
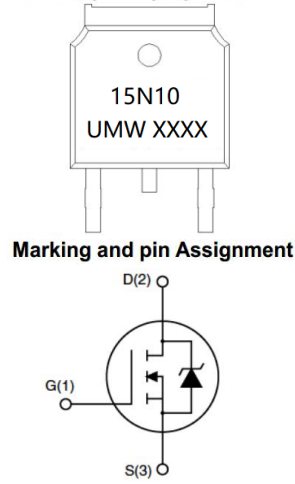


# 15N10

<p><b>General Description</b></p> <p>The 15N10 uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math>, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.</p> <p><b>Features</b></p> <ul style="list-style-type: none"> <li>● <math>V_{DS} = 100V, I_D = 15A</math></li> <li>● <math>R_{DS(ON)}, 95\text{ m}\Omega</math> (Typ) @ <math>V_{GS} = 10V</math></li> <li>● <math>R_{DS(ON)}, 100\text{ m}\Omega</math> (Typ) @ <math>V_{GS} = 4.5V</math></li> <li>● Low Total Gate Charge</li> <li>● Low Reverse Transfer Capacitance</li> <li>● Improved <math>dv/dt</math> Capability</li> <li>● Fast Switching Speed</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● Uninterruptible Power Supply(UPS)</li> <li>● Inverter System</li> </ul>	 <p><b>TO-252(DPAK) top view</b></p>  <p><b>Marking and pin Assignment</b></p>
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## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
15N10	15N10	TO-252	325mm	16mm	2500

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	$TC=25^\circ\text{C}$ <sup>Note1</sup>	15
		$TC=100^\circ\text{C}$	10
Drain Current-Pulsed <sup>Note2</sup>	$I_{DM}$	60	A
Maximum Power Dissipation	$P_D$	55	W
Storage Temperature Range	$T_{STG}$	-55 to +175	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 to +175	$^\circ\text{C}$

## Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	2.72	-	$^\circ\text{C/W}$

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

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA	100	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	-	-	1	uA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	1.0	1.6	3.0	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>DS</sub> =10A	-	95	110	mΩ
		V <sub>GS</sub> =4.5V, I <sub>DS</sub> =5A	-	100	130	
Forward Transconductance	g <sub>FS</sub>	V <sub>GS</sub> =5V, I <sub>DS</sub> =4A	2	-	-	S

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V, f=1MHz	-	632	-	pF
Output Capacitance	C <sub>oss</sub>		-	37	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	21	-	

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, R <sub>L</sub> =2.8Ω, R <sub>GEN</sub> =6Ω, I <sub>D</sub> =10A	-	12.6	-	ns
Rise Time	t <sub>r</sub>		-	6	-	
Turn-Off Delay Time	T <sub>d(off)</sub>		-	32.5	-	
Fall Time	t <sub>f</sub>		-	4.3	-	
Total Gate Charge at 10V	Q <sub>g</sub>	V <sub>DS</sub> =80V, I <sub>DS</sub> =10A, V <sub>GS</sub> =10V	-	19.2	-	nC
Gate to Source Gate Charge	Q <sub>gs</sub>		-	3.4	-	
Gate to Drain“Miller”Charge	Q <sub>gd</sub>		-	6.1	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>DS</sub> =10A	-	-	1.2	V

Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>G</sub>=10V, R<sub>G</sub>=25Ω

