SC180N75Z

Silicon Carbide MOSFET 750V, 180mΩ, 20A

重庆平伟半导体股份有限公司

Features

- 0 V turn-off gate voltage can be applied
- High Blocking Voltage with Low RDS(on)
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Qualified according to JEDEC criteria

Applications

- Lighting
- Telecom and UPS
- PWM stages for e.g. PC Silverbox, Adapter, LCD & PDP TV

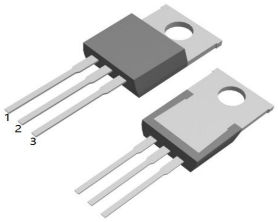
100% DVDS Tested

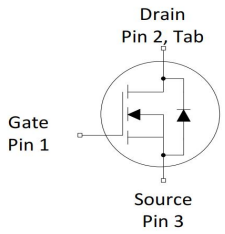
100% AvalancheTested

Product Summary

V_{DS}	750V
$R_{DS(on)\ typ.}$	180mΩ
I_D	20A

TO-220AB-3L





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC180N75Z	SC180N75Z	TO-220AB-3L	N/A	N/A	N/A	50

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	750	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 20 17	A
Pulsed drain current (T_C = 25°C)	$I_{D\ pulse}$	59	A
Avalanche energy, single pulse (L=5mH)	E_{AS}	16	mJ
Gate-Source voltage,max.transient voltage	V_{GSmax}	-8/+22	V
Recommended operating values	V_{GSsop}	0/+18	V
Power dissipation T_C = 25°C	P_{tot}	 75	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	1.33	2.0	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	R_{thJA}	-	-	62	°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}	750	-	-	V	V_{GS}=0V, I_D=100uA
Gate threshold voltage	$V_{GS(th)}$	2.5	3.5	4.5	V	V_{DS}=V_{GS}, I_D=6mA
Zero gate voltage drain current	I_{DSS}	- -	1 -	10 100	μA	V_{DS}=750V,V_{GS}=0V T_j=25°C T_j=175°C
Gate-source leakage current	I_{GSS}	-	-	100	nA	V_{GS}=22V,V_{DS}=0V
		-	-	-100	nA	V_{GS}=-8V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	180	240	mΩ	V_{GS}=15V,I_D=10A
Drain-source on-state resistance	$R_{DS(on)}$	-	130	185	mΩ	V_{GS}=18V,I_D=10A
Transconductance	g_{fs}	-	6.5	-	S	V_{DS}=20V,I_D=10A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	503	-	pF	V_{GS}=0V, V_{DS}=400V, f=1MHz
Output Capacitance	C_{oss}	-	42	-		
Reverse Transfer Capacitance	C_{rss}	-	4	-		
Gate Total Charge	Q_G	-	17	-	nC	V_{DS}=400V,I_D=10A ,V_{GS}=0V/15V
Gate-Source charge	Q_{gs}	-	5	-		
Gate-Drain charge	Q_{gd}	-	8	-		
Turn-on delay time	$t_{d(on)}$	-	12	-	ns	V_{GS}=0/18V, V_{DD}=400V, R_G=5Ω,I_D=10A
Rise time	t_r	-	13	-		
Turn-off delay time	$t_{d(off)}$	-	22	-		
Fall time	t_f	-	7	-		
Gate resistance	R_G	-	3.0	-	Ω	V_{GS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	- -	4.2 3.7	- -	V	V_{GS}=0V, I_{SD}=10A T_j=25°C T_j=175°C
Body Diode Continuous Forward Current	I_S	-	-	18	A	T_C = 25°C
		-	-	13	A	T_C = 100°C
Body Diode Reverse Recovery Time	t_{rr}	-	23	-	ns	V_{GS}=-5V,I_{SD}=10A, V_R=400V di/dt=1000A/us
Body Diode Reverse Recovery Charge	Q_{rr}	-	88	-	nC	
Peak Reverse Recovery Current	I_{RRM}	-	5	-	A	

