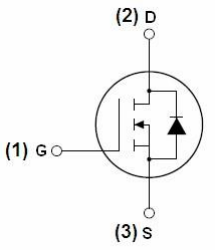
20V N-Channel Enhancement Mode MOSFET

Description

The PTD90N02 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

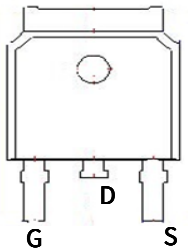
V_{DS} = 20V I_D =90 A

Application

Battery protection

Load switch

Uninterruptible power supply



TO-252

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	90	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	59	A
Pulsed Drain Current	I_{DM}	360	A
Maximum Power Dissipation	P_D	81	W
Single pulse avalanche energy (Note 5)	E_{AS}	112	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃
Thermal Resistance,Junction-to-Case(Note 2)	$R_{\theta JC}$	1.54	℃/W

20V N-Channel Enhancement Mode MOSFET

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.5	0.75	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=30A	-	2.8	4	mΩ
		V_{GS}=2.5V, I_D=20A		4	6	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=20A	15	-	-	S
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	-	3100	-	PF
Output Capacitance	C_{oss}		-	460	-	PF
Reverse Transfer Capacitance	C_{rss}		-	437	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,I_D=30A, V_{GS}=4.5V,R_G=1.8Ω	-	9.8	-	nS
Turn-on Rise Time	t_r		-	36	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	62	-	nS
Turn-Off Fall Time	t_f		-	51	-	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=30A, V_{GS}=4.5V	-	47		nC
Gate-Source Charge	Q_{gs}		-	6.5		nC
Gate-Drain Charge	Q_{gd}		-	19		nC
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=10A	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	90	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 20A di/dt = 100A/μs(Note3)	-	25	-	nS
Reverse Recovery Charge	Qrr		-	24	-	nC
Forward Turn-On Time	t_{on}	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, IAS=20A

20V N-Channel Enhancement Mode MOSFET

Typical Electrical and Thermal Characteristics (Curves)

