

General Description

The MY20N15D 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.

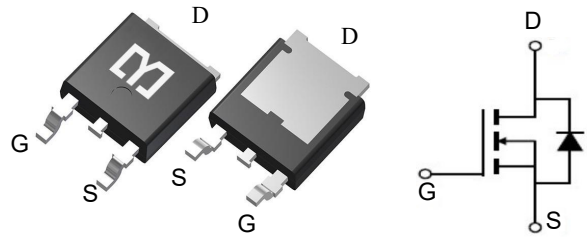


Features

V_{DSS}	150	V
I_D	20	A
$R_{DS(ON)}(at V_{GS}=10V)$	<105	m Ω
$R_{DS(ON)}(at V_{GS}=4.5V)$	<115	m Ω

Application

- Battery protection
- Load switch
- Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY20N15D	TO-252-2L	MY20N15D	2500

Absolute Maximum Ratings ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_{D@T_c=25^{\circ}\text{C}}$	Continuous Drain Current, $V_{GS} @ 10V^1$	20	A
$I_{D@T_c=100^{\circ}\text{C}}$	Continuous Drain Current, $V_{GS} @ 10V^1$	14	A
$I_{D@T_A=25^{\circ}\text{C}}$	Continuous Drain Current, $V_{GS} @ 10V^1$	3	A
$I_{D@T_A=70^{\circ}\text{C}}$	Continuous Drain Current, $V_{GS} @ 10V^1$	2.5	A
I_{DM}	Pulsed Drain Current ²	40	A
EAS	Single Pulse Avalanche Energy ³	53	mJ
I_{AS}	Avalanche Current	18	A
$P_{D@T_c=25^{\circ}\text{C}}$	Total Power Dissipation ³	72.6	W
$P_{D@T_A=25^{\circ}\text{C}}$	Total Power Dissipation ³	2.1	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	60	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.72	$^{\circ}\text{C/W}$

Electrical Characteristics ($T_J=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	150	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=10A$	---	95	105	$m\Omega$
	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V$, $I_D=10A$	---	105	115	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	---	2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=120V$, $V_{GS}=0V$, $T_J=25\text{ }^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=120V$, $V_{GS}=0V$, $T_J=55\text{ }^{\circ}\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=10A$	---	33	---	S
Q_g	Total Gate Charge	$V_{DS}=75V$, $V_{GS}=4.5V$, $I_D=10A$	---	25.1	---	nC
Q_{gs}	Gate-Source Charge		---	6.8	---	
Q_{gd}	Gate-Drain Charge		---	12.6	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=75V$, $V_{GS}=10V$, $R_G=3.3$, $I_D=10A$	---	13	---	ns
T_r	Rise Time		---	8.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	25	---	
T_f	Fall Time		---	11	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1MHz$	---	2285	---	pF
C_{oss}	Output Capacitance		---	110	---	
C_{rss}	Reverse Transfer Capacitance		---	83	---	
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	20	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	40	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25\text{ }^{\circ}\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=10A$, $dI/dt=100A/\mu s$, $T_J=25\text{ }^{\circ}\text{C}$	---	37	---	nS
Q_{rr}	Reverse Recovery Charge		---	263	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3 .The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.3mH, I_{AS}=18A$
- 4.The power dissipation is limited by 150 $^{\circ}\text{C}$ junction temperature
- 5 .The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

