

40N10DSL

Perfect MOS4 N-MOSFET 100V, 19mΩ, 40A



重庆平伟实业股份有限公司

Features

- Uses PingWei advanced PerfectMOS4 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- Excellent Low Ciss
- Qualified according to JEDEC criteria

Benefits

- High robustness and reliability
- Increases maximum current capability
- Low power loss, high power density
- Easy paralleling

Applications

- Synchronous Rectification for AC/DC Quick Charger
- Battery management
- UPS (Uninterruptible Power Supplies)

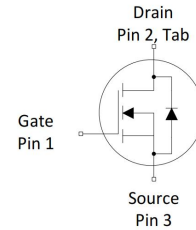
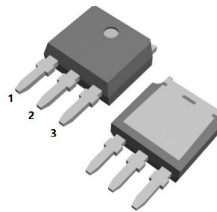


100% DVDS Tested
100% Avalanche Tested

Product Summary

V_{DS}	100V
$R_{DS(on)}@10V$ typ	19mΩ
$R_{DS(on)}@4.5V$ typ	26mΩ
I_D	40A

TO-251-3L



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
40N10DSL	40N10DSL	TO-251-3L	Tube	N/A	N/A	80pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current	I_D	40	A
$T_C = 25^\circ\text{C}$ (Silicon limit)		58	
$T_C = 25^\circ\text{C}$ (Package limit)		25	
$T_C = 100^\circ\text{C}$ (Silicon limit)		5	
$T_a = 25^\circ\text{C}$			
Pulsed drain current ($T_C = 25^\circ\text{C}$, $t_p = 100\mu\text{s}$)	$I_{D\ pulse}$	160	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $V_{ds}=50\text{V}$)	E_{AS}	16	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation	P_{tot}	63	W
$T_C = 25^\circ\text{C}$		1.1	
$T_a = 25^\circ\text{C}$			
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	$^\circ\text{C}$
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	T_{sold}	260	$^\circ\text{C}$



Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	RthJC	-	1.9	-	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	RthJA	-	-	110	°C/W	-

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	100	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	1.2	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	0.02	1	μA	$V_{DS}=100V, V_{GS}=0V$ $T_j=25^\circ C$ $T_j=150^\circ C$
Gate-source leakage current	I_{GSS}	-	± 10	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	19	23	mΩ	$V_{GS}=10V, I_D=20A$
		-	26	34	mΩ	$V_{GS}=4.5V, I_D=20A$
Transconductance	g_{fs}	-	15	-	S	$V_{DS}=5V, I_D=8A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	809	-	pF	$V_{GS}=0V, V_{DS}=50V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	225	-		
Reverse Transfer Capacitance	C_{rss}	-	26	-		
Gate Total Charge	Q_G	-	16	-	nC	$V_{DS}=50V, I_D=20A,$ $V_{GS}=10V$
Gate-Source charge	Q_{gs}	-	5	-		
Gate-Drain charge	Q_{gd}	-	3	-		
Turn-on delay time	$t_{d(on)}$	-	10	-	ns	$V_{GS}=10V, V_{DD}=50V,$ $R_{G_ext}=1.6\Omega, I_D=20A$
Rise time	t_r	-	57	-		
Turn-off delay time	$t_{d(off)}$	-	15	-		
Fall time	t_f	-	94	-		
Gate resistance	R_G	-	0.8	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$



Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	-	1.2	V	$V_{GS}=0V, I_{SD}=20A$
Body Diode Continuous Forward Current	I_S	-	-	40	A	$TC = 25^{\circ}C$
Body Diode Pulsed Current	I_S pulse	-	-	161	A	$TC = 25^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	45	-	ns	$I_F=20A,$ $di/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	-	33	-	nC	



