

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)

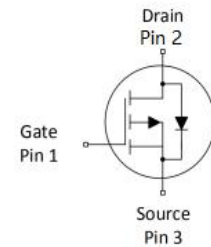
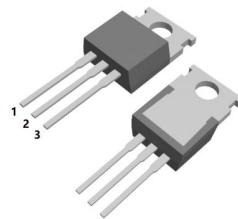


100% DVDS Tested
100% Avalanche Tested

Product Summary

V_{DS}	-60V
$R_{DS(on)}@10V$ typ	7.5mΩ
$R_{DS(on)}@4.5V$ typ	9.6mΩ
I_D	-65A

TO-220CB-3L



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
PW120P06CSL	PW120P06CSL	TO-220CB-3L	Tube	N/A	N/A	50pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-60	V
Continuous drain current	I_D	-65	A
$T_C = 25^\circ\text{C}$ (Silicon limit)		-80	
$T_C = 25^\circ\text{C}$ (Package limit)		-41	
$T_C = 100^\circ\text{C}$ (Silicon limit)		-9	
$T_a = 25^\circ\text{C}$			
Pulsed drain current ($T_C = 25^\circ\text{C}$, $t_p = 100\mu\text{s}$)	$I_{D\ pulse}$	-260	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $V_{ds}=50\text{V}$)	E_{AS}	127	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation	P_{tot}	83	W
$T_C = 25^\circ\text{C}$		1.7	
$T_a = 25^\circ\text{C}$			
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	-	0.9	1.5	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	RthJA	-	-	75	°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}	-60	-	-	V	$V_{GS}=0V, I_D=-250\mu A$
Gate threshold voltage	$V_{GS(th)}$	-1.1	-	-2.5	V	$V_{DS}=V_{GS}, I_D=-250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-0.04	-1	μA	$V_{DS}=-60V, V_{GS}=0V$ $T_j=25^\circ C$ $T_j=150^\circ C$
Gate-source leakage current	I_{GSS}	-	± 10	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	7.5	12.0	mΩ	$V_{GS}=-10V, I_D=-20A$
		-	9.6	15.0		$V_{GS}=-4.5V, I_D=-20A$
Transconductance	g_{fs}	-	48	-	S	$V_{DS}=-5V, I_D=-20A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	4117	-	pF	$V_{GS}=0V, V_{DS}=-30V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	633	-		
Reverse Transfer Capacitance	C_{rss}	-	22	-		
Gate Total Charge	Q_G	-	65	-	nC	$V_{DS}=-48V, I_D=-20A,$ $V_{GS}=-10V$
Gate-Source charge	Q_{gs}	-	14	-		
Gate-Drain charge	Q_{gd}	-	11	-		
Turn-on delay time	$t_{d(on)}$	-	46	-	ns	$V_{GS}=-10V, V_{DD}=-30V,$ $R_{G_ext}=10\Omega, I_D=-30A$
Rise time	t_r	-	2	-		
Turn-off delay time	$t_{d(off)}$	-	39	-		
Fall time	t_f	-	6	-		
Gate resistance	R_G	-	2	-	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}	-	-0.85	-1.2	V	$V_{GS}=0V, I_{SD}=-20A$
Body Diode Continuous Forward Current	I_S	-	-	-65	A	$TC = 25^{\circ}C$
Body Diode Pulsed Current	I_S pulse	-	-	-260	A	$TC = 25^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	56	-	ns	$I_F=-1A, dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	-	108	-	nC	