Typical Performance Characteristics

Fig 1: Output Characteristics Tj=25°C

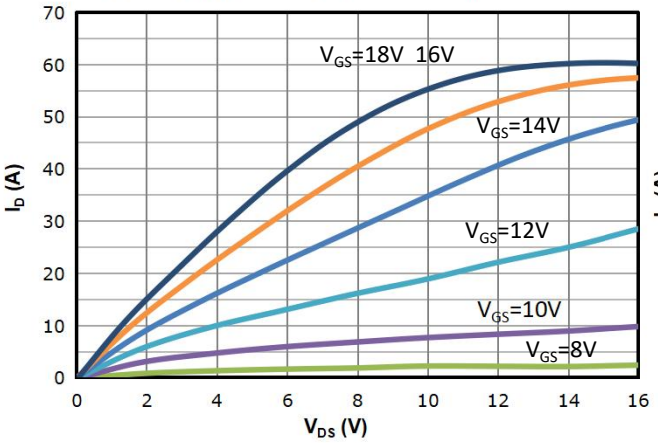


Fig 2: Output Characteristics Tj=175°C

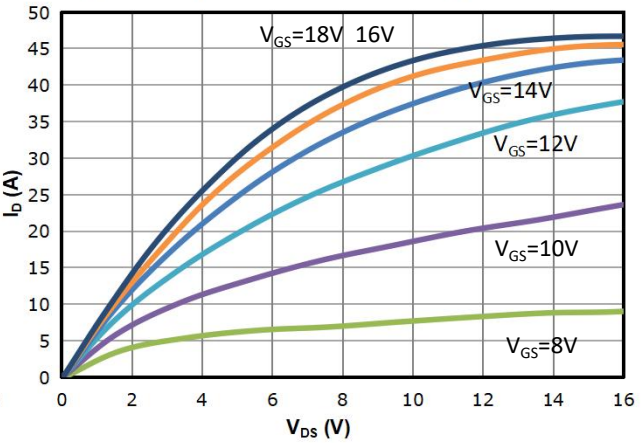


Fig 3: Transfer Characteristics

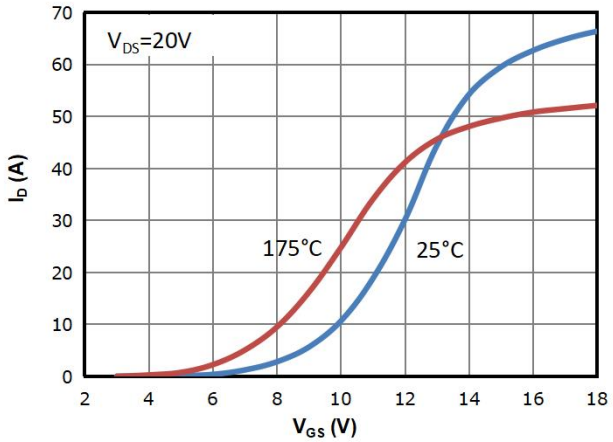