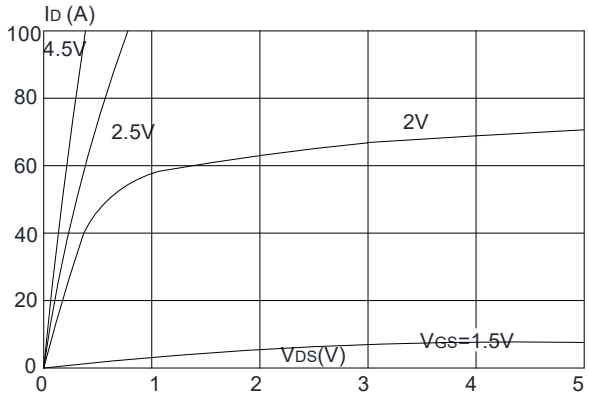


Figure1: Output Characteristics

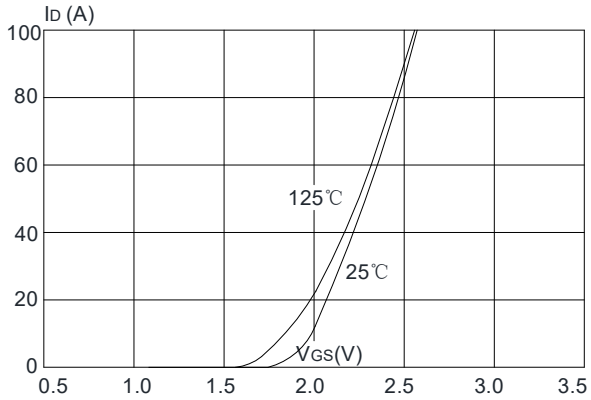


Figure 2: Typical Transfer Characteristics

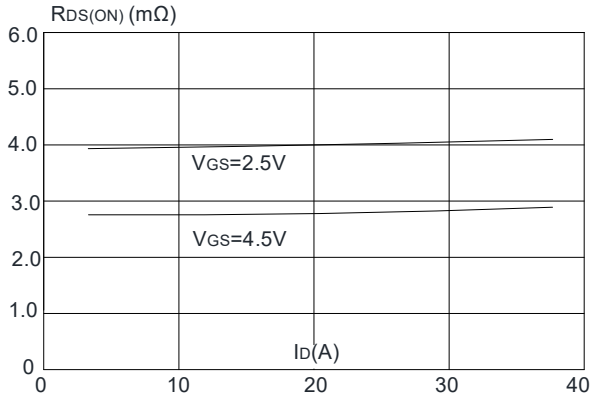


Figure 3: On-resistance vs. Drain Current

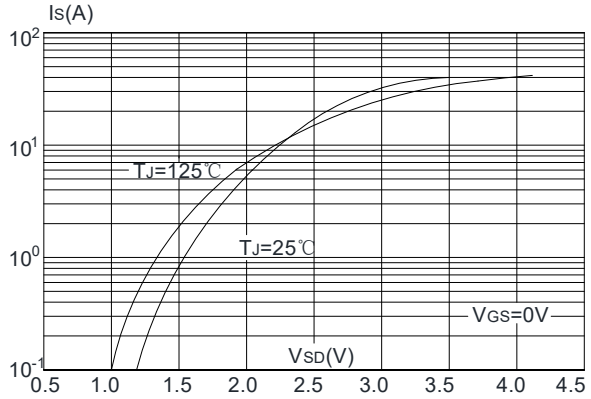


Figure 4: Body Diode Characteristics

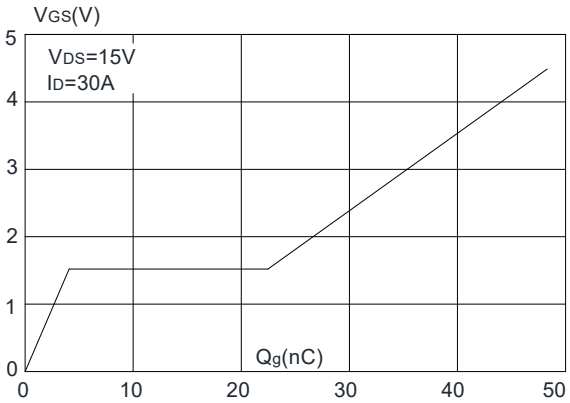


Figure 5: Gate Charge Characteristics

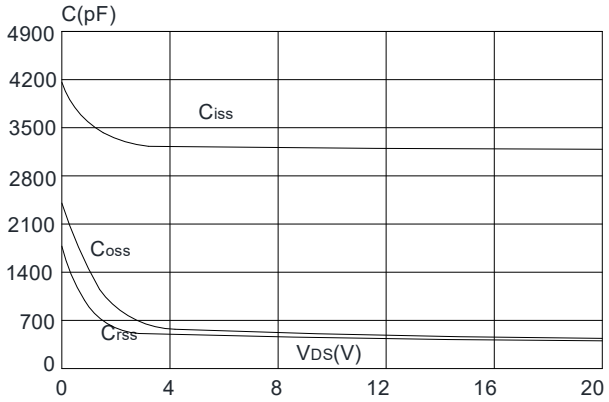


Figure 6: Capacitance Characteristics

20V N-Channel Enhancement Mode MOSFET

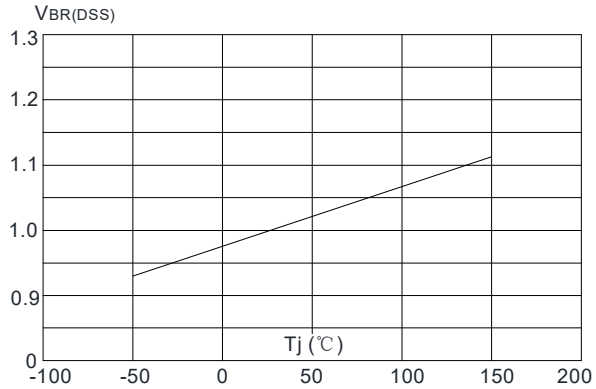


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

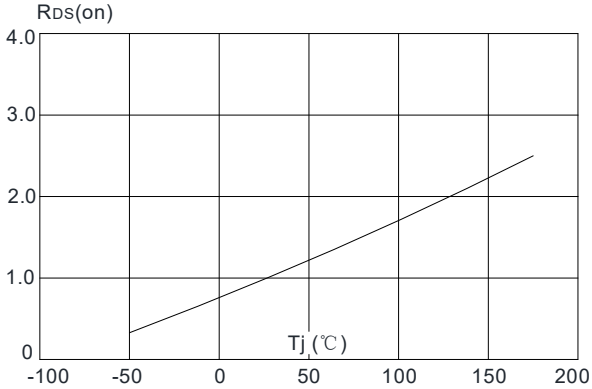


Figure 8: Normalized on Resistance vs. Junction Temperature

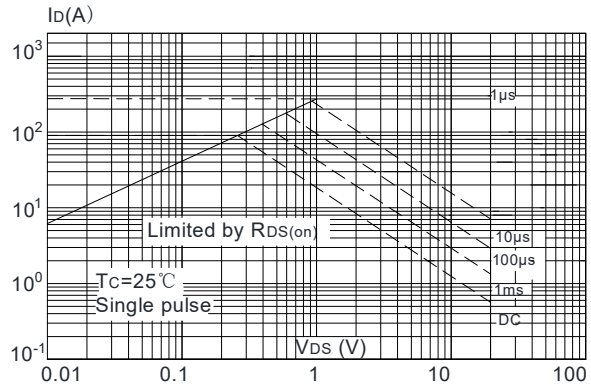