Typical Performance Characteristics

Fig 1: Output Characteristics

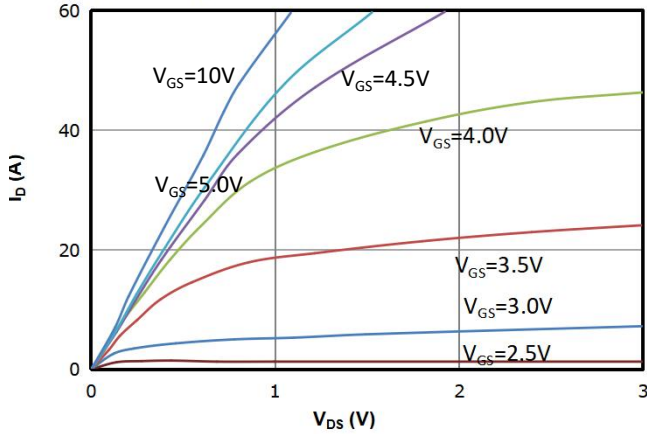


Fig 2: Transfer Characteristics

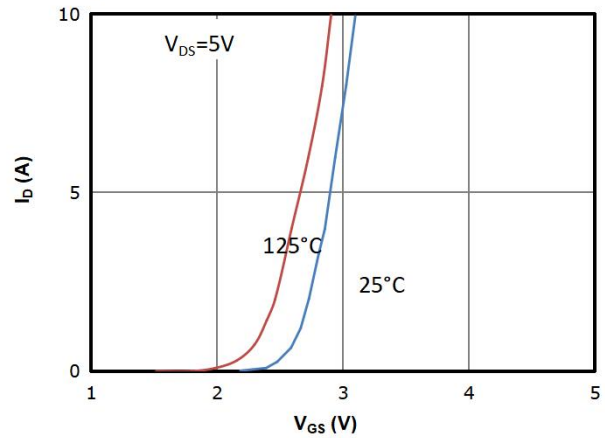


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

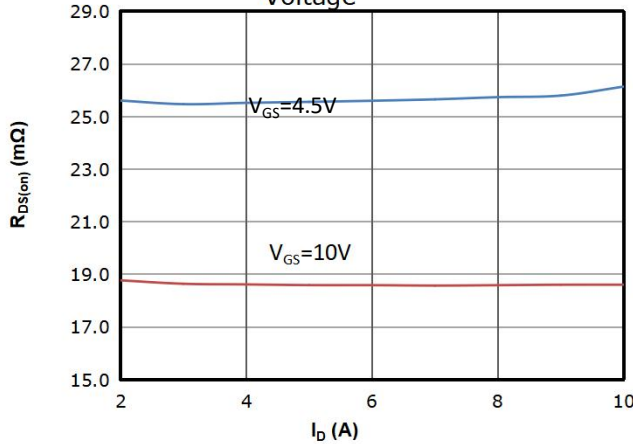


Fig 4: $R_{DS(on)}$ vs Gate Voltage