Fig 4: Rds(on) vs Drain Current and Gate Voltage

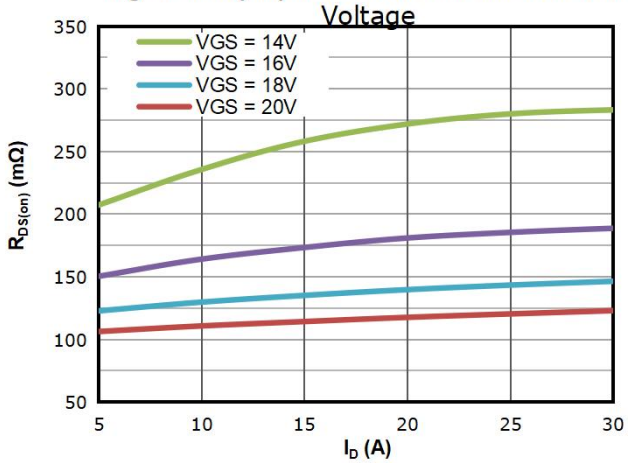


Fig 5: Rds(on) vs. Temperature

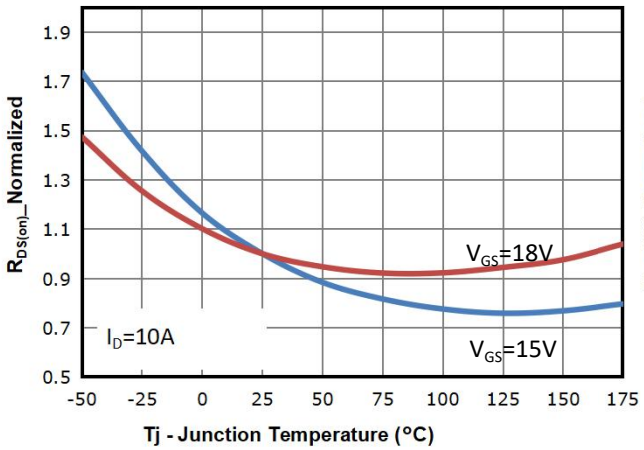


Fig 6: Vgs(th) vs. Temperature

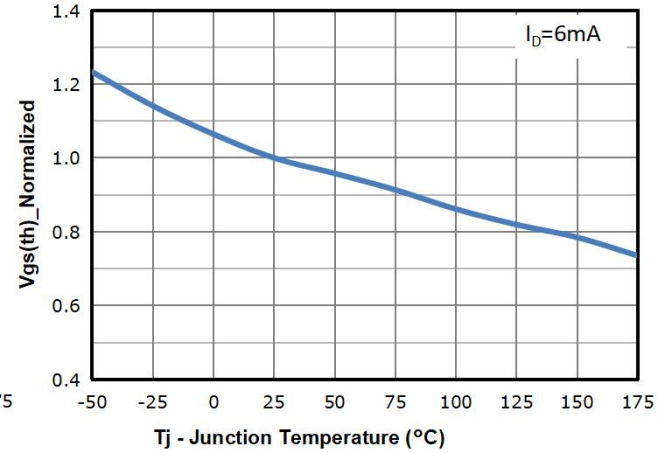


Fig 7: BVdss vs. Temperature

