

General Description

The MY50N10D 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.

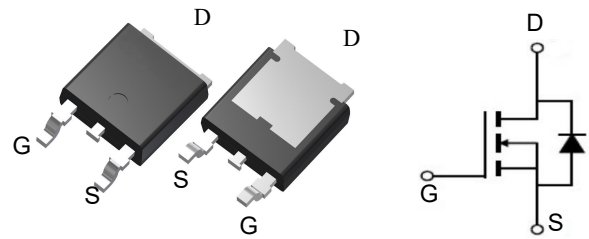


Features

V_{DSS}	100	V
I_D	50	A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	16	$m\Omega$
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	18	$m\Omega$

Application

- Battery protection
- Load switch
- Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY50N10D	TO-252-2L	MY50N10D	2500

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

Parameter	Symbol	Value	Unit
Drain source voltage	VDS	100	V
Gate source voltage	VGS	± 20	V
Continuous drain current ¹⁾ , $T_C=25^{\circ}C$	I_D	50	A
Pulsed drain current ²⁾ , $T_C=25^{\circ}C$	I_D , pulse	120	A
Power dissipation ³⁾ , $T_C=25^{\circ}C$	P_D	72	W
Single pulsed avalanche energy ⁵⁾	EAS	30	mJ
Operation and storage temperature	Tstg, T_J	-55 to 150	$^{\circ}C$
Thermal resistance, junction-case	$R_{\theta JC}$	1.74	$^{\circ}C/W$
Thermal resistance, junction-ambient ⁴⁾	$R_{\theta JA}$	62	$^{\circ}C/W$

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

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}$, $I_D=250\text{ }\mu\text{A}$	100			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\text{ }\mu\text{A}$	1.0		2.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10\text{ V}$, $I_D=50\text{ A}$		16	20	m Ω
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=4.5\text{ V}$, $I_D=30\text{ A}$		18	27	m Ω
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}$			100	nA
					-100	
Drain-source leakage current	I_{DSS}	$V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$			1	μA
Input capacitance	C_{iss}	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=1\text{ MHz}$		1190.6		pF
Output capacitance	C_{oss}			194.6		pF
Reverse transfer capacitance	C_{rss}			4.1		pF
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10\text{ V}$, $V_{DS}=50\text{ V}$, $R_G=2.2\text{ }\Omega$, $I_D=10\text{ A}$		17.8		ns
Rise time	t_r			3.9		ns
Turn-off delay time	$t_{d(off)}$			33.5		ns
Fall time	t_f			3.2		ns
Total gate charge	Q_g	$I_D=8\text{ A}$, $V_{DS}=50\text{ V}$, $V_{GS}=10\text{ V}$		19.8		nC
Gate-source charge	Q_{gs}			2.4		nC
Gate-drain charge	Q_{gd}			5.3		nC
Gate plateau voltage	$V_{plateau}$			3.2		V
Diode forward current	I_S	$V_{GS}<V_{th}$			40	
Pulsed source current	I_{SP}				120	A
Diode forward voltage	V_{SD}	$I_S=8\text{ A}$, $V_{GS}=0\text{ V}$			1.3	V
Reverse recovery time	t_{rr}	$I_S=8\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$		50.2		ns
Reverse recovery charge	Q_{rr}			95.1		nC
Peak reverse recovery current	I_{rm}			2.5		A

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25\text{ }^{\circ}\text{C}$.
- 5) $V_{DD}=50\text{ V}$, $R_G=25\text{ }\Omega$, $L=0.3\text{ mH}$, starting $T_J=25\text{ }^{\circ}\text{C}$.

