

## General Description

The MY60N02D 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.

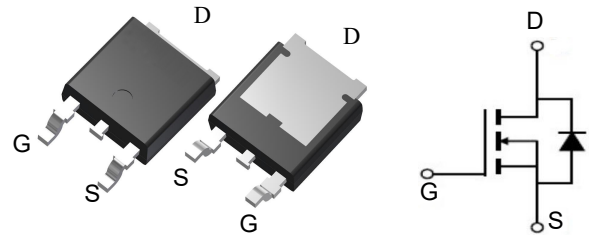


## Features

$V_{DSS}$	20	V
$I_D$	60	A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	4.8	$m\Omega$
$R_{DS(ON)}$ (at $V_{GS}=4.5V$ )	6.8	$m\Omega$

## Application

- Battery protection
- Load switch
- Uninterruptible power supply



## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY60N02D	TO-252-2L	MY60N02D	2500

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate- Source Voltage	$\pm 12$	V
$I_D @ T_c=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	60	A
$I_D @ T_c=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	35	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	240	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	48	mJ
$P_D @ T_c=25^\circ C$	Total Power Dissipation <sup>4</sup>	38	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	4.2	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.4	0.7	1.0	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note3</small>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A	-	4.8	6.5	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =15A	-	6.8	10	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1.0MHz	-	1832	-	pF
C <sub>oss</sub>	Output Capacitance		-	289	-	pF
C <sub>riss</sub>	Reverse Transfer Capacitance		-	271	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =25A, V <sub>GS</sub> =4.5V	-	23	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	4.5	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	7.3	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =10V, I <sub>D</sub> =25A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =4.5V	-	15	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	37	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	52	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	21	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	60	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1.2	V
t <sub>rr</sub>	Body Diode Reverse Recovery Time	IF=25A, di/dt=100A/μs	-	25	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		-	21	-	nC

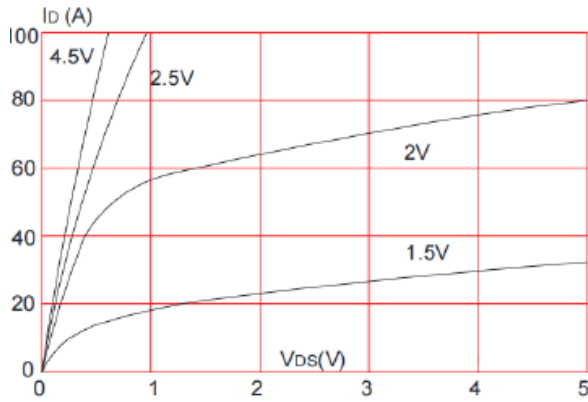
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T<sub>J</sub>=25 °C, V<sub>DD</sub>=10V, V<sub>G</sub>=4.5V, L=0.5mH, R<sub>G</sub>=25Ω, I<sub>AS</sub>=13.8A

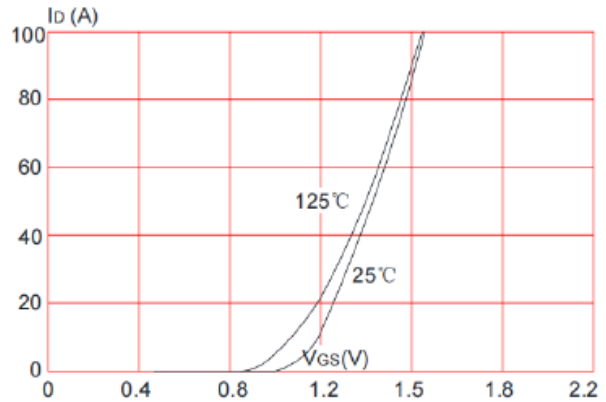
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

**Typical Characteristics**

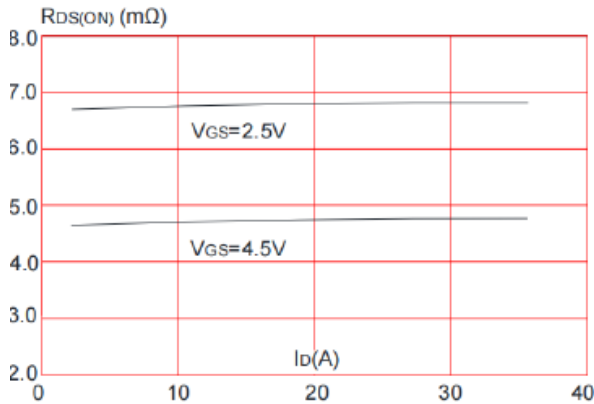
**Figure 1: Output Characteristics**



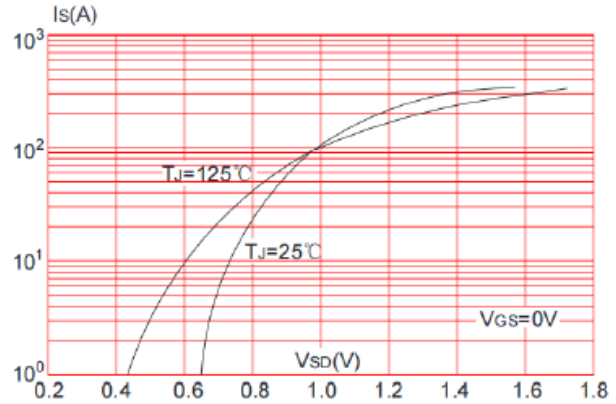
**Figure 2: Typical Transfer Characteristics**