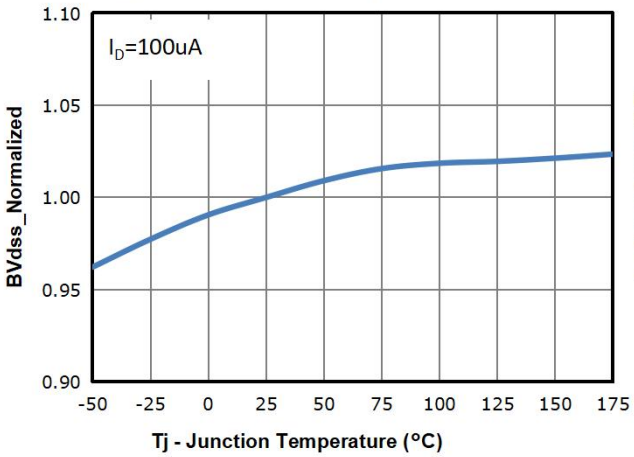


Fig 8: Capacitance Characteristics

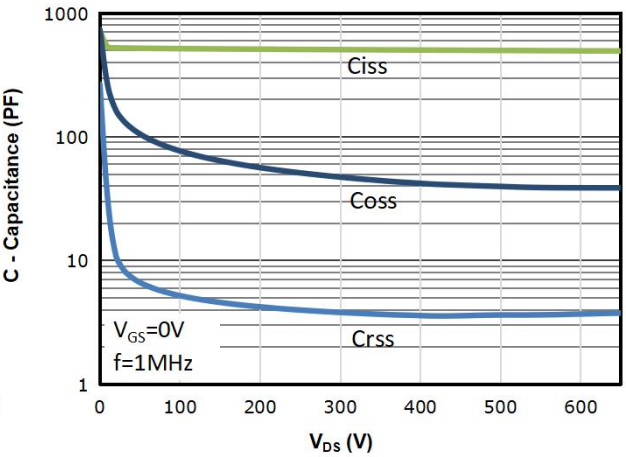


Fig 9: Gate ChargeCharacteristics

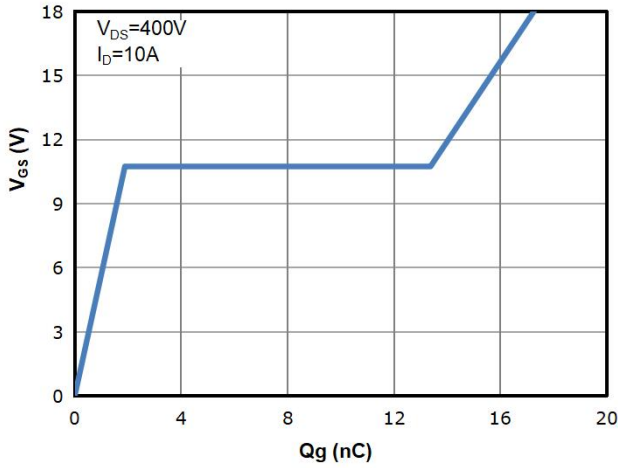


Fig 10: Body-diode Forward Characteristics

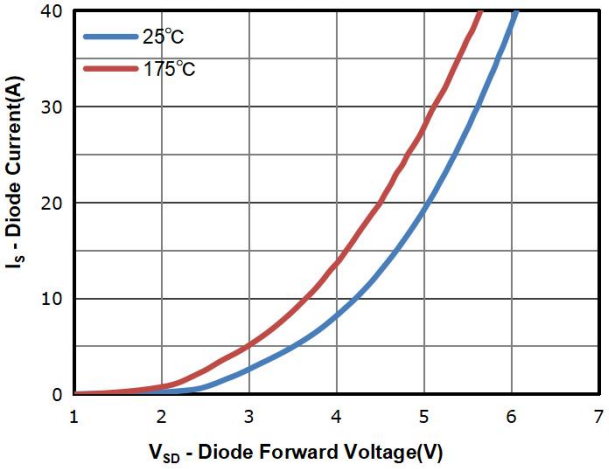


Fig 11: Power Dissipation