Typical Performance Characteristics

Fig 1: Output Characteristics

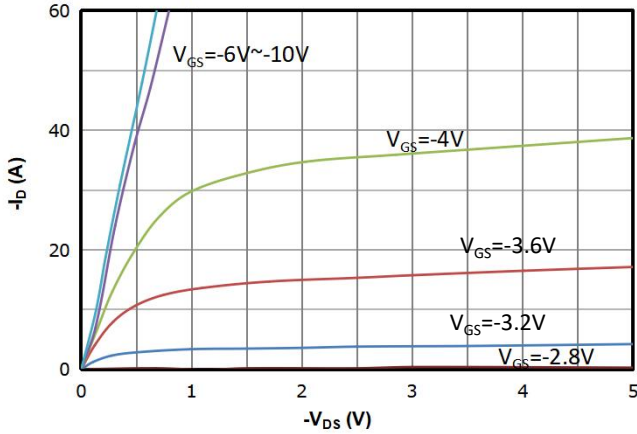


Fig 2: Transfer Characteristics

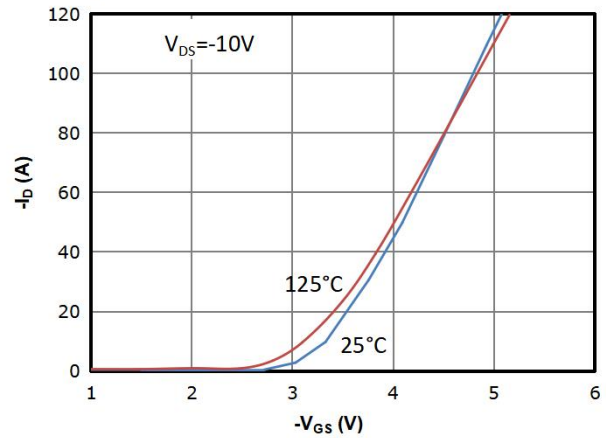


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

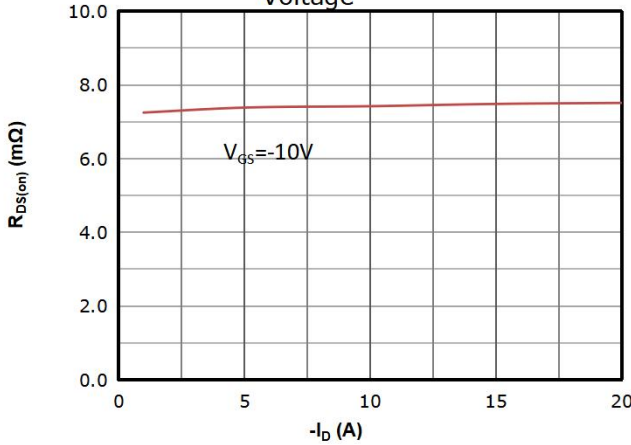


Fig 4: $R_{DS(on)}$ vs Gate Voltage

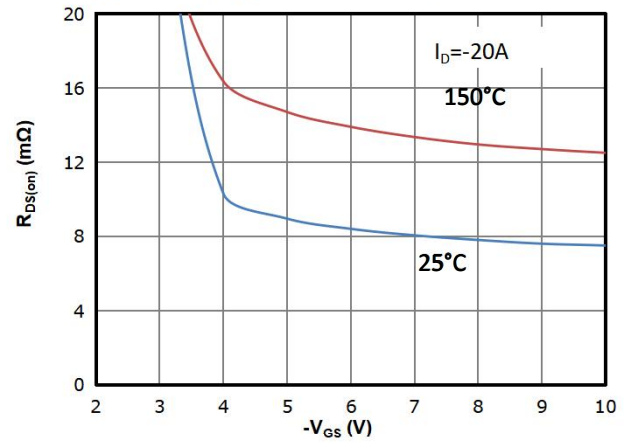