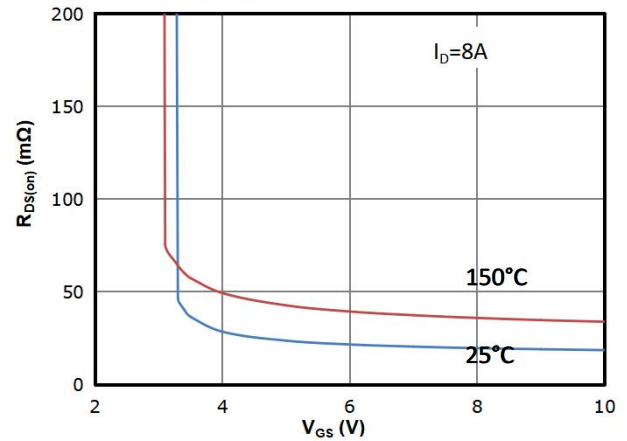


Fig 5: $R_{DS(on)}$ vs. Temperature

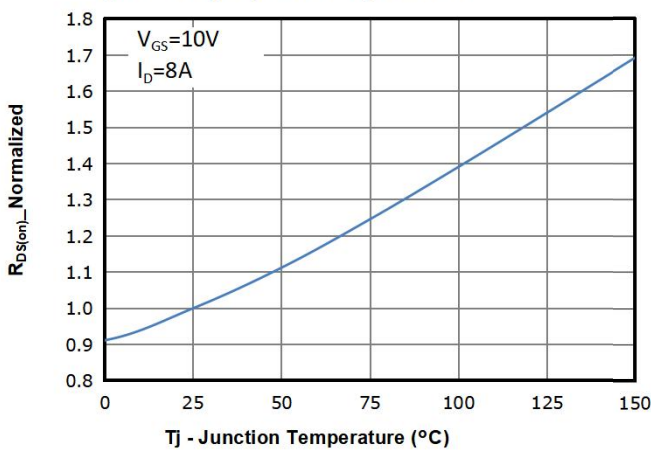


Fig 6: $V_{GS(th)}$ vs. Temperature

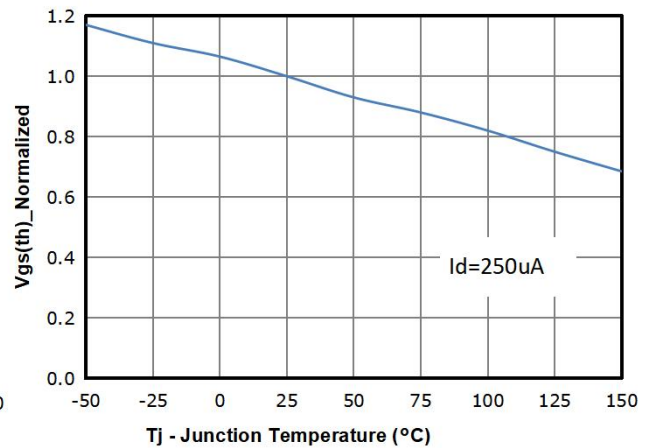




Fig 7: BVdss vs. Temperature

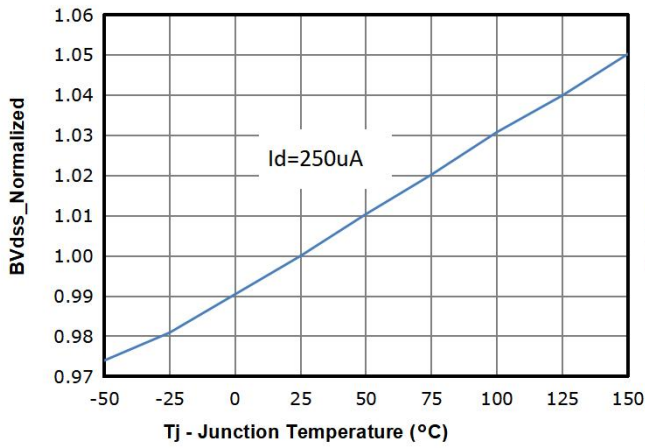


Fig 8: Capacitance Characteristics