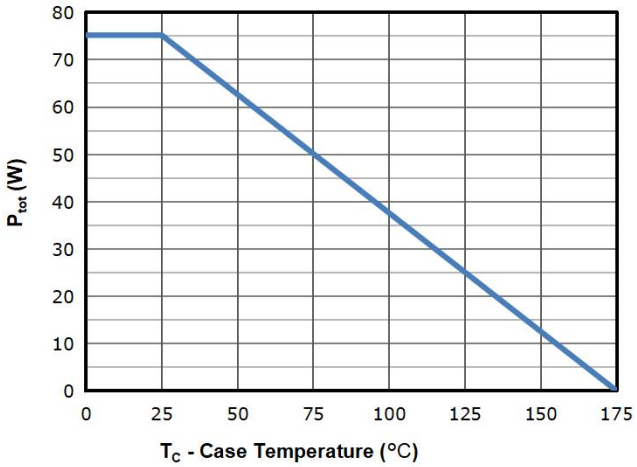


Fig 12: Drain Current Derating

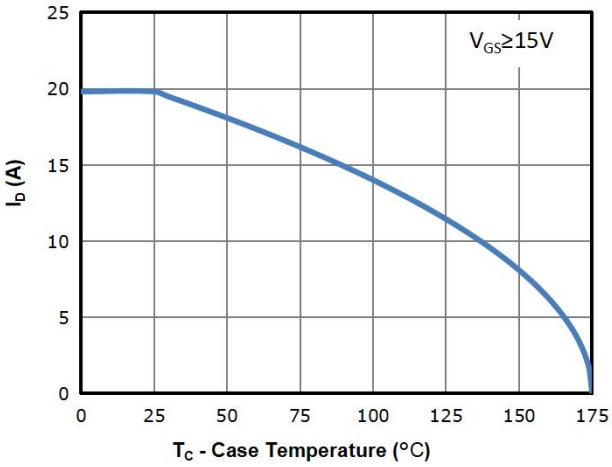


Fig 13: Safe Operating Area

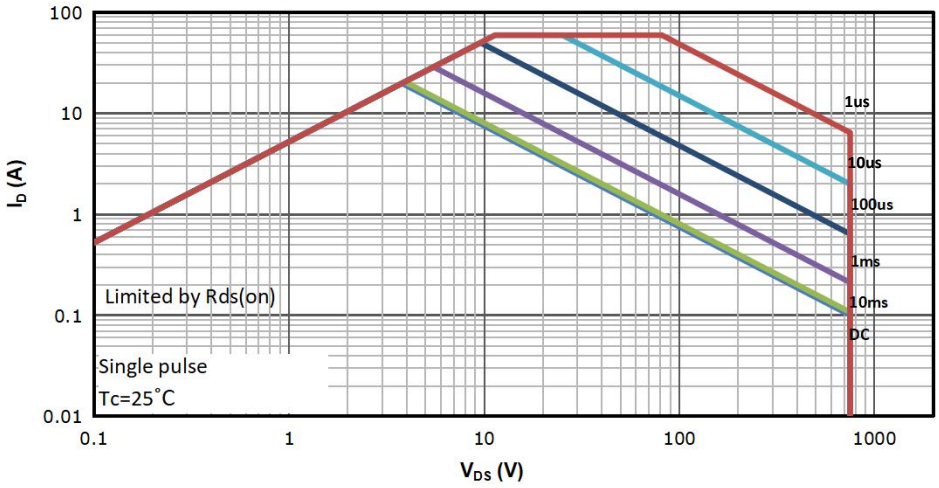
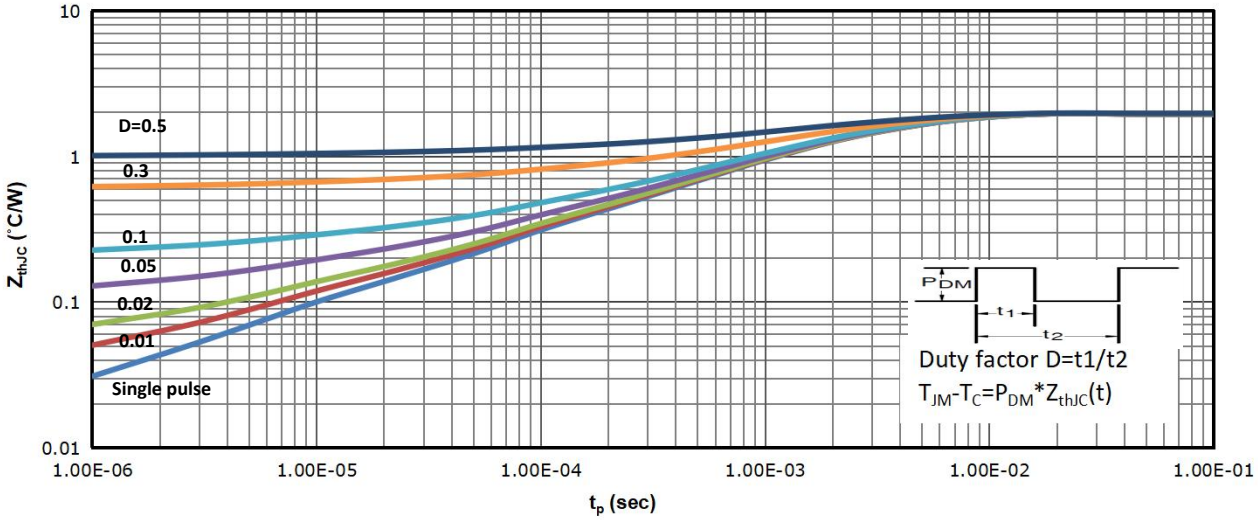
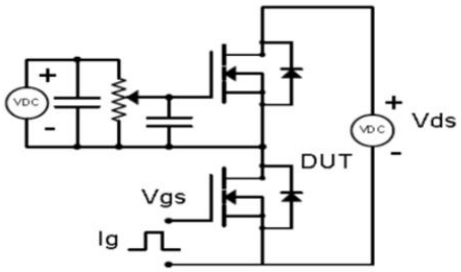