Figure 9: Maximum Safe Operating Area

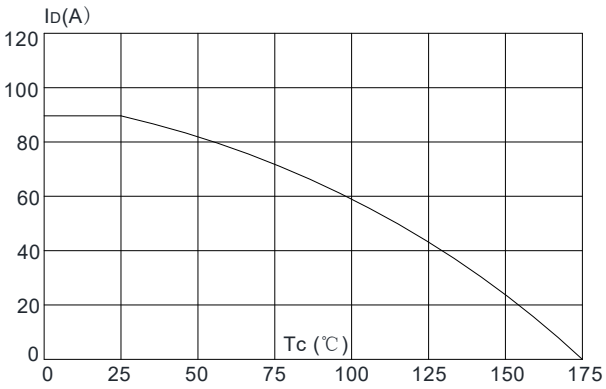


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

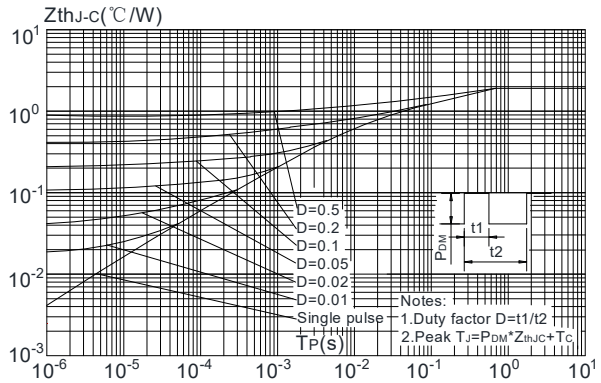
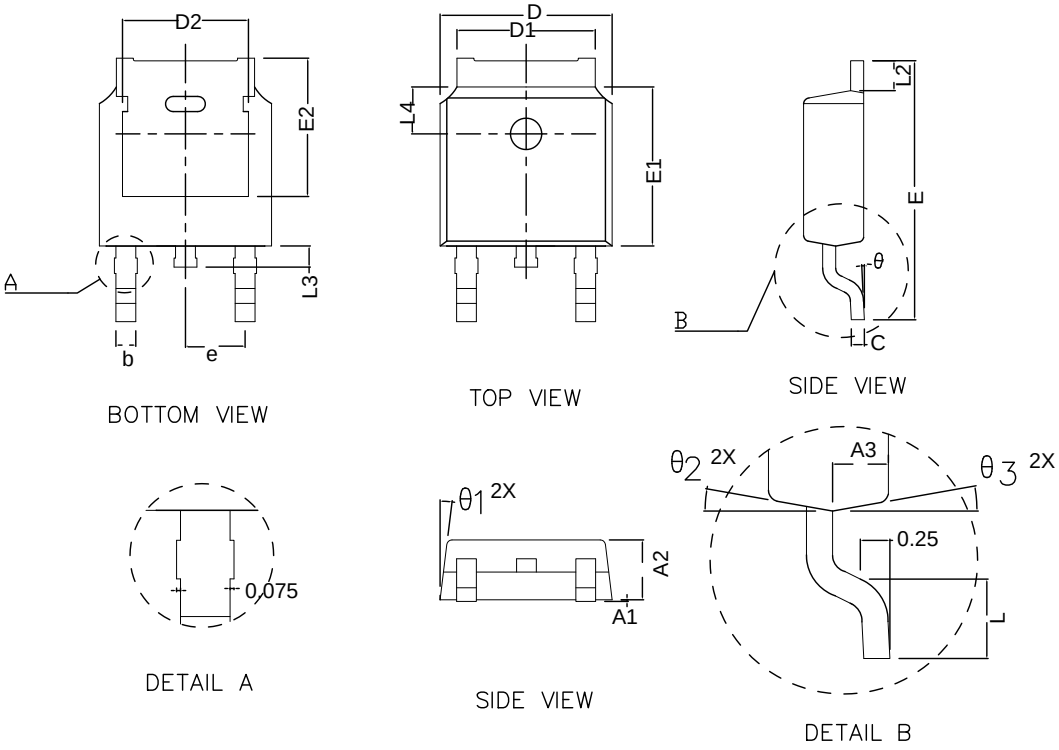


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

20V N-Channel Enhancement Mode MOSFET

TO-252 Packae outline dimensions(Units：mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	0.000	–	0.100
A2	2.200	2.300	2.400
A3	1.020	1.070	1.120
b	0.740	–	0.820
c	0.510	–	0.550
D	6.500	6.600	6.700
D1	5.330REF		
D2	4.830REF		
E	9.900	10.100	10.300
E1	6.000	6.100	6.200
E2	5.300REF		
e	2.286REF		
L	1.400	1.500	1.600
L2	0.900	–	1.250
L3	0.600	0.800	1.000
L4	1.700	1.800	1.900
θ	0		8°
θ1	7° TYPE		
θ2	10° TYPE		
θ3	10° TYPE		