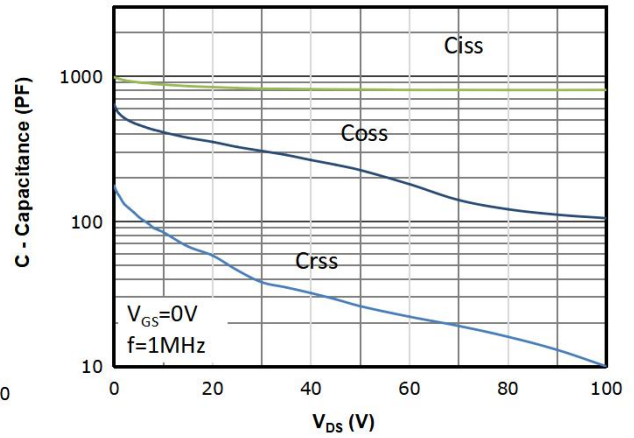


Fig 9: Gate Charge Characteristics

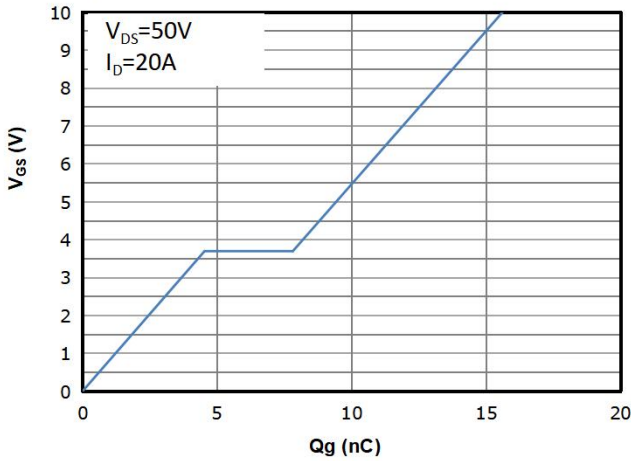


Fig 10: Body-diode Forward Characteristics

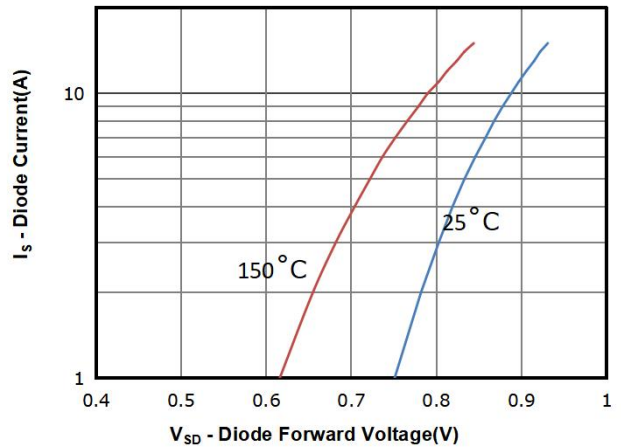


Fig 11: Power Dissipation

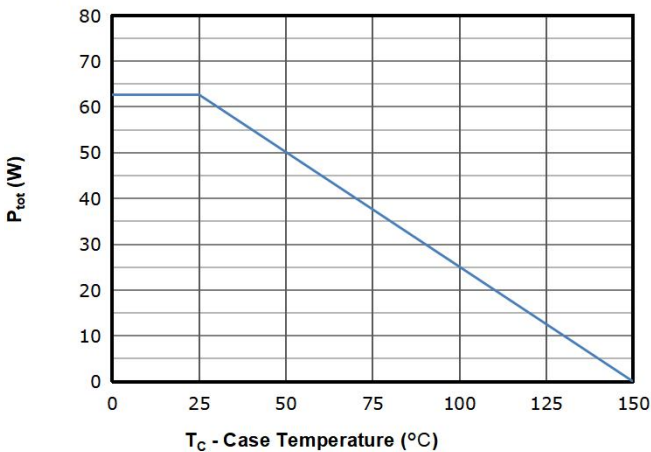


Fig 12: Drain Current Derating

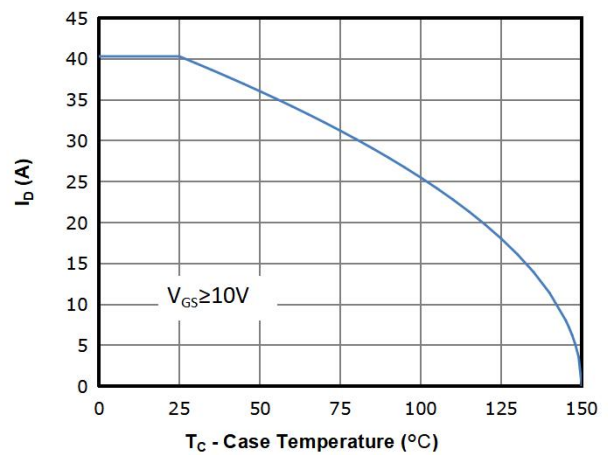