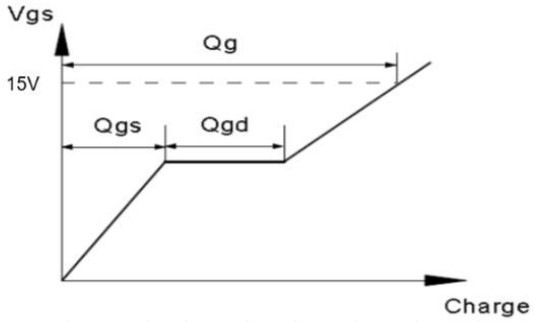
Fig 14: Max. Transient Thermal Impedance



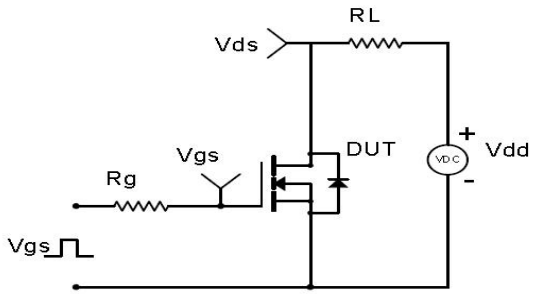
Test Circuit & Waveform

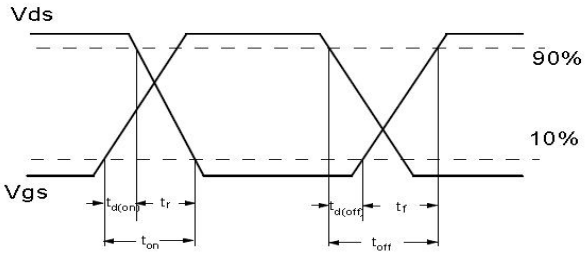
Gate Charge Test Circuit & Waveform



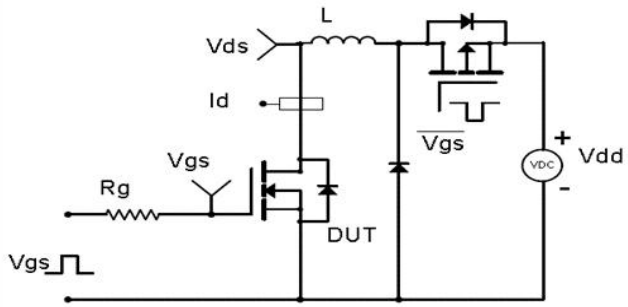


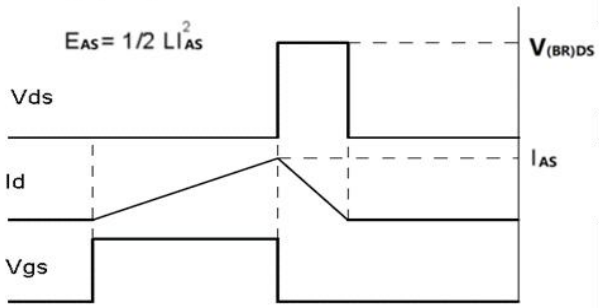
Resistive Switching Test Circuit & Waveforms



