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V,I_D = 5A	11	-	-	S
Dynamic Characteristics[4)]						
Input Capacitance	C_{lss}	V_{DS} = 15V,V_{GS} = 0V, F = 1.0MHz	-	590	-	pF
Output Capacitance	C_{oss}		-	70	-	pF
Reverse Transfer Capacitance	C_{rss}		-	64	-	pF
Switching Characteristics[4)]						
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 30V,I_D = 2A, V_{GS} = 10V,R_G = 3Ω	-	6	-	ns
Turn-on Rise Time	t_r		-	6.1	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	ns
Turn-Off Fall Time	t_r		-	3	-	ns
Total Gate Charge	Q_g	V_{DS} = 30V,I_D = 10A, V_{GS} = 10V	-	25.3	-	nC
Gate-Source Charge	Q_{gs}		-	4.7	-	nC
Gate-Drain Charge	Q_{gd}		-	6.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage[3)]	V_{SD}	V_{GS} = 0V,I_S = 2A	-	-	1.2	V
Diode Forward Current[2)]	I_S		-	-	20	A
Reverse Recovery Time	t_{rr}	T_J = 25℃,I_F = 20A, di/dt = 100A/μs[3)]	-	29.5	-	nS
Reverse Recovery Charge	Q_{rr}		-	50	-	nC

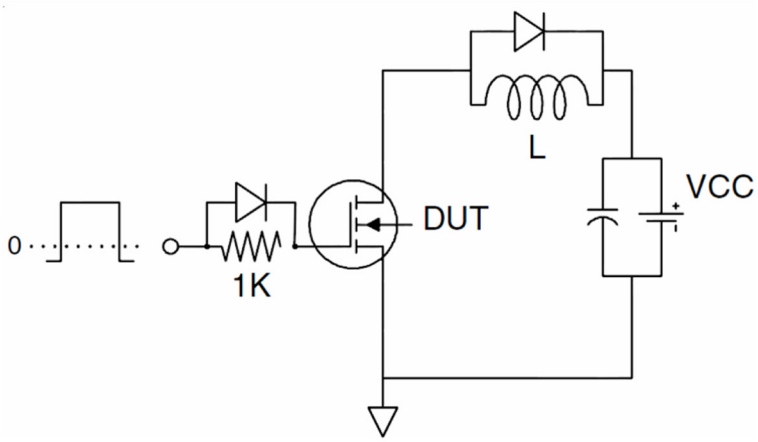
Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition:T_j=25℃,V_{DD}=30V,V_G=10V,L=0.5mH,R_g=25Ω

Test Circuit

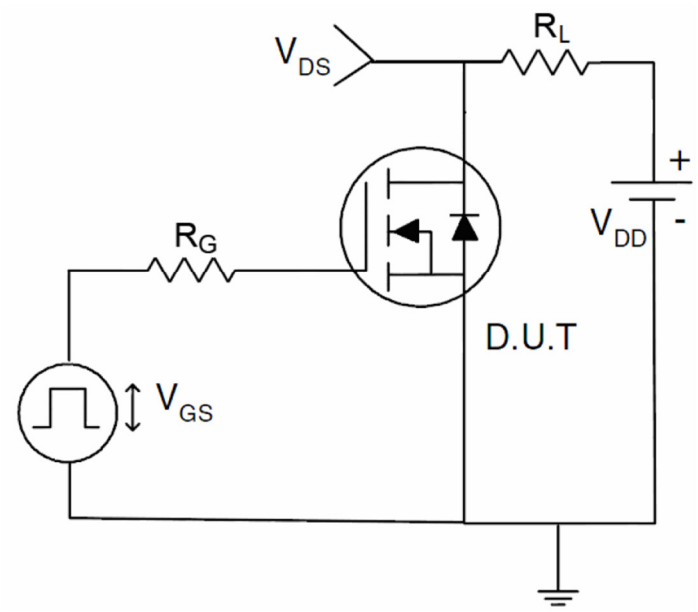
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Characteristics