Fig 13: Safe Operating Area

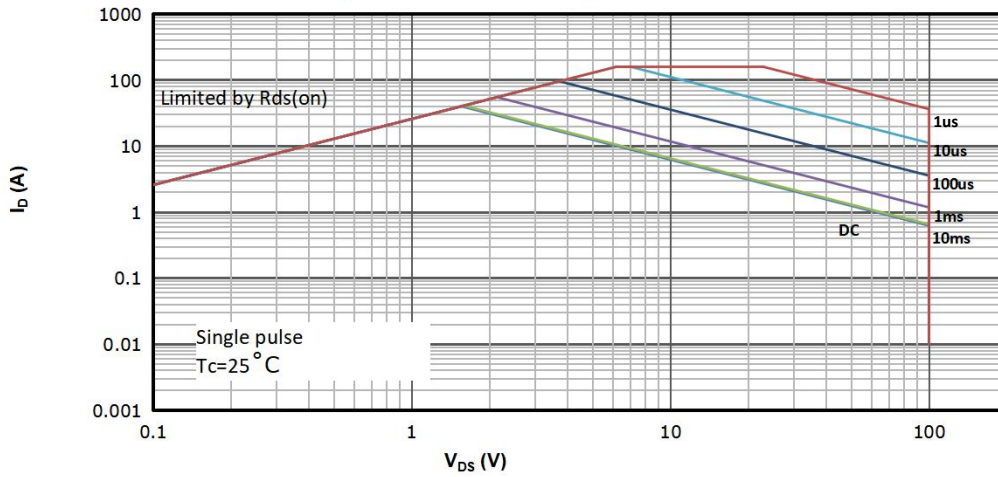
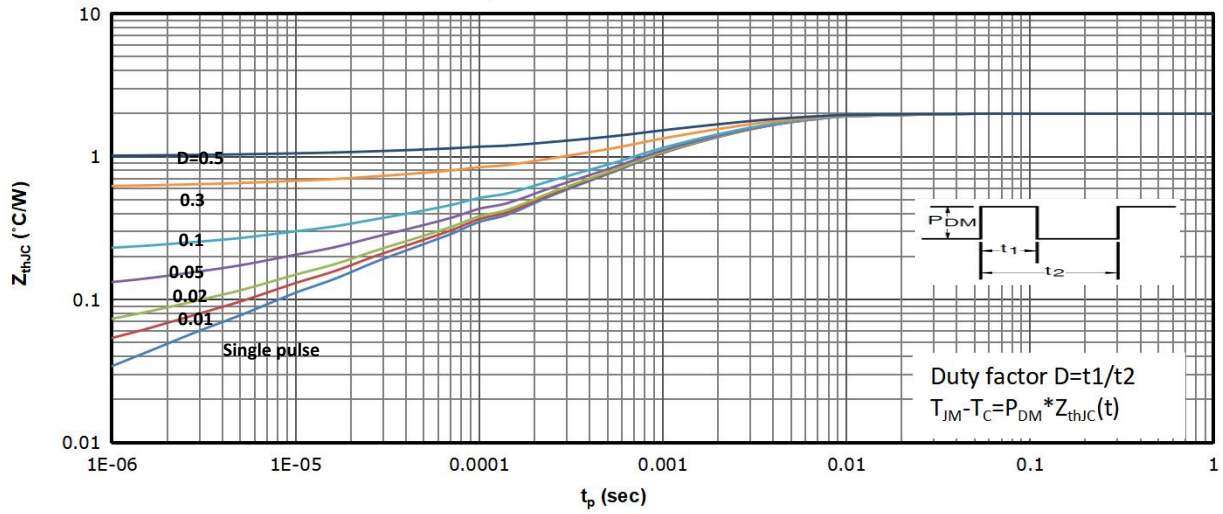
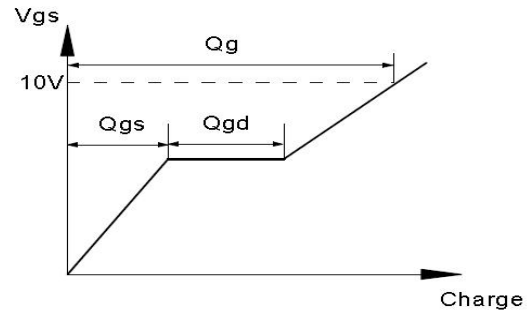
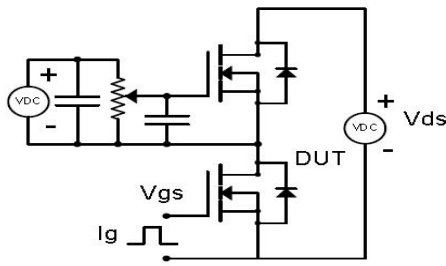


Fig 14: Max. Transient Thermal Impedance

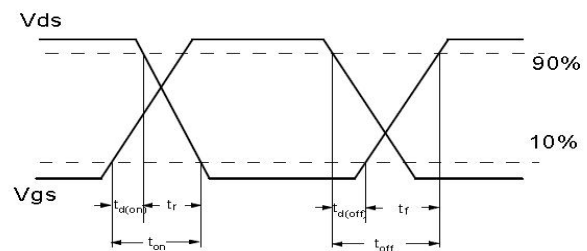
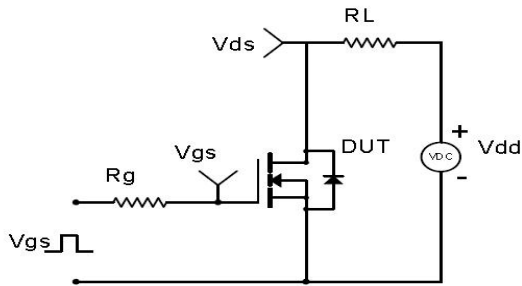