Typical Characteristics

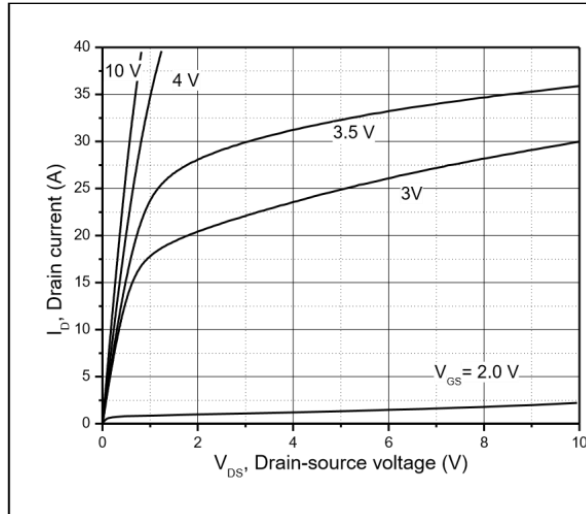


Figure 1, Typ. output characteristics

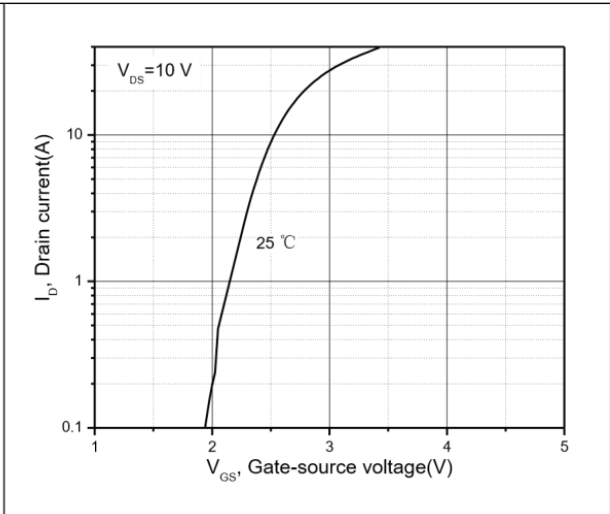


Figure 2, Typ. transfer characteristics

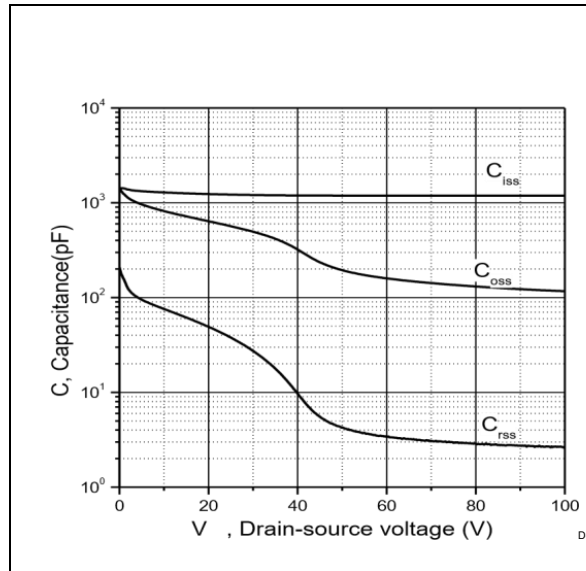


Figure 3, Typ. capacitances

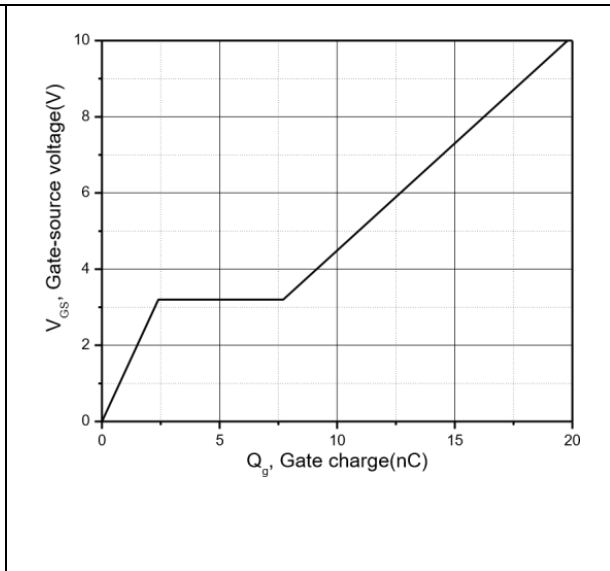


Figure 4, Typ. gate charge