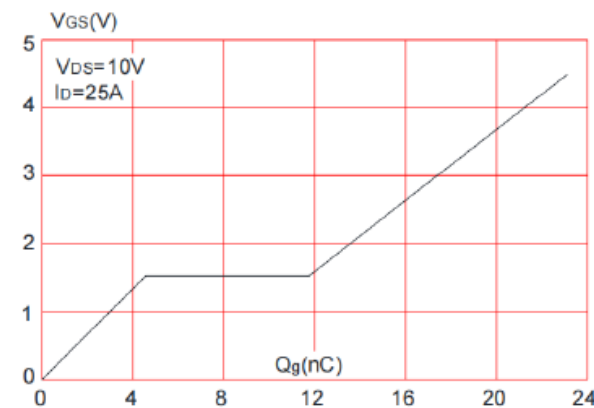
**Figure 3: On-resistance vs. Drain Current**



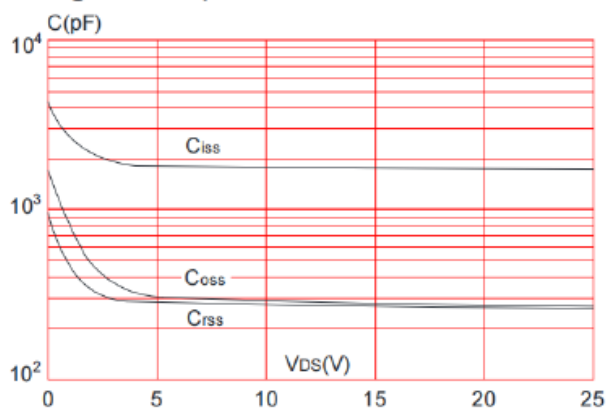
**Figure 4: Body Diode Characteristics**



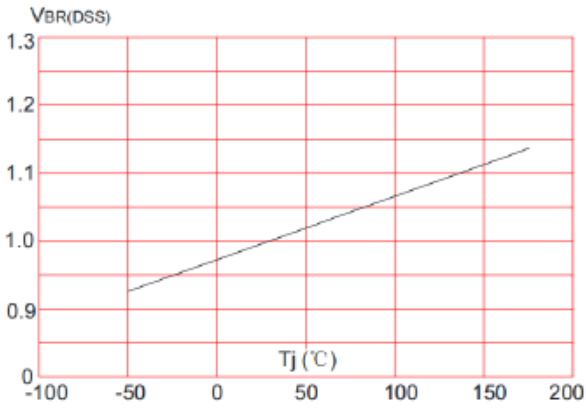
**Figure 5: Gate Charge Characteristics**



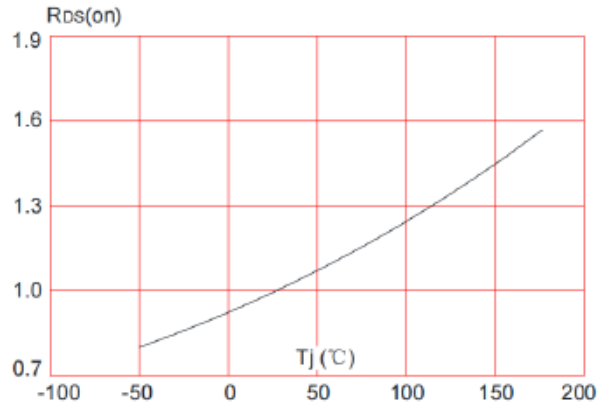
**Figure 6: Capacitance Characteristics**



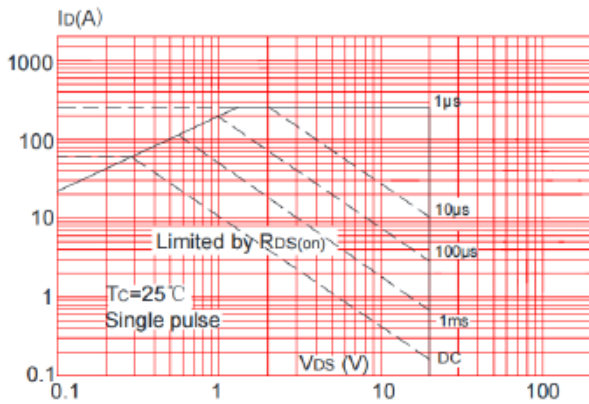
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