Test Circuit & Waveform

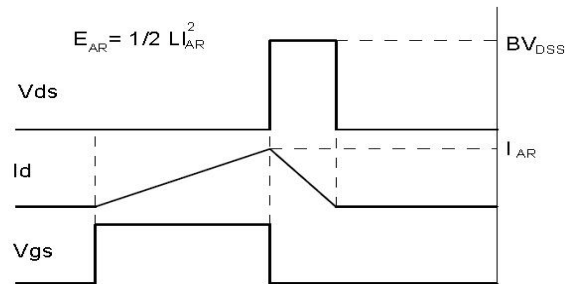
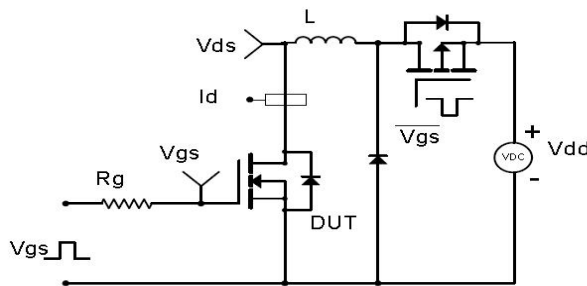
Gate Charge Test Circuit & Waveform



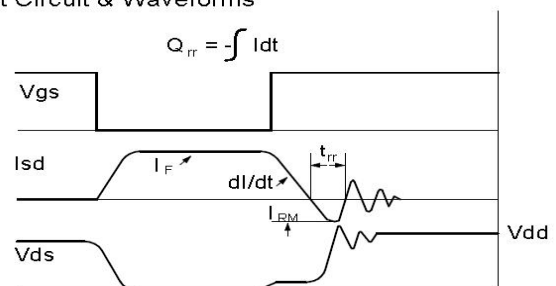
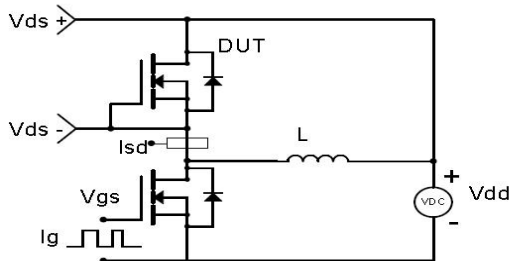
Resistive Switching Test Circuit & Waveforms



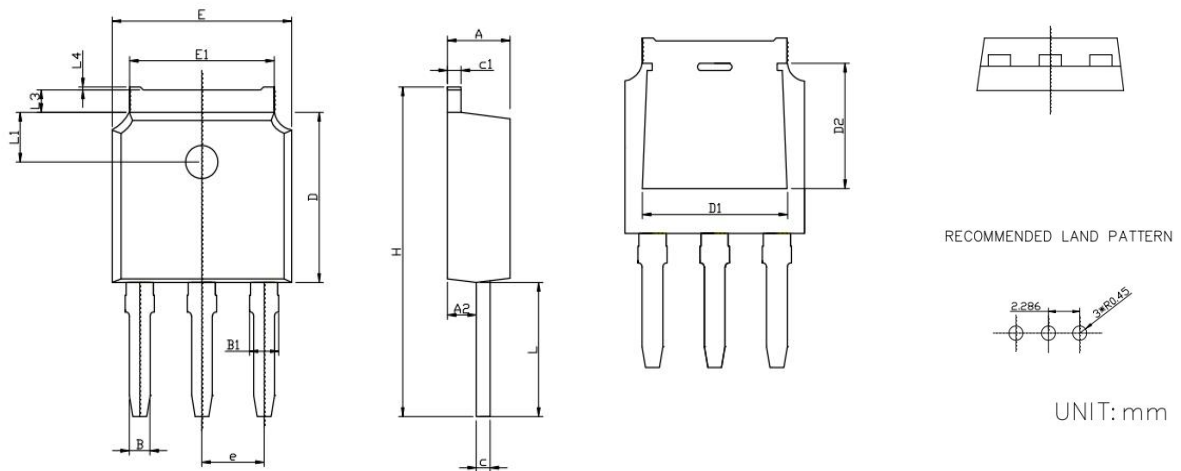
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-251-3L



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.15	2.45	0.085	0.096
A1	0.91	1.22	0.036	0.048
B	0.66	0.86	0.026	0.034
B1	0.93	1.23	0.037	0.048
C	0.40	0.60	0.016	0.024
C1	0.40	0.60	0.016	0.024
D	5.95	6.25	0.234	0.246
D1	4.80		0.189	
D2	3.80		0.150	
E	6.45	6.75	0.254	0.266
E1	5.12	5.52	0.202	0.217
L	4.50	5.10	0.177	0.201
L1	1.58	1.98	0.062	0.078
L3	0.70	1.00	0.028	0.039
L4	0.00	0.20	0.000	0.008
H	11.50	12.10	0.453	0.476
e	2.286		0.090	



Revision History

Revision	Date	Major changes
1.0	2023/5/17	Release of Formal Version.

Disclaimer

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