Fig 5: $R_{DS(on)}$ vs. Temperature

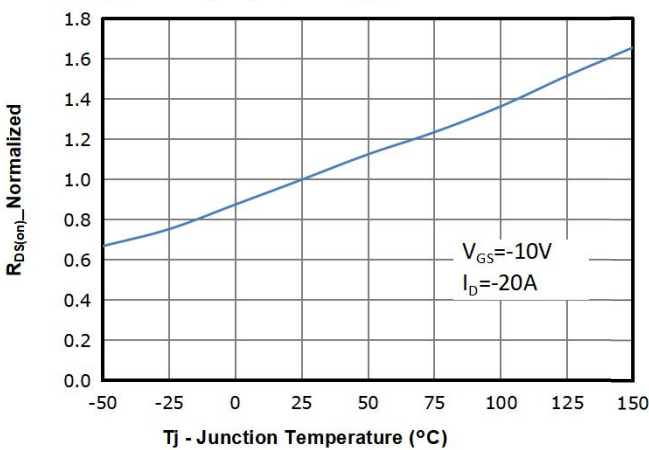


Fig 6: $V_{GS(th)}$ vs. Temperature

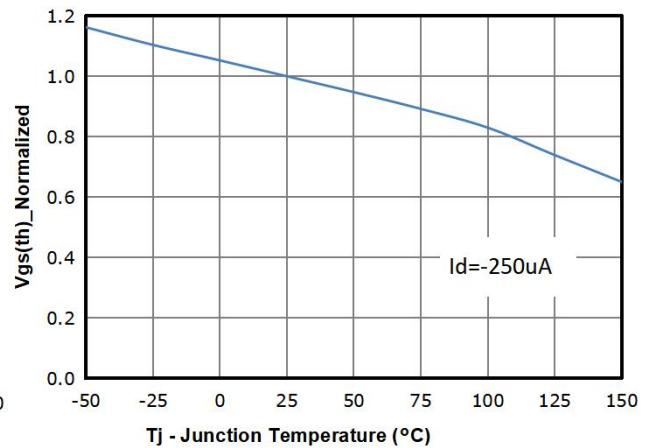




Fig 7: BVdss vs. Temperature

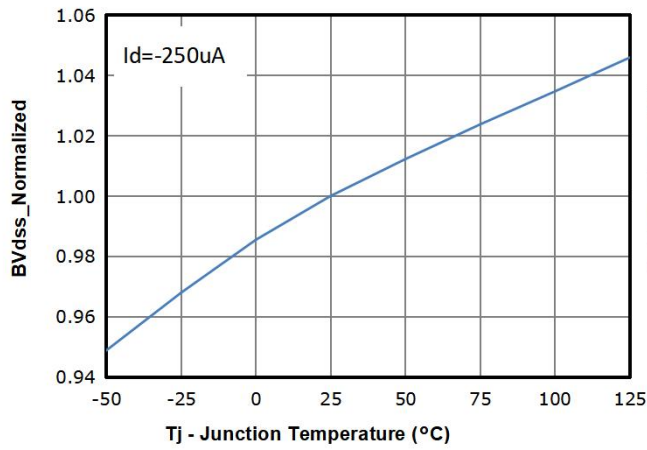


Fig 8: Capacitance Characteristics

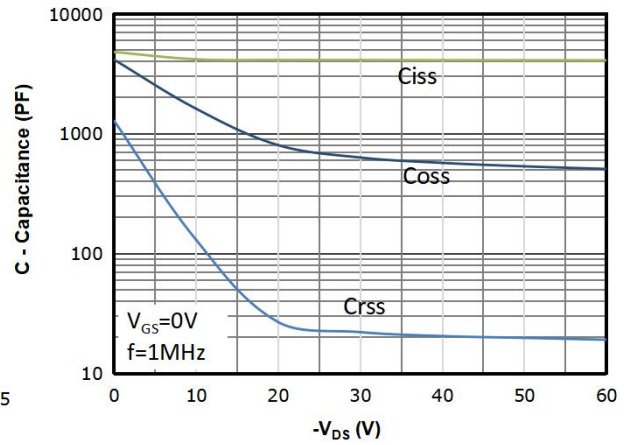


Fig 9: Gate Charge Characteristics