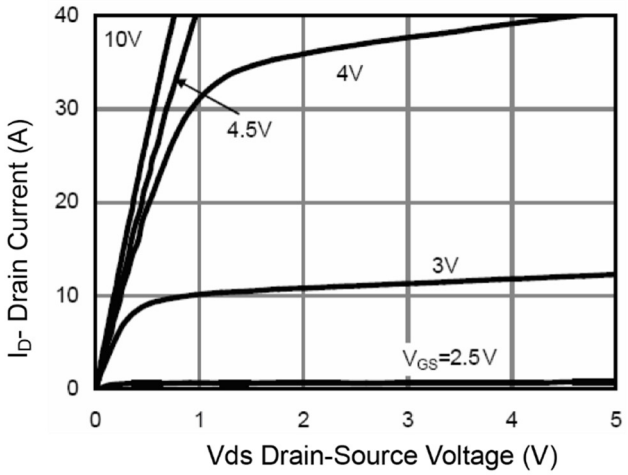


Figure 1 Output Characteristics

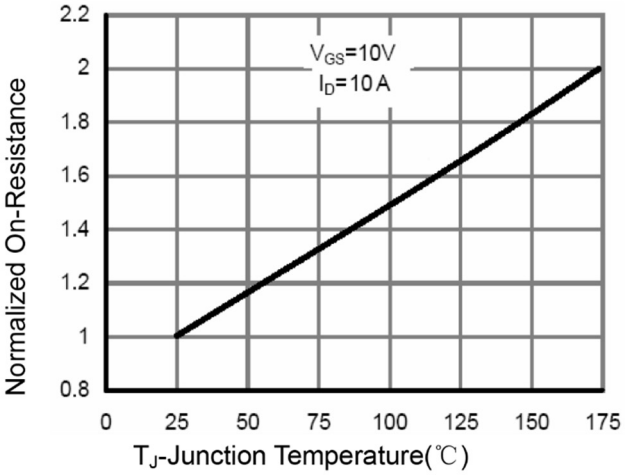


Figure 4 Rdson-Junction Temperature

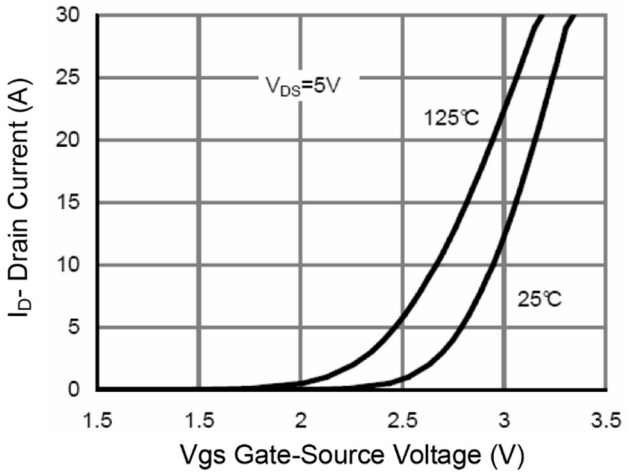


Figure 2 Transfer Characteristics

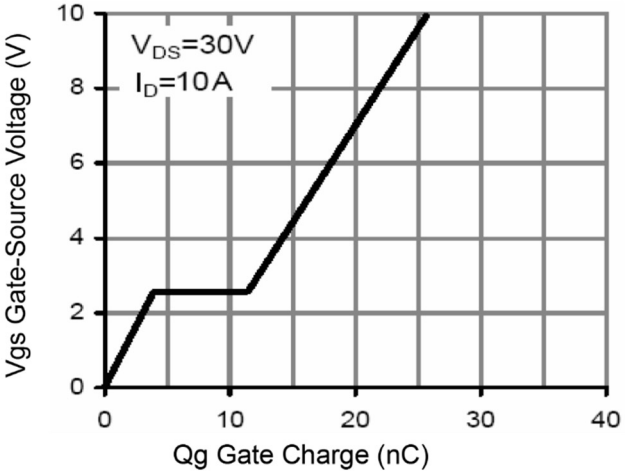


Figure 5 Gate Charge

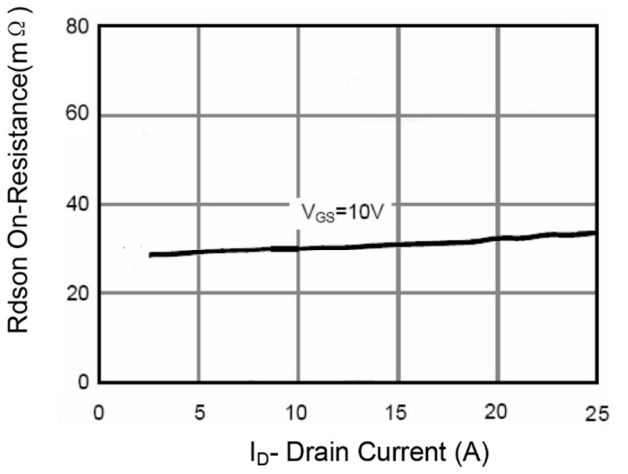


Figure 3 Rdson- Drain Current

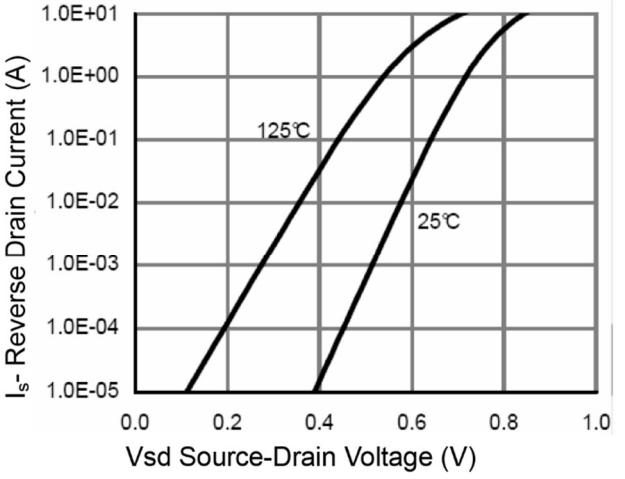


Figure 6 Source- Drain Diode Forward

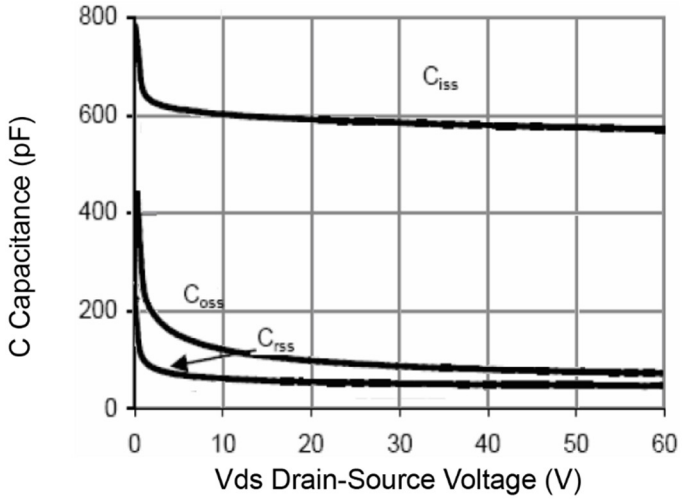


Figure 7 Capacitance vs Vds

