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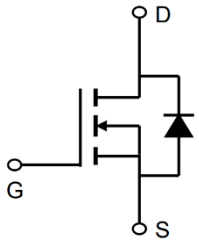
PULAN TECHNOLOGY CO.,LIMITED

PL60N02D

20V N-Channel Enhancement Mode MOSFET

Description

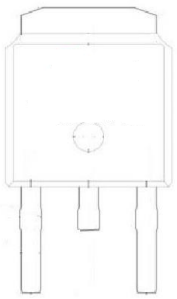
The PL60N02D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = 20V I_D =60A

$R_{DS(ON)}$ < 5.5mΩ@ V_{GS}=10V



Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
PL60N02D	TO-252-3	PL60N02D XXX YYYY	2500

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current-Continuous	60	A
I_D (100℃)	Drain Current-Continuous(T_C=100℃)	42	A
I_{DM}	Pulsed Drain Current	210	A
P_D	Maximum Power Dissipation	60	W
	Derating factor	0.48	W/℃
E_{AS}	Single pulse avalanche energy (Note 5)	200	mJ
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case(Note 2)	2.1	℃/W

20V N-Channel Enhancement Mode MOSFET

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	20	22	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V,V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.5	0.75	1.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=30 A	-	3.9	5.5	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=2.5V, I_D=20A		5.8	8	mΩ
g_{FS}	Forward Transconductance	V_{DS}=10V,I_D=20A	15	-	-	S
C_{lss}	Input Capacitance	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	-	2000	-	PF
C_{oss}	Output Capacitance		-	500	-	PF
C_{rss}	Reverse Transfer Capacitance		-	200	-	PF
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=10V,I_D=2A,R_L=1Ω V_{GS}=4.5V,R_G=3Ω	-	6.4	-	nS
t_r	Turn-on Rise Time		-	17.2	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	29.6	-	nS
t_f	Turn-Off Fall Time		-	16.8	-	nS
Q_g	Total Gate Charge	V_{DS}=10V,I_D=20A, V_{GS}=10V	-	27		nC
Q_{gs}	Gate-Source Charge		-	6.5		nC
Q_{gd}	Gate-Drain Charge		-	6.4		nC
V_{SD}	Diode Forward Voltage (Note 3)	V_{GS}=0V,I_S=10A	-		1.2	V
I_S	Diode Forward Current (Note 2)		-	-	60	A
t_{rr}	Reverse Recovery Time	TJ = 25°C, IF = 20A di/dt = 100A/μs(Note3)	-	25	-	nS
Qrr	Reverse Recovery Charge		-	24	-	nC
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

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. E_{AS} condition : Tj=25℃,V_{DD}=10V,V_G=10V,L=0.5mH,Rg=25Ω，