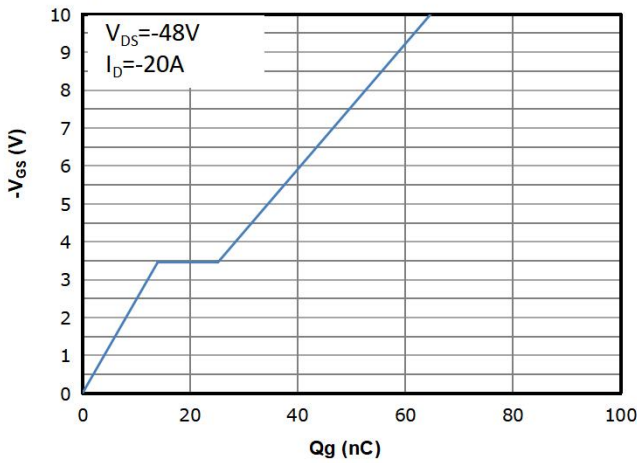


Fig 10: Body-diode Forward Characteristics

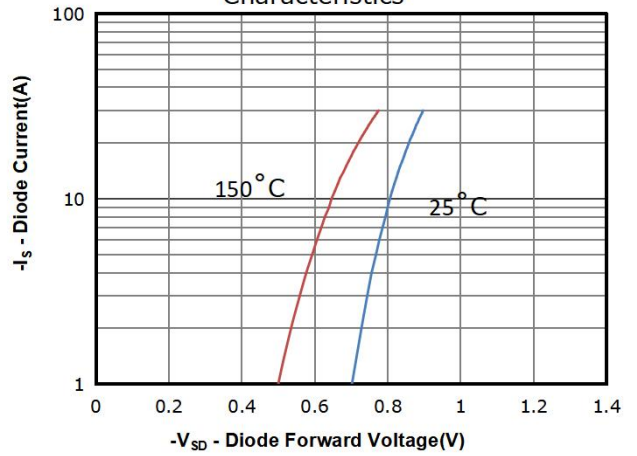


Fig 11: Power Dissipation

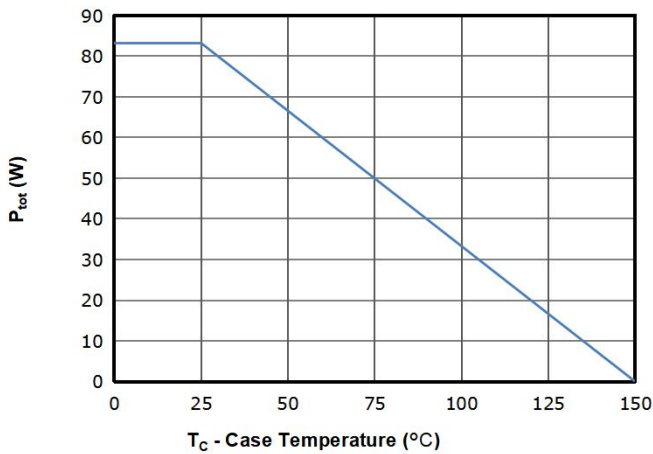


Fig 12: Drain Current Derating

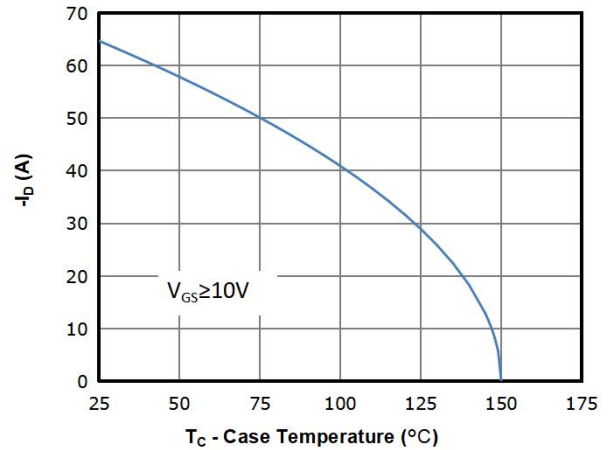




Fig 13: Safe Operating Area

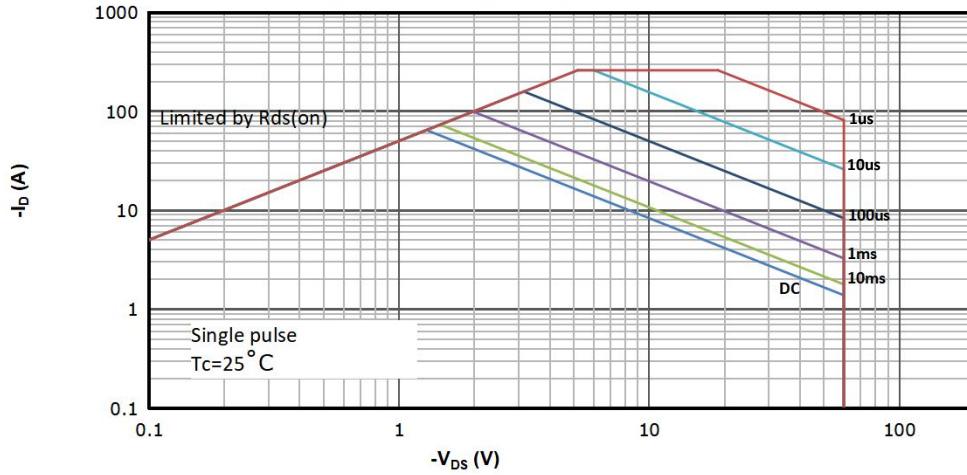
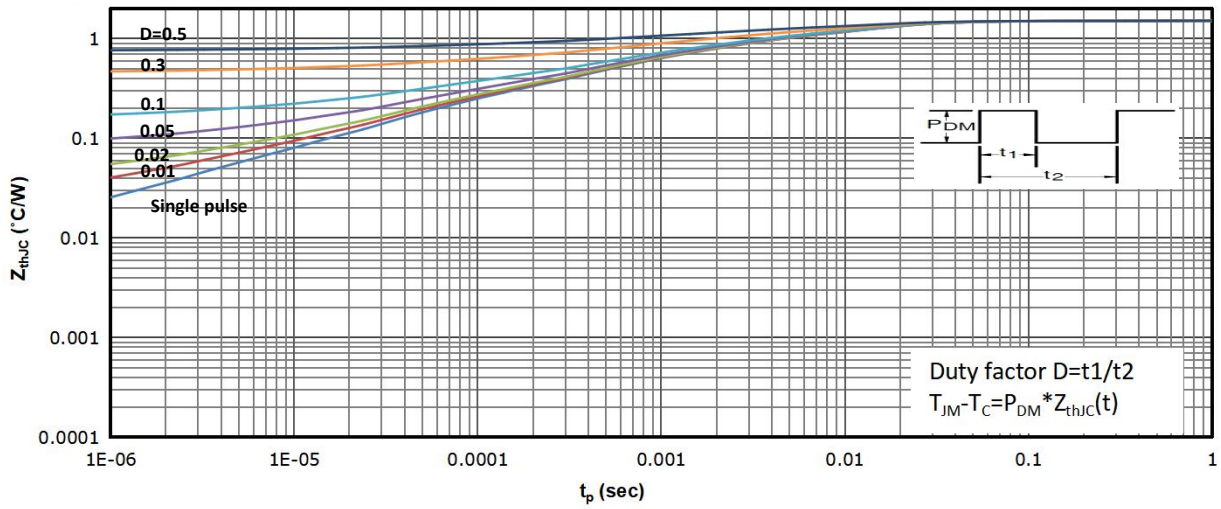