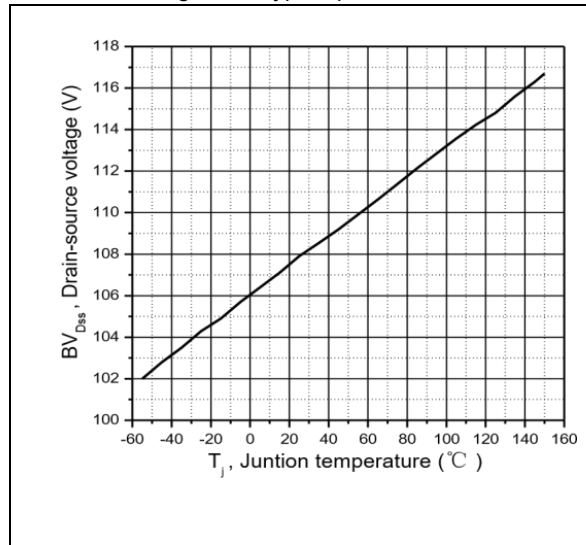


Figure 5, Drain-source breakdown voltage

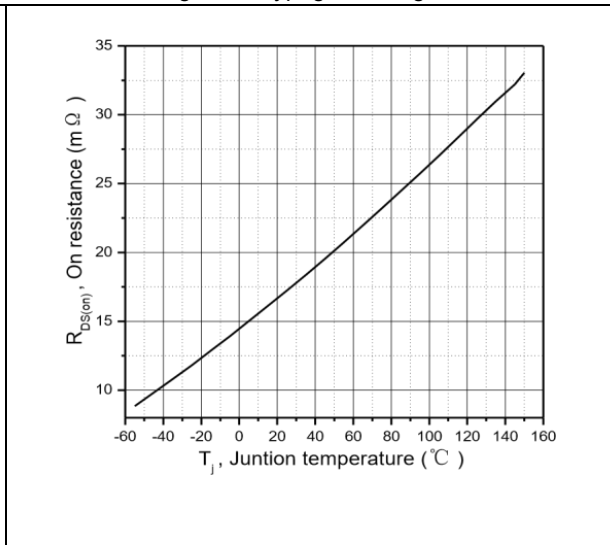


Figure 6, Drain-source on-state resistance

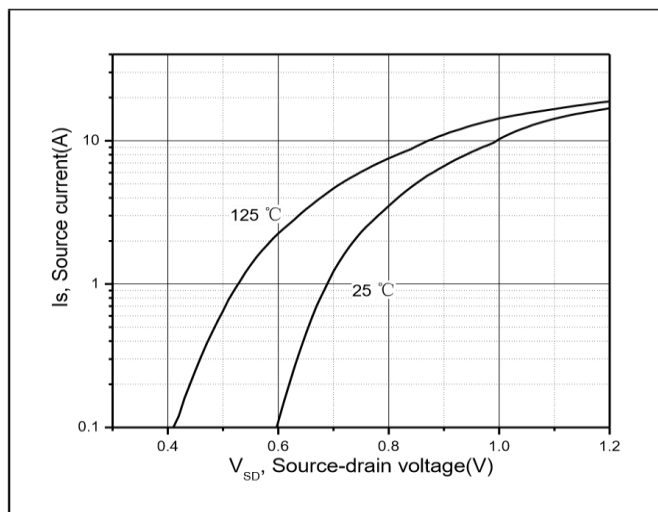


Figure 7, Forward characteristic of body diode

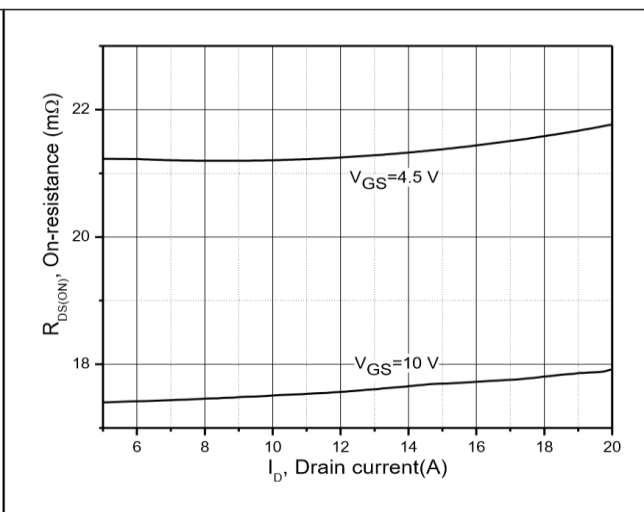


Figure 8, Drain-source on-state resistance