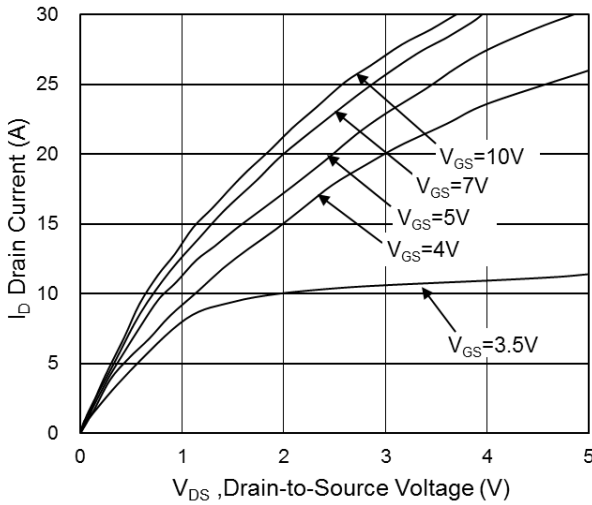


Fig.1 Typical Output Characteristics

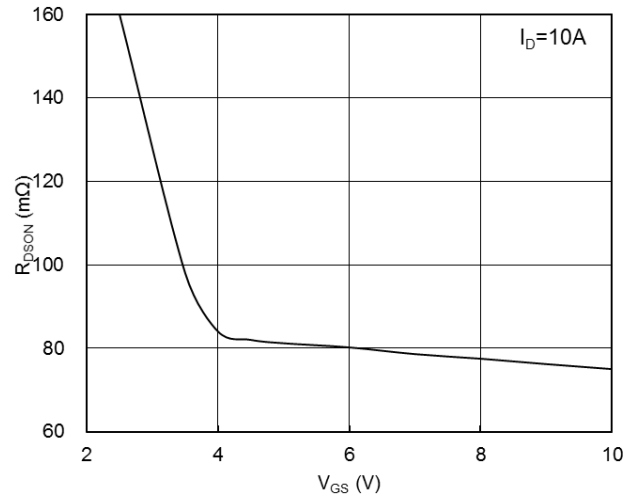


Fig.2 On-Resistance vs. Gate-Source Voltage

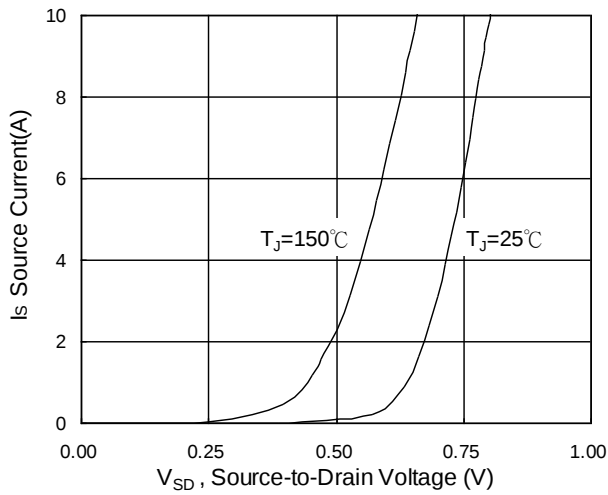


Fig.3 Forward Characteristics of Reverse

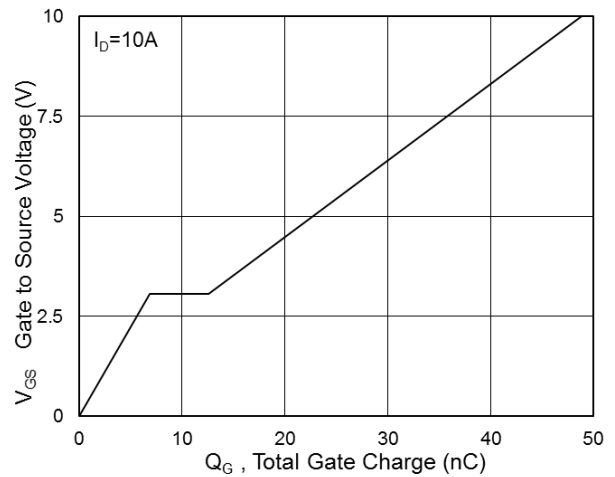


Fig.4 Gate-Charge Characteristics

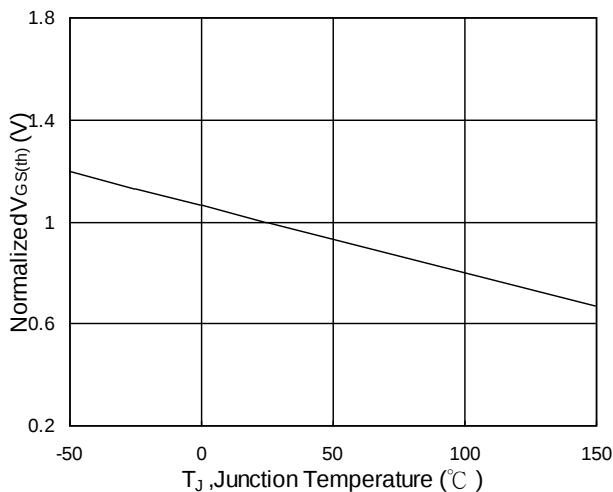


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

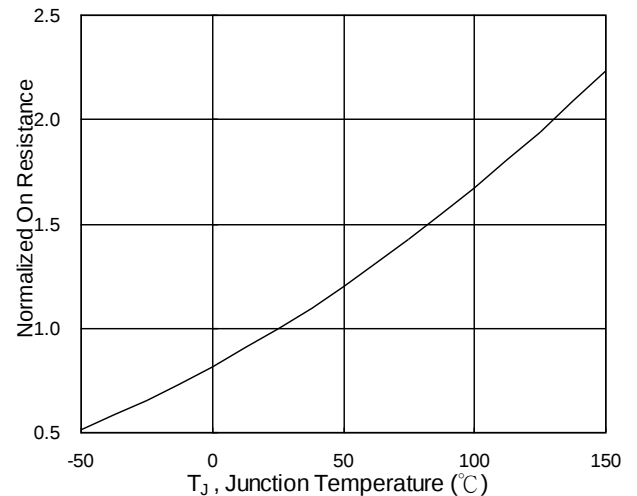


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

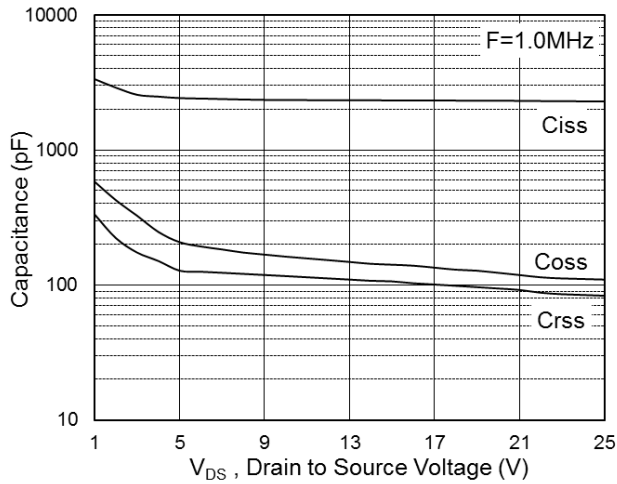


Fig.7 Capacitance

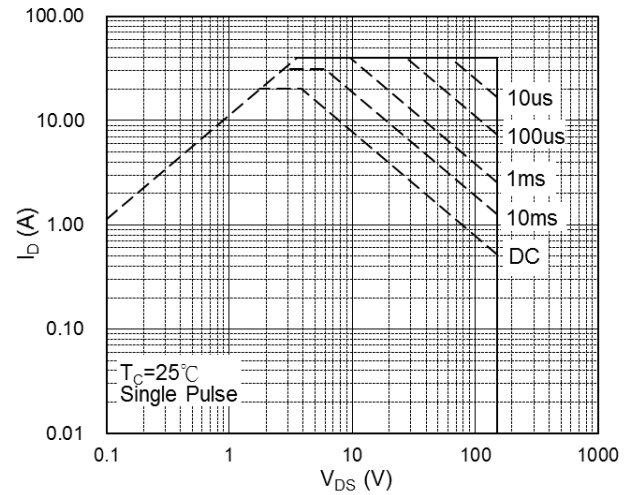