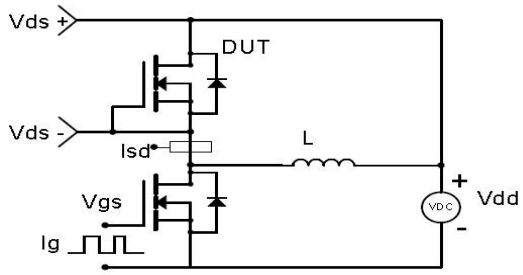


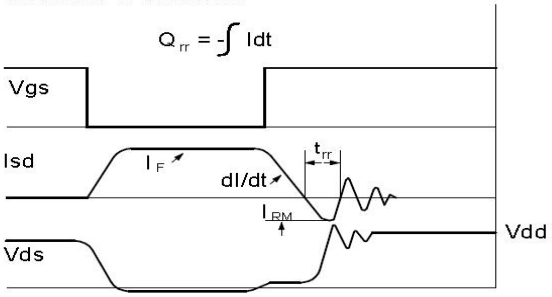
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



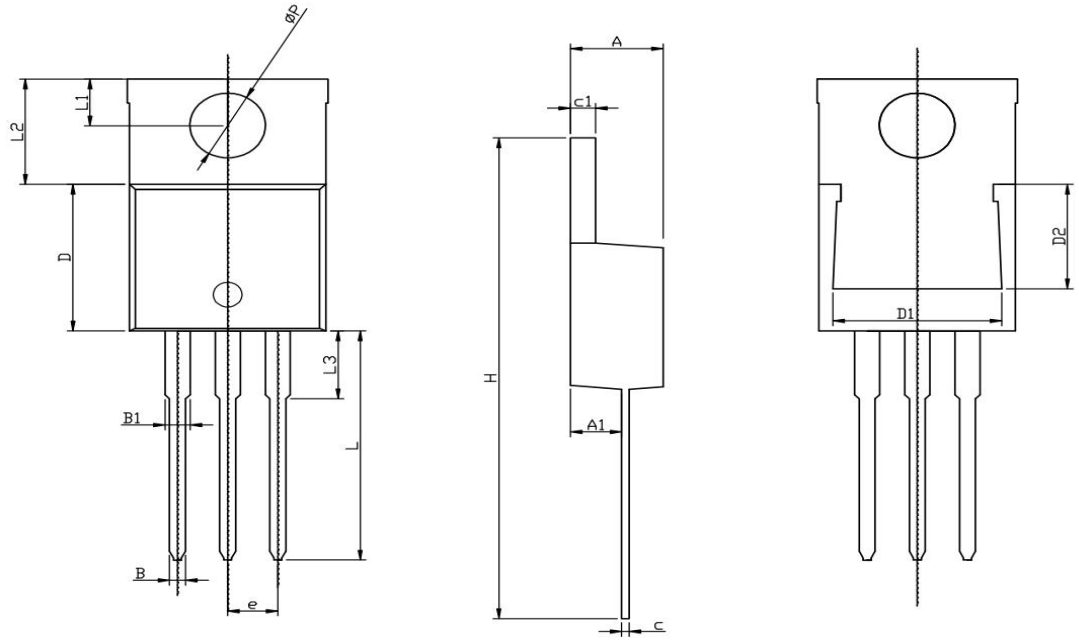


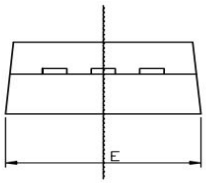
Diode Recovery Test Circuit & Waveforms



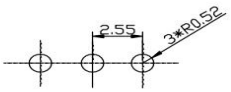


Package Outline: TO-220AB-3L





RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	4.50	4.70	4.90
A1	2.45	2.60	2.70
B	0.72	0.82	0.92
B1	1.12	1.27	1.42
c	0.28	0.38	0.48
c1	1.17	1.27	1.37
D	8.46	8.66	8.86
D1	7.90	8.10	8.40
D2	5.50	5.70	5.90
e	2.45	2.55	2.65
E	9.85	10.15	10.45
H	28.00	28.50	29.00
ΦP		3.84	
L	13.1	13.6	14.1
L1	2.54	2.74	2.94
L2	6.04	6.24	6.44
L3	3.85	4.05	4.35

Disclaimer

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