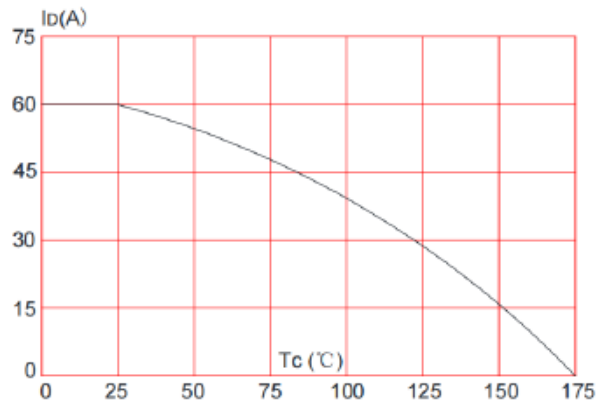
**Figure 8: Normalized on Resistance vs. Junction Temperature**



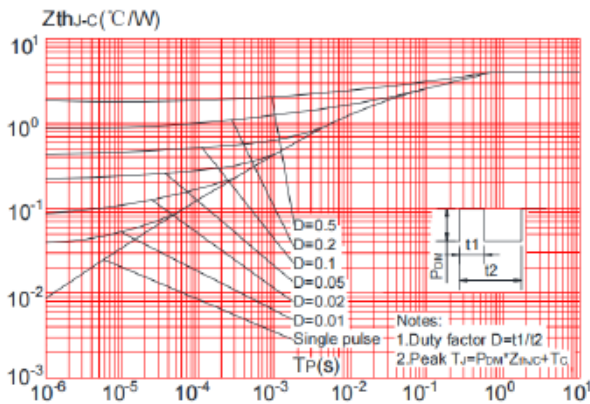
**Figure 9: Maximum Safe Operating Area**



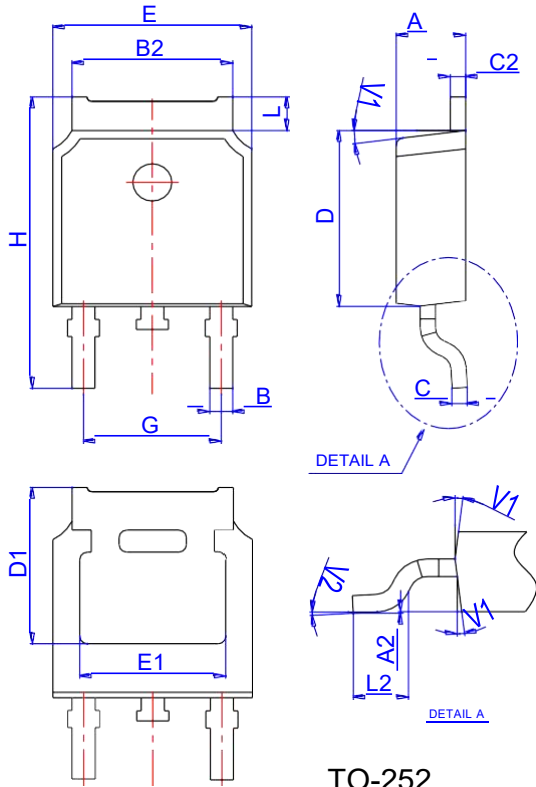
**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



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



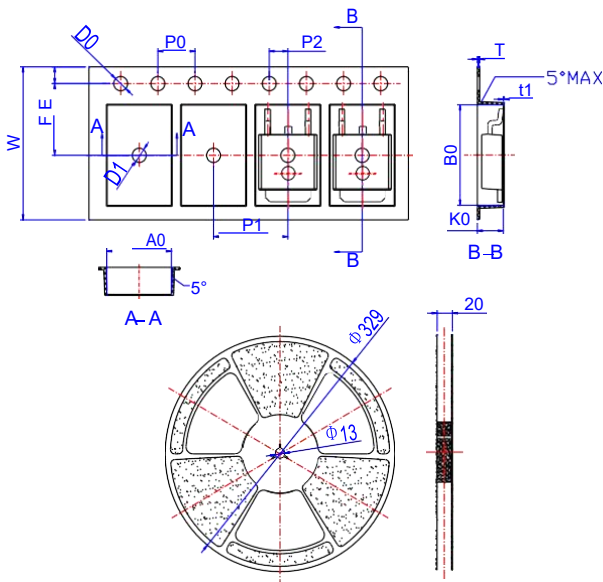
**Package Mechanical Data TO-252**



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°

TO-252

**Reel Specification-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