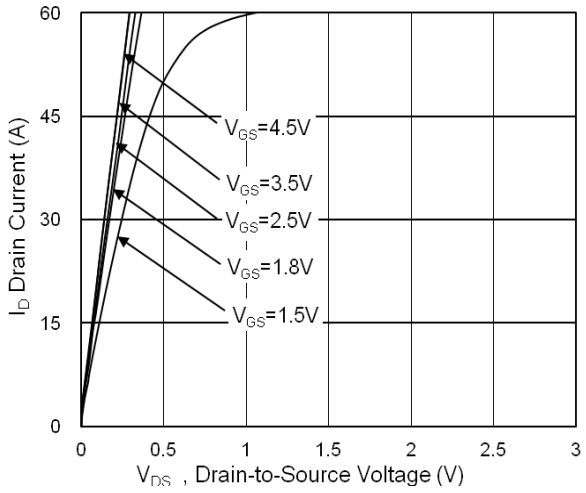


Fig.1 Typical Output Characteristics

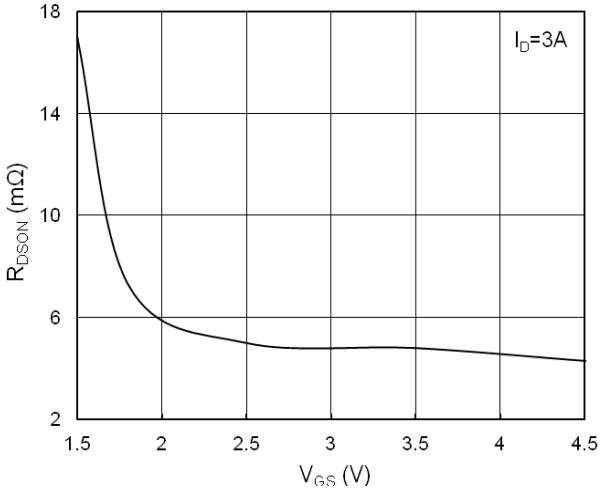


Fig.2 On-Resistance vs. Gate-Source

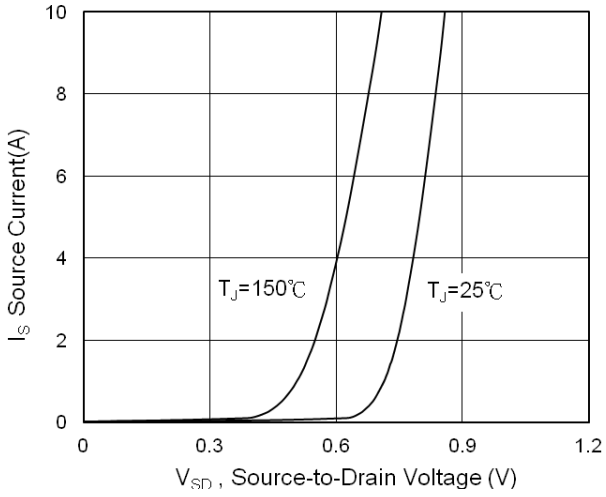


Fig.3 Forward Characteristics Of Reverse

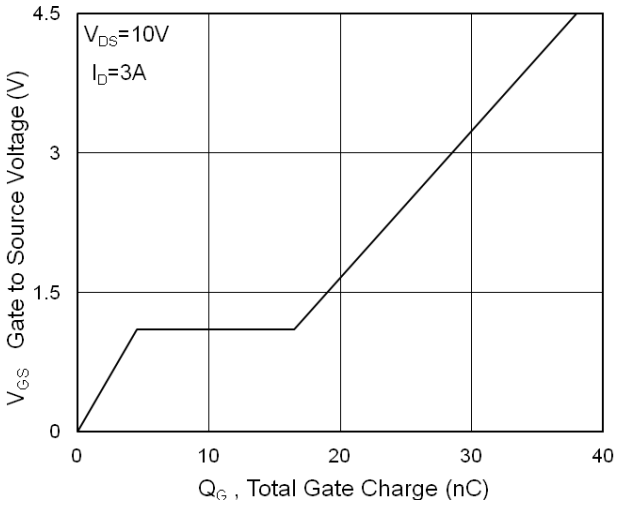


Fig.4 Gate-Charge Characteristics

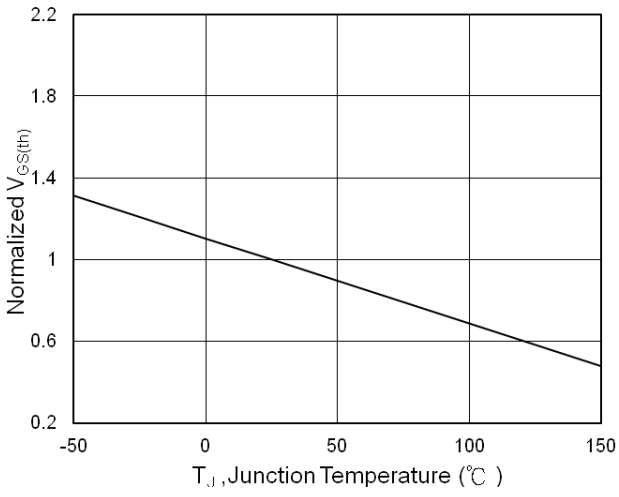