Typical Performance Characteristics

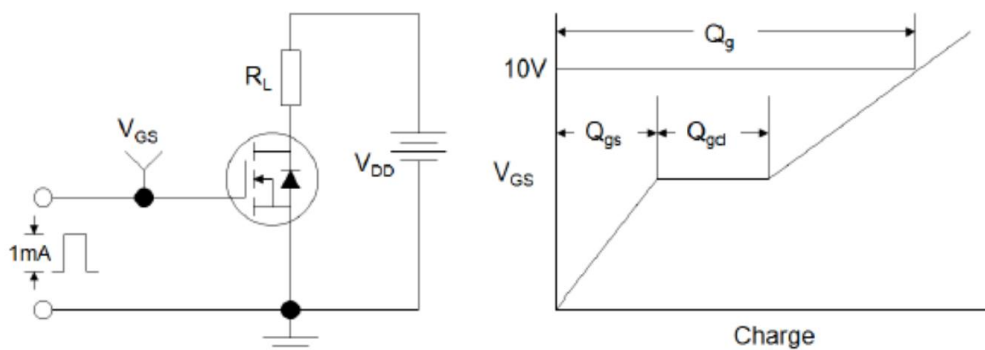


Figure1: Gate Charge Test Circuit & Waveform

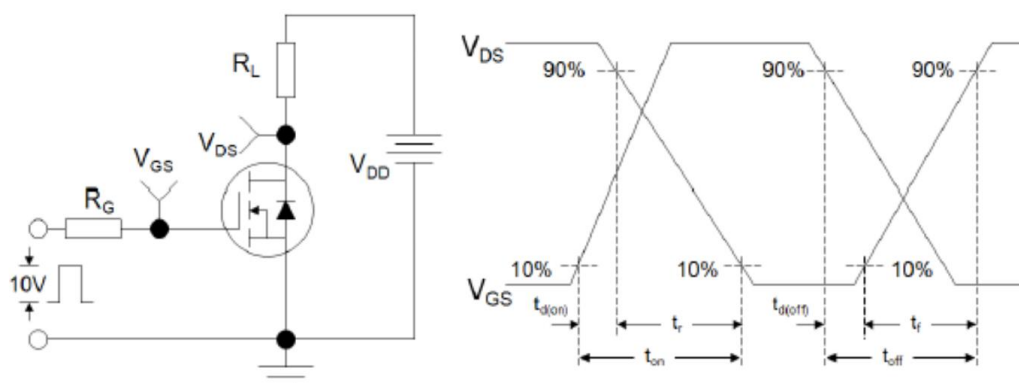


Figure 2: Resistive Switching Test Circuit & Waveforms

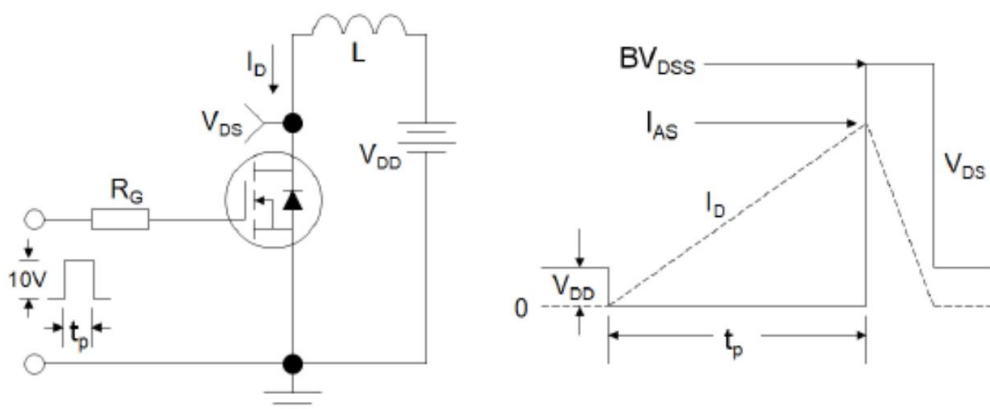


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

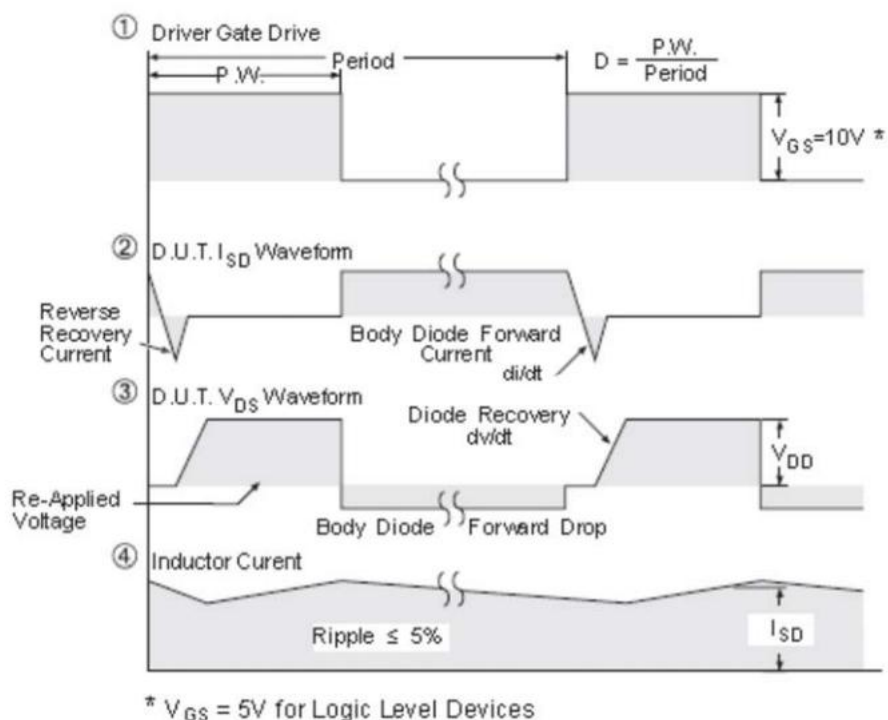