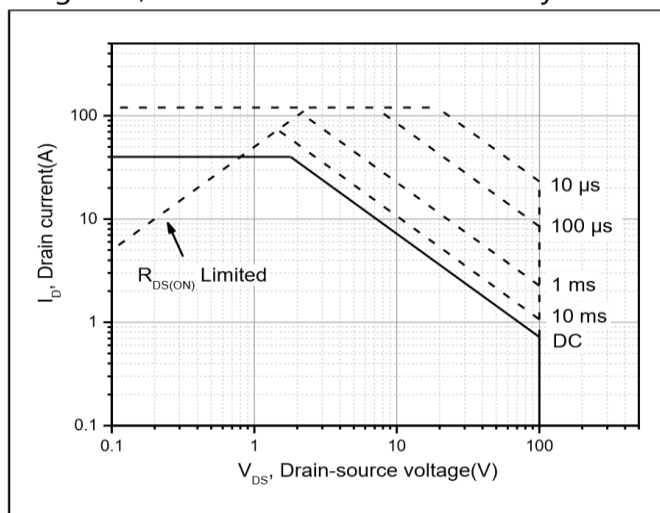


Figure 9, Safe operation area $T_C = 25\text{ }^{\circ}C$

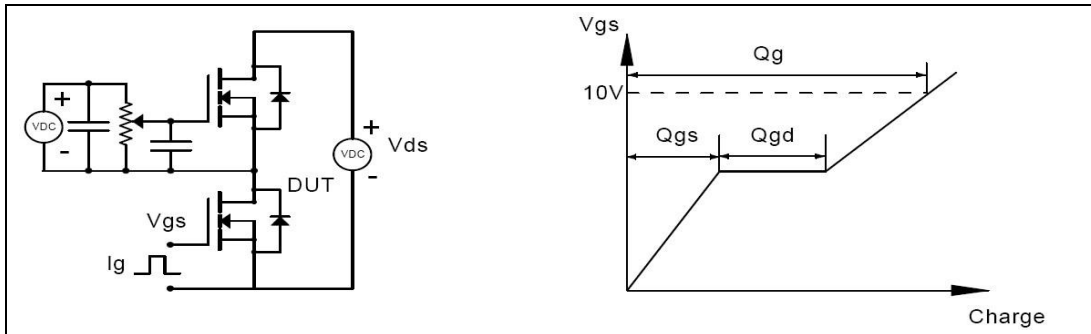


Figure 1, Gate charge test circuit & waveform

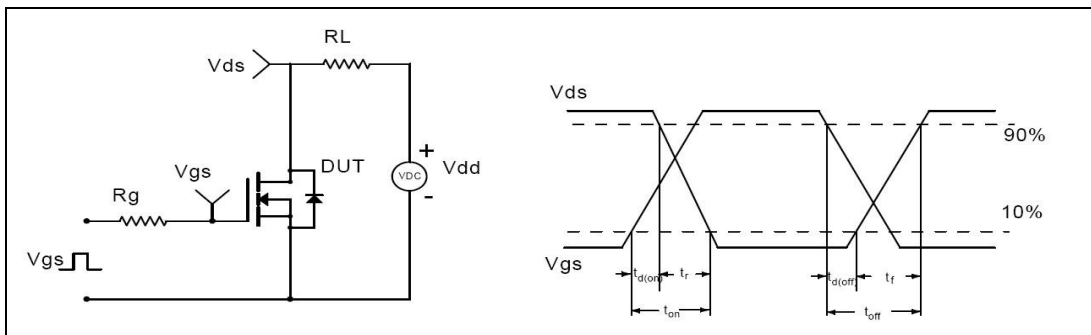


Figure 2, Switching time test circuit & waveforms

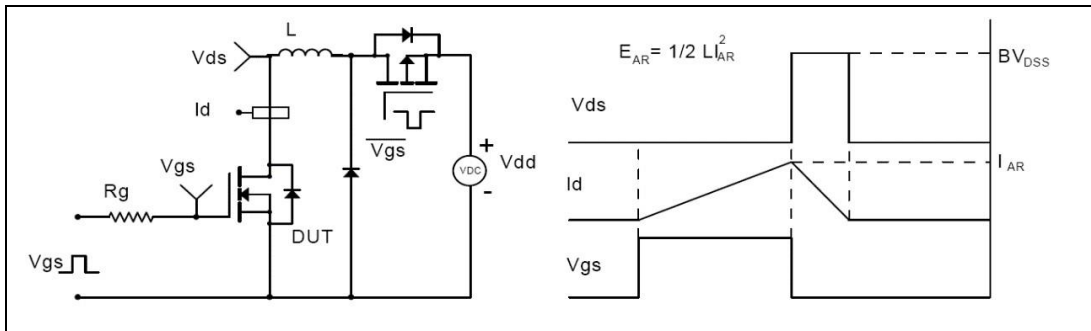


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