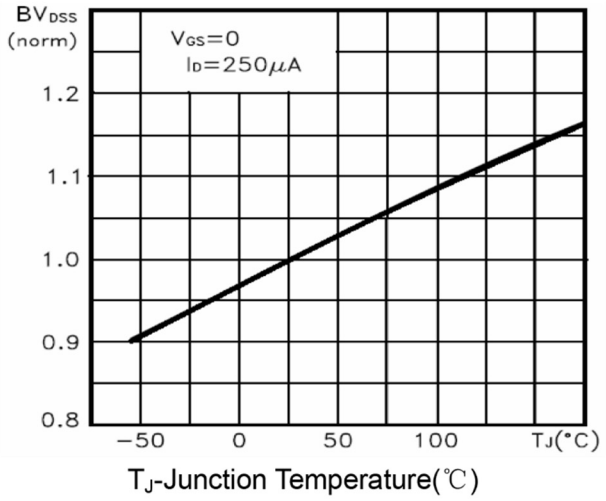


Figure 9 BV_{DSS} vs Junction Temperature

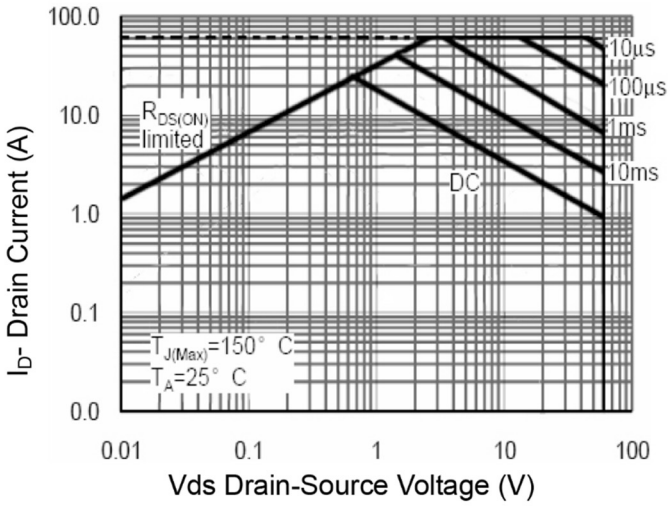


Figure 8 Safe Operation Area

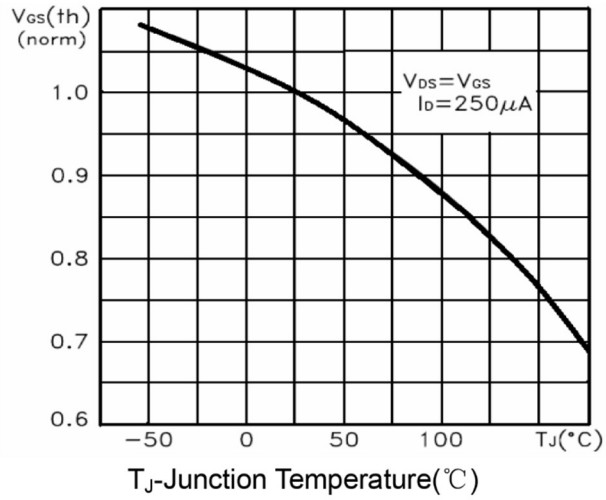


Figure 10 $V_{GS(th)}$ vs Junction Temperature

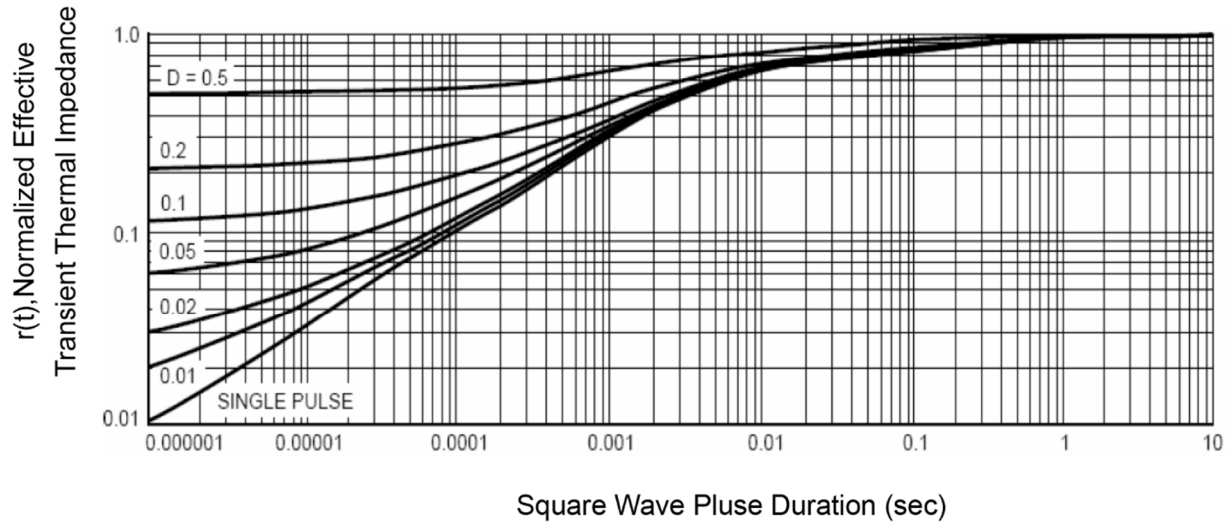
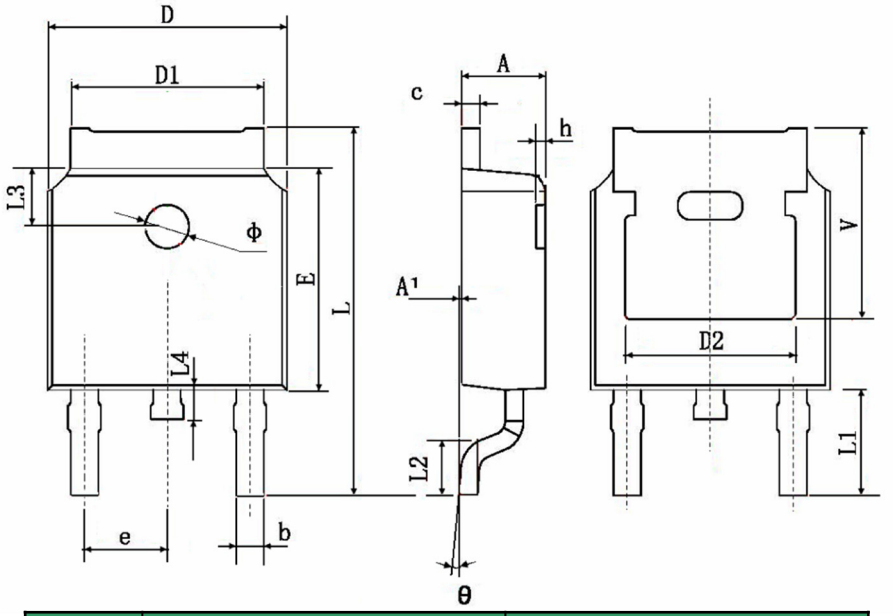


Figure 11 Normalized Maximum Transient Thermal Impedance

Product dimension (TO-252)



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 Typ.		0.190 Typ.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 Typ.		0.114 Typ.	
L2	1.400	1.700	0.055	0.067
L3	1.600 Typ.		0.063 Typ.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 Typ.		0.211 Typ.	

Ordering information

Device	Package	Reel	Shipping
PNMDP60V22	TO-252 (Pb-Free)	13"	2500 / Tape & Reel

IMPORTANT NOTICE

and Prisemi® are registered trademarks of **Prisemi Electronics Co., Ltd** (Prisemi**),** Prisemi reserves the right to make changes without further notice to any products herein. Prisemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Prisemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. “Typical” parameters which may be provided in Prisemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typicals” must be validated for each customer application by customer’s technical experts. Prisemi does not convey any license under its patent rights nor the rights of others. The products listed in this document are designed to be used with ordinary electronic equipment or devices, Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

Website: http://www.prisemi.com
For additional information, please contact your local Sales Representative.