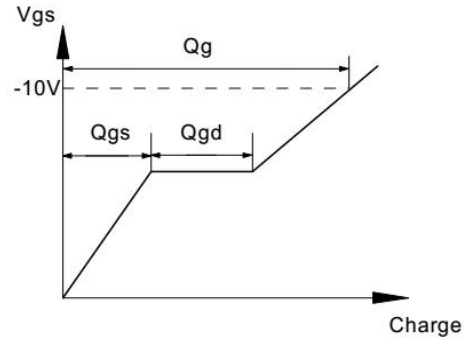
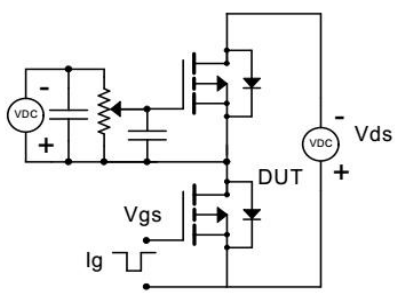


Fig 14: Max. Transient Thermal Impedance

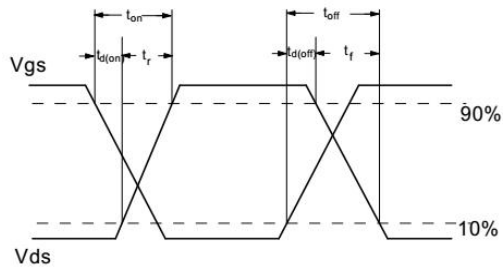
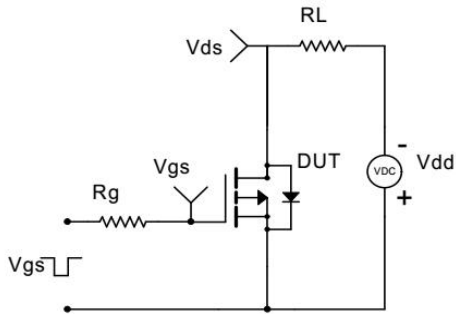


Test Circuit & Waveform

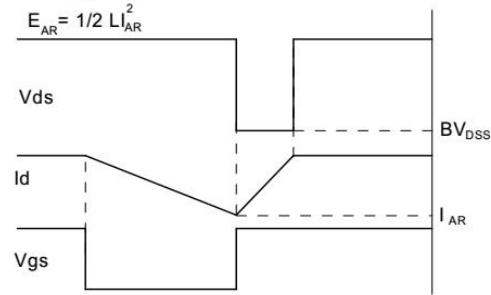
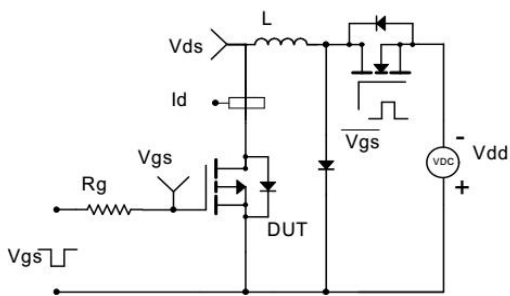
Gate Charge Test Circuit & Waveform