Fig.8 Safe Operating Area

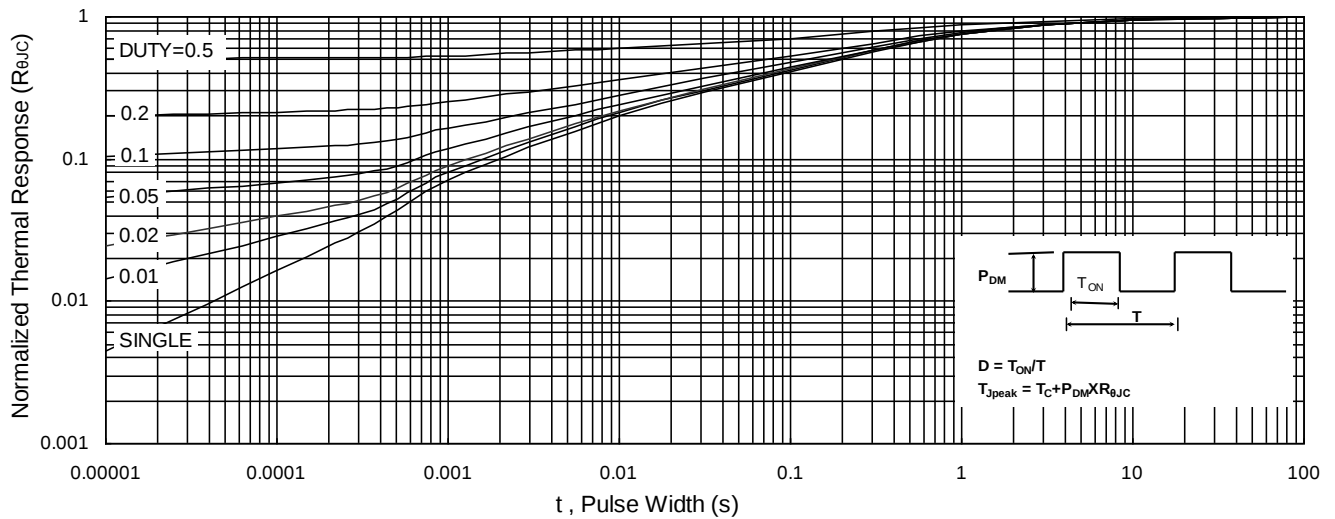


Fig.9 Normalized Maximum Transient Thermal Impedance

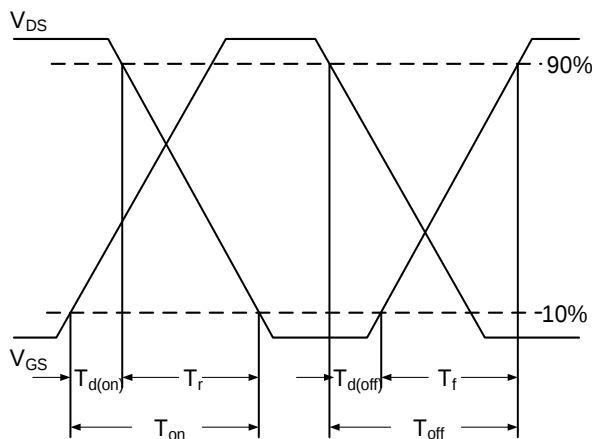


Fig.10 Switching Time Waveform

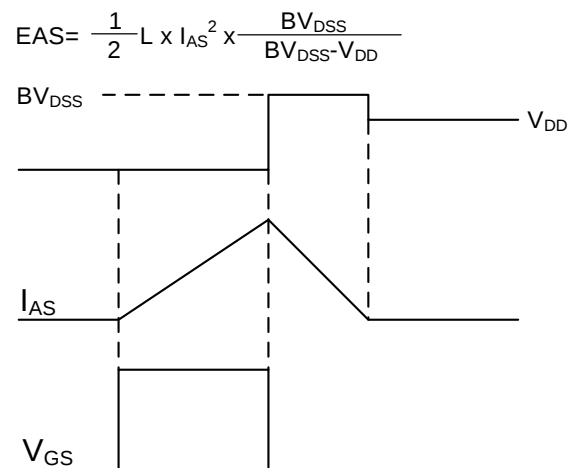


Fig.11 Unclamped Inductive Switching Waveform

Technical drawing of the TQ-252 connector, showing three views: front, side, and detail A.

Front View (Top Left): Shows the overall dimensions: E (total width), B2 (inner width), L (flange thickness), H (total height), G (base width), and B (base thickness). A central circular feature is indicated by a dashed line.

Side View (Top Right): Shows the profile dimensions: A (top flange height), C2 (top flange thickness), D (main body height), and V1 (fillet radius). A dashed circle indicates the location of Detail A.

Detail A (Bottom Right): A magnified view of the curved transition, showing dimensions: V1 (outer fillet radius), V2 (inner fillet radius), A2 (curved section height), and L2 (curved section length).

Front View (Bottom Left): Shows the overall dimensions: D1 (total height), E1 (inner width), and three vertical mounting points indicated by dashed lines.

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°

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