Fig.5 $V_{GS(th)}$ vs. T_J

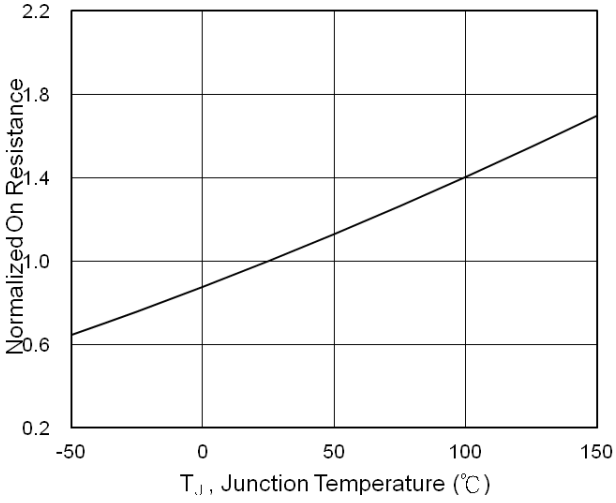


Fig.6 Normalized R_{DSON} vs. T_J

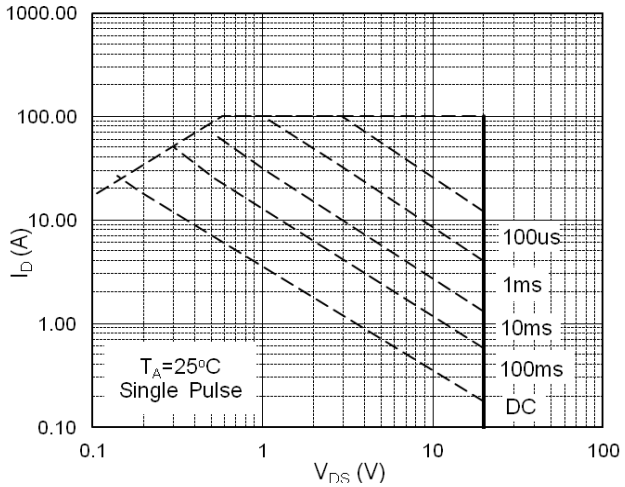


Fig.7 Capacitance

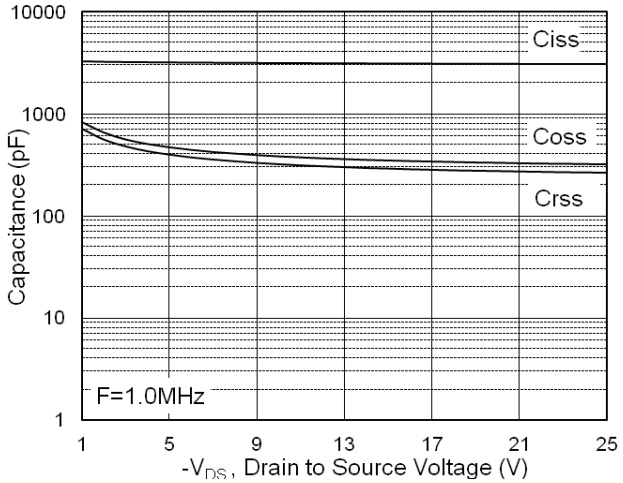


Fig.8 Safe Operating Area

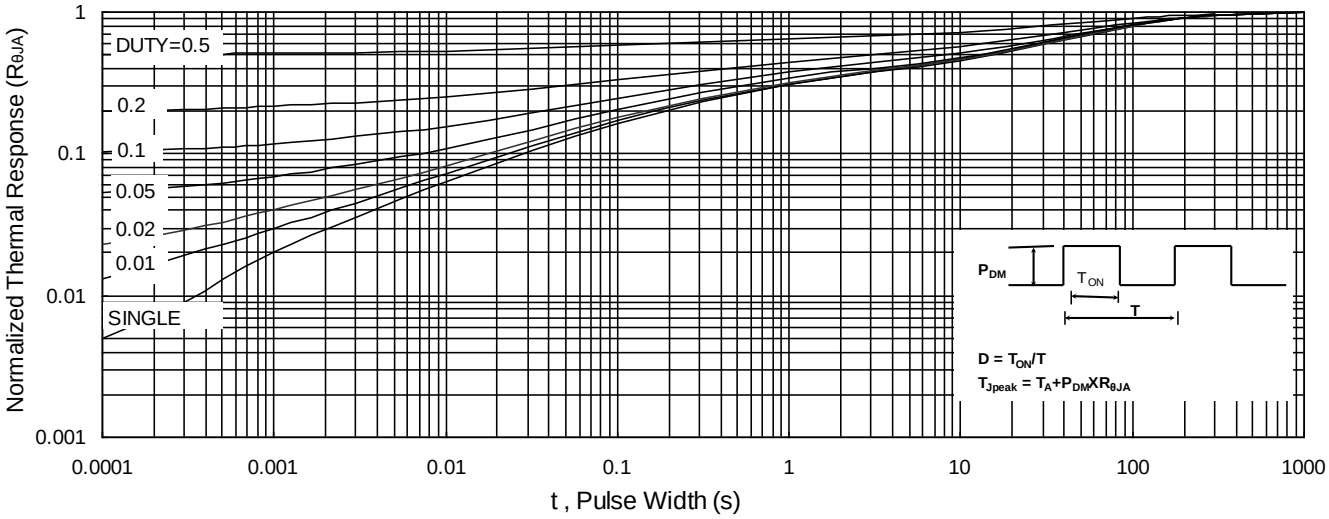


Fig.9 Normalized Maximum Transient Thermal Impedance

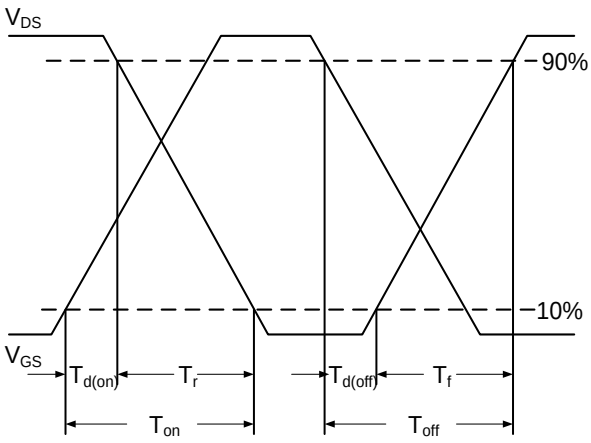