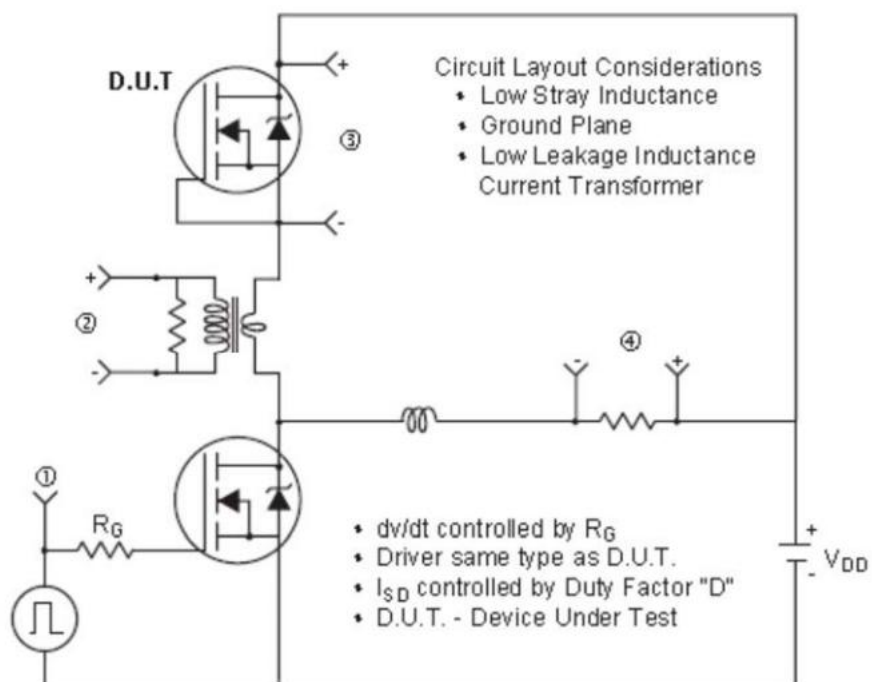
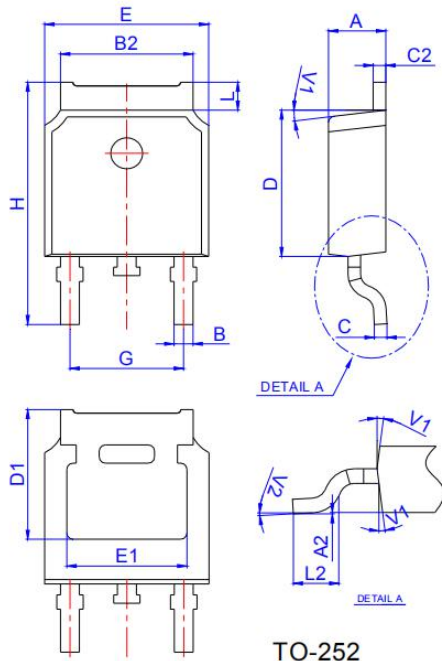


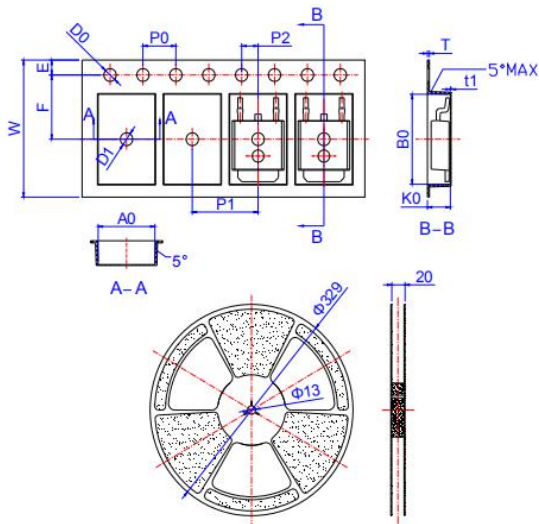
Figure 4: Peak Diode Recovery  $dv/dt$  Test Circuit & Waveforms (For N-channel)

**Package Mechanical Data**



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

DWG NO: TO-252-01-A1	TITLE TO-252	SCALE	 THIRD ANGLE PROJECTION
		4:1	
SHEET	1 OF 1		