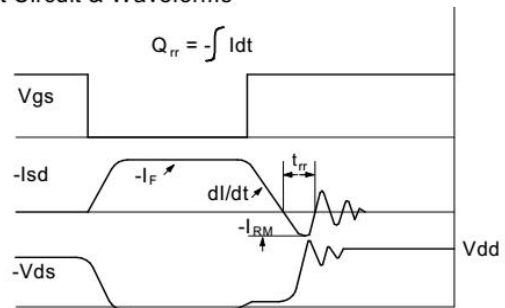
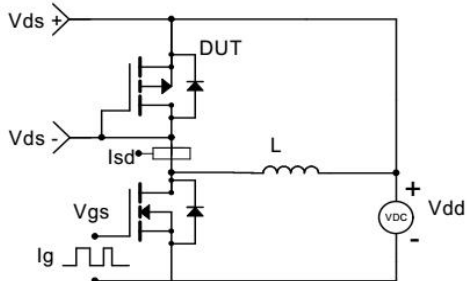
Resistive Switching Test Circuit & Waveforms



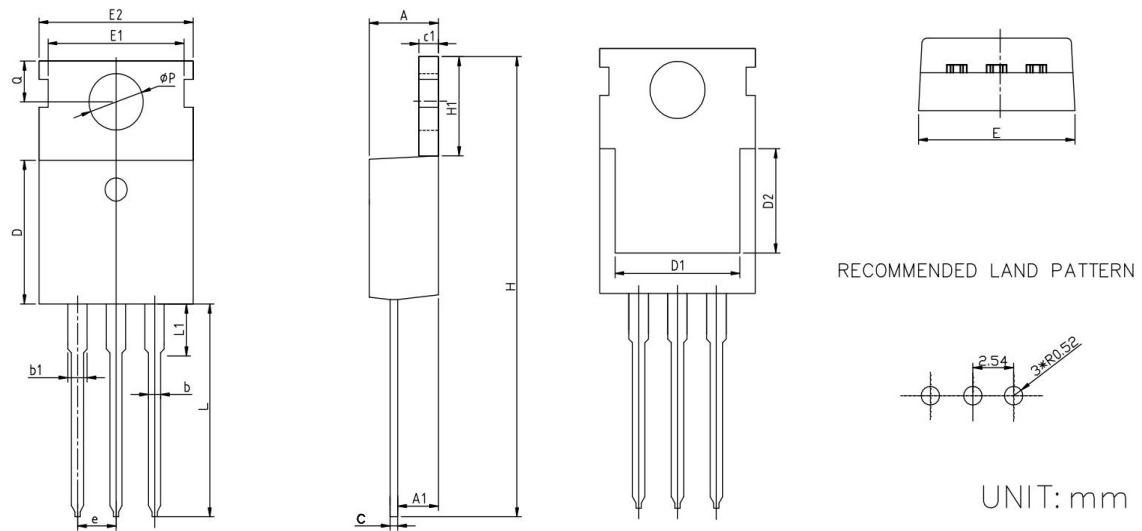
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-220CB-3L



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.80	0.173	0.189
A1	2.25	2.55	0.089	0.100
b	0.72	0.92	0.028	0.036
b1	1.12	1.42	0.044	0.056
c	0.40	0.60	0.016	0.024
c1	1.20	1.40	0.047	0.055
D	8.80	9.40	0.346	0.370
D1	7.75	8.15	0.305	0.321
D2	6.55	6.95	0.258	0.274
e	2.54		0.100	
E	9.65	10.35	0.380	0.407
E1	8.70		0.343	
E2	9.70	10.30	0.382	0.406
H	28.70	29.70	1.130	1.169
H1	6.25	6.85	0.246	0.270
L	13.20	13.80	0.520	0.543
L1	2.80	3.40	0.110	0.134
Q	2.60	3.00	0.102	0.118
φP	3.45	3.75	0.136	0.148



Revision History

Revision	Date	Major changes
1.0	2023/1/31	Release of Formal Version.

Disclaimer

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