Fig.10 Switching Time Waveform

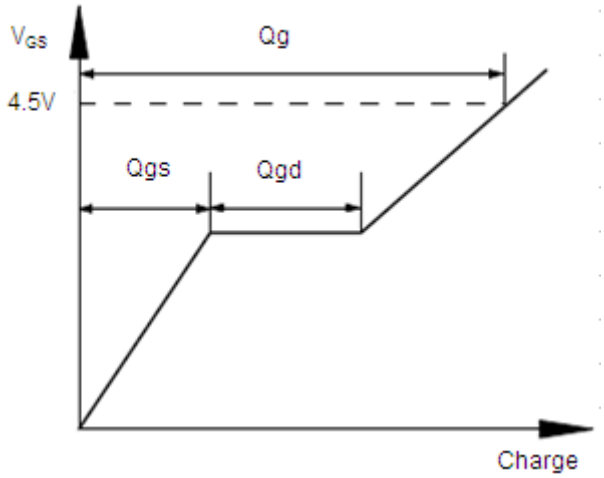
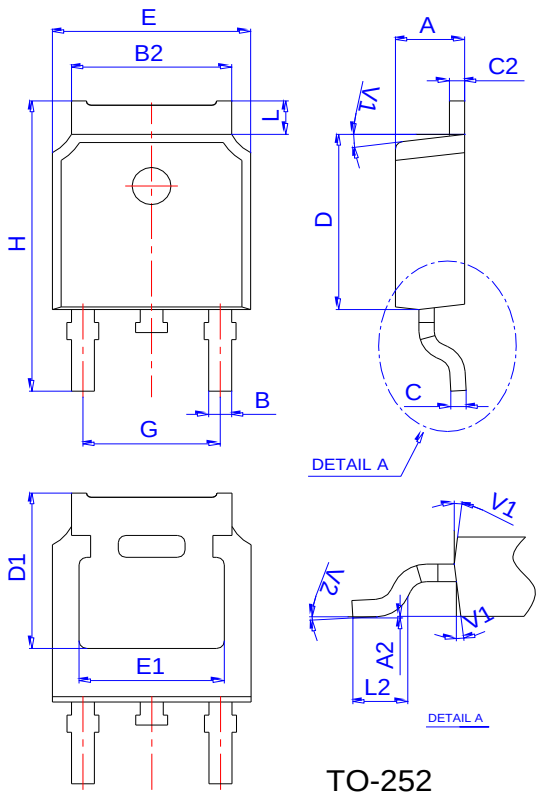


Fig.11 Gate Charge Waveform

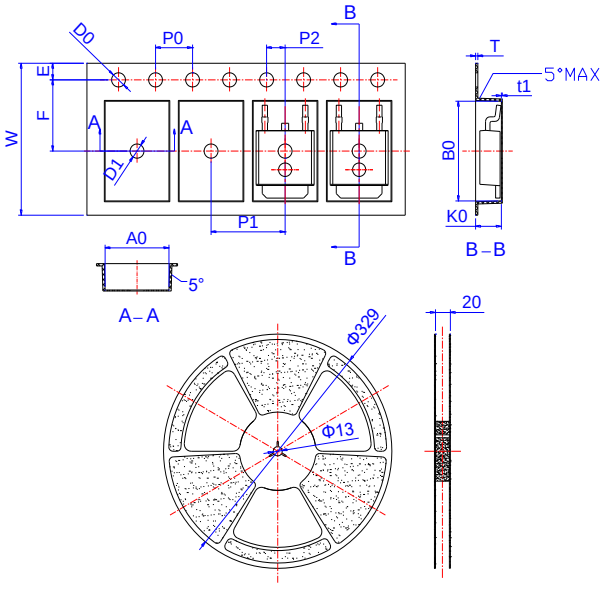
Package Mechanical Data:TO-252-3L



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Spectification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583