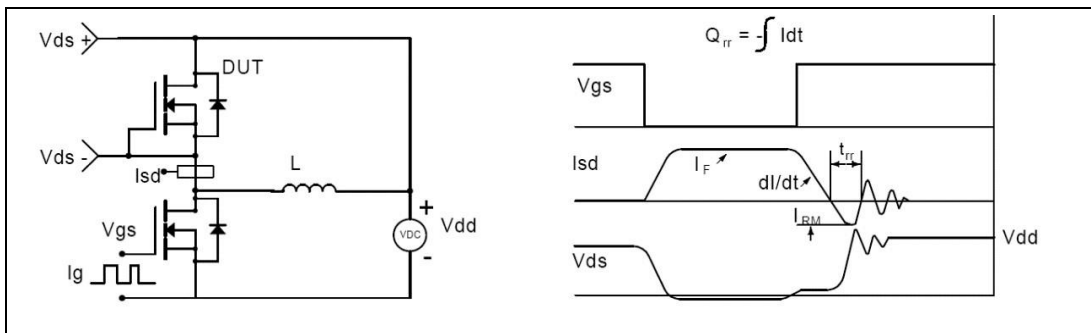
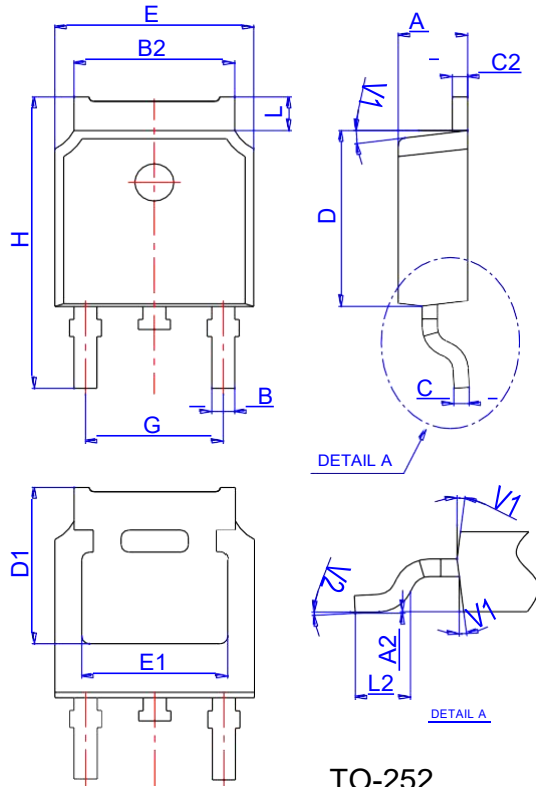


Figure 4, Diode reverse recovery test circuit & waveforms

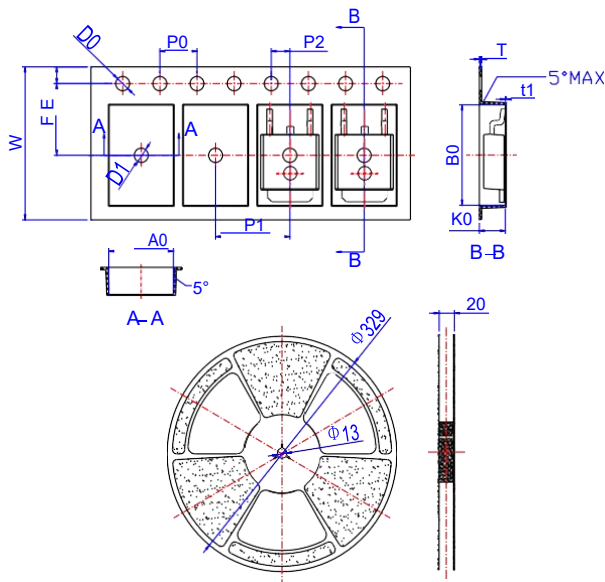
Package Mechanical Data-TO-252-JQ Single



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 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