

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.

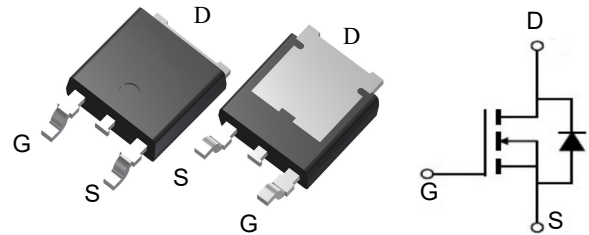


Features

V_{DSS}	150	V
I_D	20	A
$R_{DS(ON)}(at V_{GS}=10V)$	95	m Ω
$R_{DS(ON)}(at V_{GS}=4.5V)$	105	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

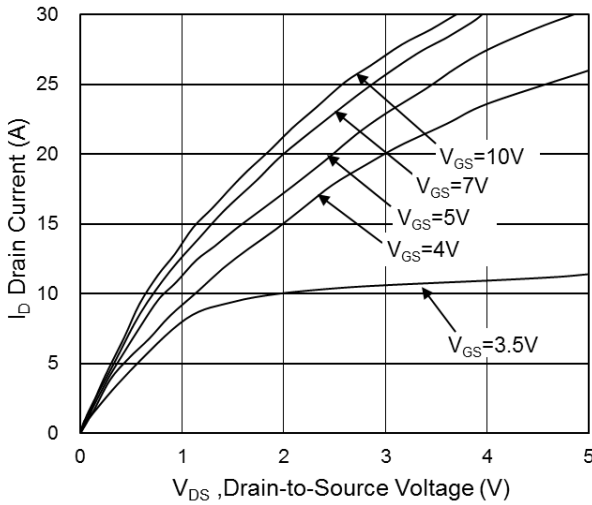


Fig.1 Typical Output Characteristics

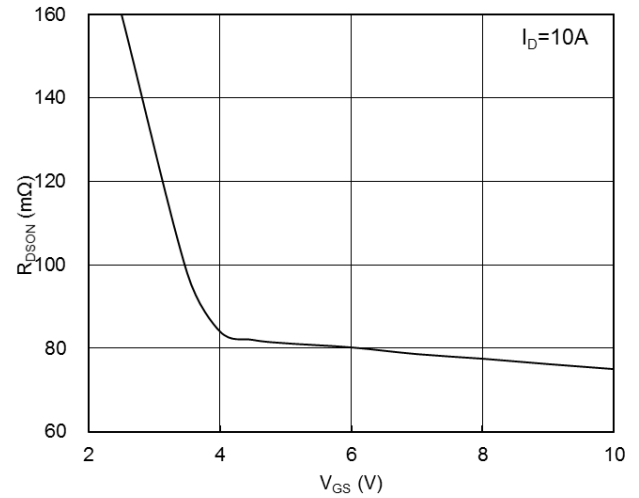


Fig.2 On-Resistance vs. Gate-Source Voltage

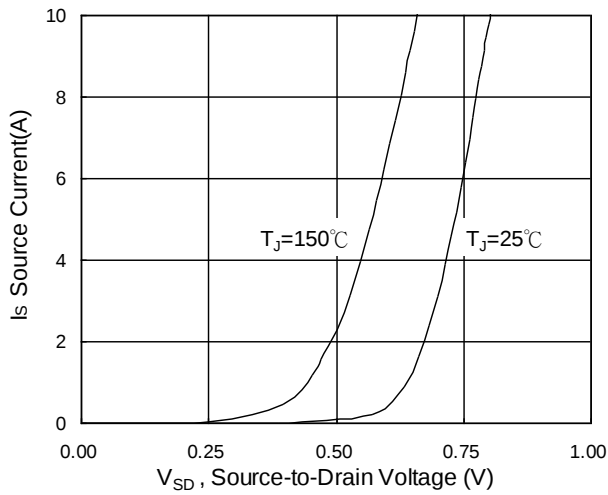


Fig.3 Forward Characteristics of Reverse

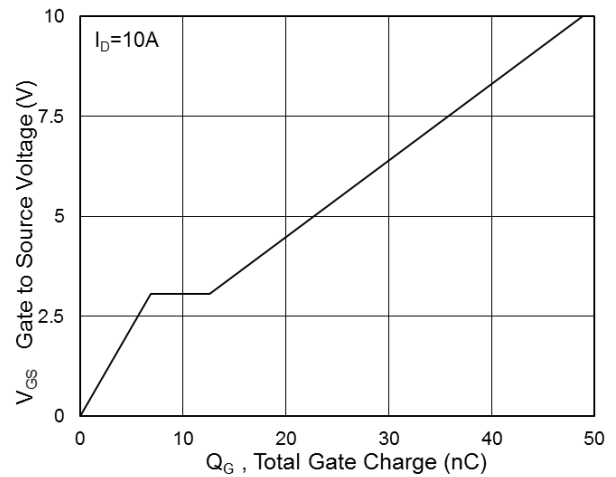


Fig.4 Gate-Charge Characteristics

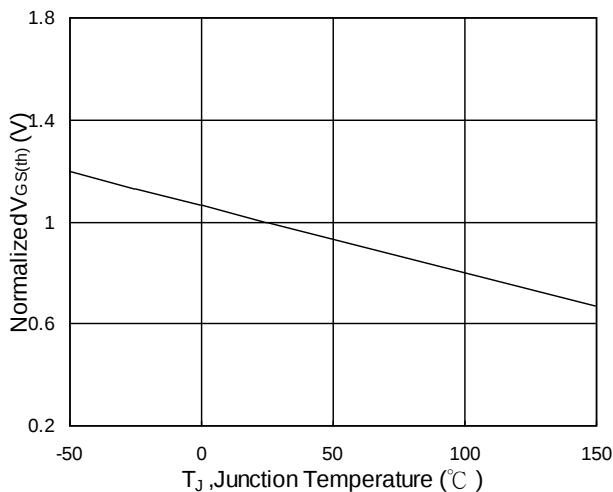


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

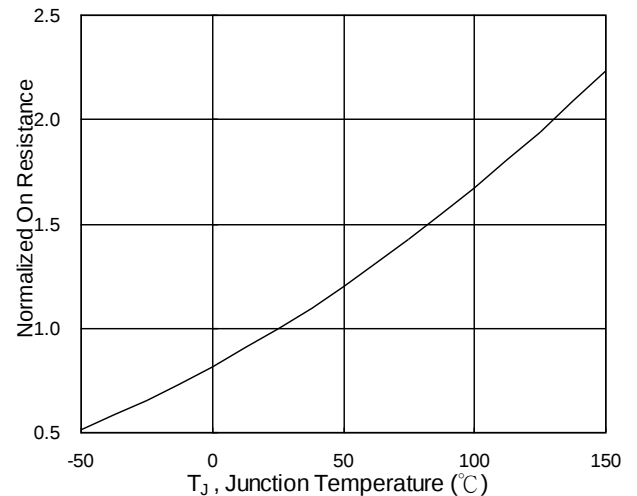


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

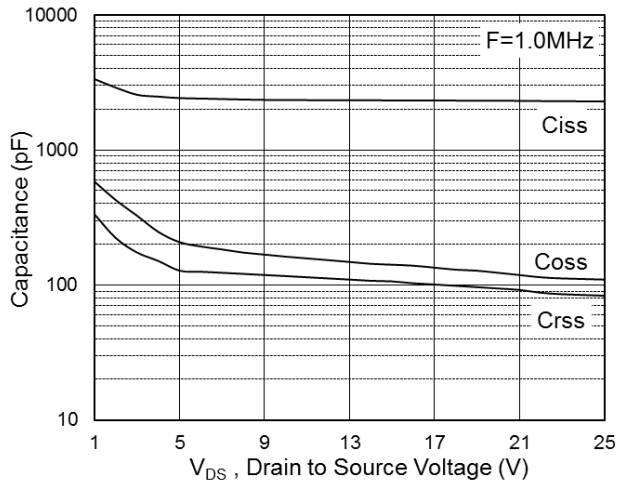


Fig.7 Capacitance

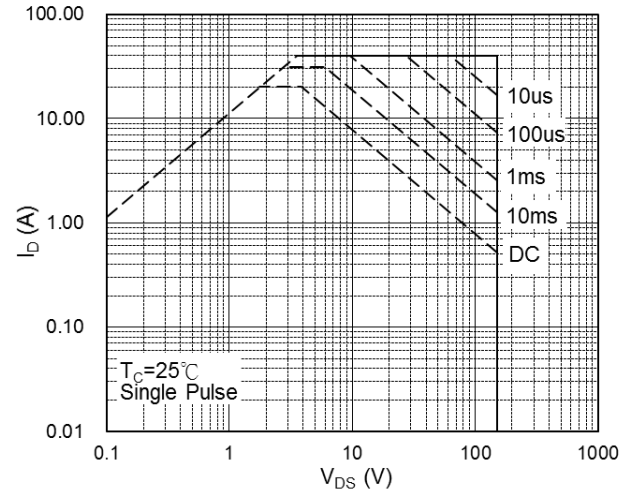


Fig.8 Safe Operating Area

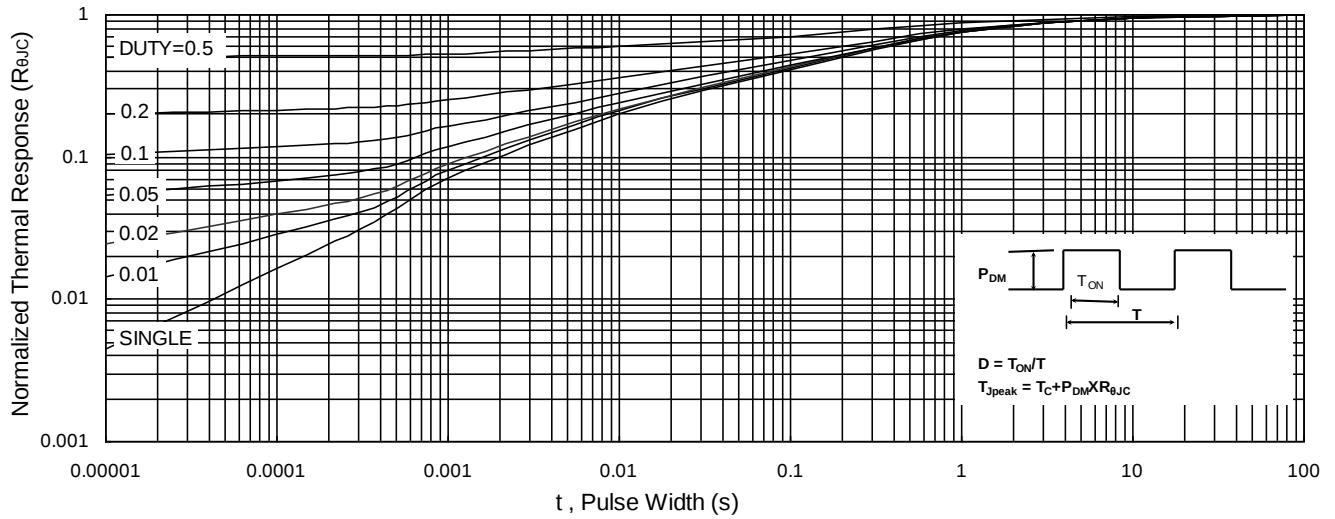


Fig.9 Normalized Maximum Transient Thermal Impedance

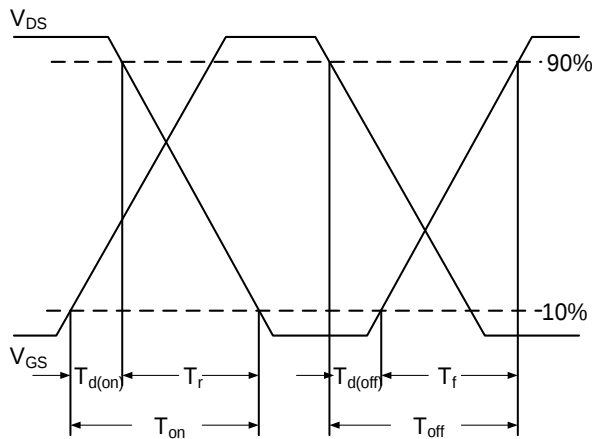


Fig.10 Switching Time Waveform

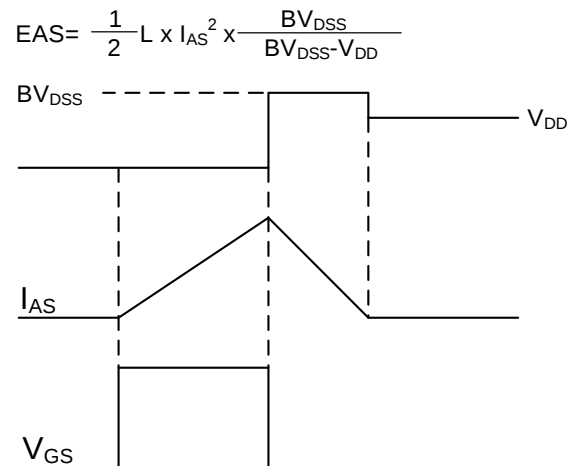


Fig.11 Unclamped Inductive Switching Waveform

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

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

Side View (Top Right): Shows the profile of the connector. The total height is D , the width of the top flange is A , and the width of the base flange is $C2$. A detail callout $\nabla 1$ points to the top flange.

Detail A (Bottom Right): A magnified view of the base flange. It shows the width of the base flange is $A2$, the height of the base flange is $L2$, and the width of the base flange is C . Detail callouts $\nabla 1$, $\nabla 2$, and $\nabla 3$ point to specific features on the base flange.

Front View (Bottom Left): Shows the overall dimensions of the connector. The total width is $E1$, the height of the top flange is $D1$, and the width of the base flange is B . A central circular feature is indicated by a dashed line.

Technical drawing of a mechanical component, showing multiple views and dimensions:

- Front View (Top):** Shows a rectangular component with four internal cavities. Dimensions include overall width W , overall height B , and internal features $D0$, $P0$, $P2$, $P1$, and A .
- Side View (Right):** Shows the profile of the component. Dimensions include total height B , internal height $B0$, and a small feature $t1$ with a 5° MAX angle. A section line $B-B$ is indicated.
- Section A-A (Bottom Left):** A cross-section view showing a width of $A0$ and a 5° angle.
- Section B-B (Bottom Right):** A cross-section view showing a width of 20 .
- Top View (Bottom):** A circular view showing the component's footprint. It features a central hole with diameter $\phi 13$ and four radial slots. The outer diameter is $\phi 320$.

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