SC045N120Y4-R

Silicon Carbide MOSFET 1200V, 45mΩ, 61A

重庆平伟半导体股份有限公司

Features

- 0 V turn-off gate voltage can be applied
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
- Excellent Low Ciss
- Qualified according to JEDEC criteria

Applications

- High Voltage DC/DC Converters
- EV Charging
- Online UPS / Industrial UPS
- String inverter
- Energy storage systems (ESS)

RoHS HF

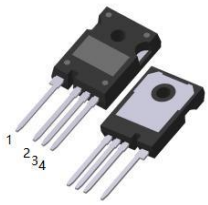
100% DVDS Tested

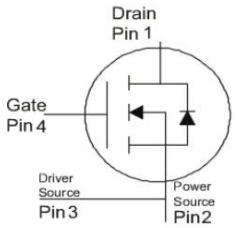
100% AvalancheTested

Product Summary

V_{DS}	1200V
$R_{DS(on)}$	45mΩ
I_D	61A

TO-247-4L





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC045N120Y4-R	SC045N120Y4	TO-247-4L	Tube	N/A	N/A	30pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 61 43	A
Pulsed drain current (T_C = 25°C)	$I_{D\ pulse}$	245	A
Avalanche energy, single pulse (L=5mH)	E_{AS}	391	mJ
Gate-Source voltage,max.transient voltage	V_{GSmax}	-5/+22	V
Recommended operating values	V_{GSsop}	0/+18	V
Power dissipation T_C = 25°C	P_{tot}	 238	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	Tsold	260	°C

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	0.42	0.63	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	R_{thJA}	-	-	50.0	°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}	1200	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2.6	3.1	4.6	V	V_{DS}=V_{GS},I_D=10mA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=1200V,V_{GS}=0V T_j=25°C T_j=175°C
Gate-source leakage current	I_{GSS}	-	-	200	nA	V_{GS}=22V,V_{DS}=0V
		-	-	-100	nA	V_{GS}=-5V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	45	54	mΩ	V_{GS}=18V,I_D=33A
Transconductance	g_{fs}	-	11	-	S	V_{DS}=20V,I_D=33A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2364	-	pF	V_{GS}=0V, V_{DS}=800V, f=1MHz
Output Capacitance	C_{oss}	-	104	-		
Reverse Transfer Capacitance	C_{rss}	-	3.5	-		
Gate Total Charge	Q_G	-	100	-	nC	V_{DS}=800V,Id=33A ,V_{GS}=0/+18V
Gate-Source charge	Q_{gs}	-	37	-		
Gate-Drain charge	Q_{gd}	-	28	-		
Turn-on delay time	$t_{d(on)}$	-	15	-	ns	V_{GS}=0/+18V, V_{DD}=800V, R_{G_ext}=5Ω,I_D=33A
Rise time	t_r	-	45	-		
Turn-off delay time	$t_{d(off)}$	-	13	-		
Fall time	t_f	-	10	-		
Gate resistance	R_G	-	1.0	-	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}	- -	3.6 3.2	6.0	V	V_{GS}=0V,I_{SD}=33A T_j=25°C T_j=175°C
Body Diode Continuous Forward Current	I_S	-	-	88	A	T_C = 25°C
		-	-	49	A	T_C = 100°C
Body Diode Reverse Recovery Time	t_{rr}	-	30	-	ns	V_{GS}=0V,I_{SD}=33A, V_R=800V di/dt=1000A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	120	-	nC	
Peak Reverse Recovery Current	I_{RRM}	-	9.5	-	A	

Typical Performance Characteristics

Fig 1: Output Characteristics Tj=25°C

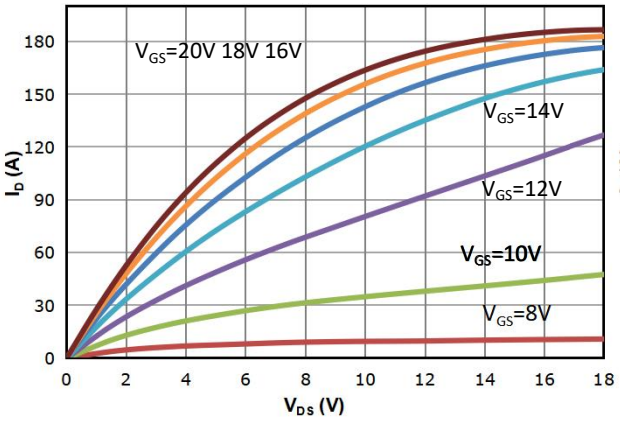


Fig 2: Output Characteristics Tj=175°C

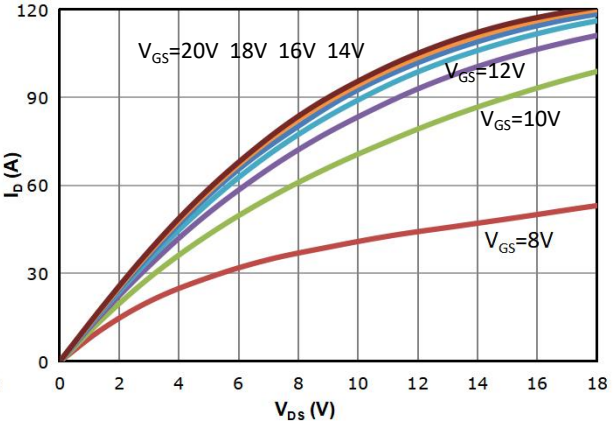


Fig 3: Transfer Characteristics

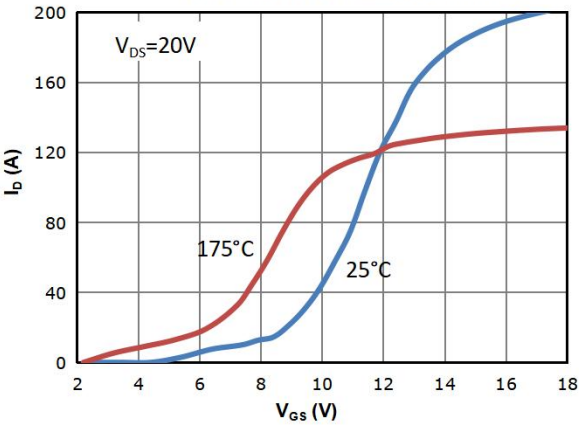


Fig 4: Rds(on) vs Drain Current and Gate Voltage

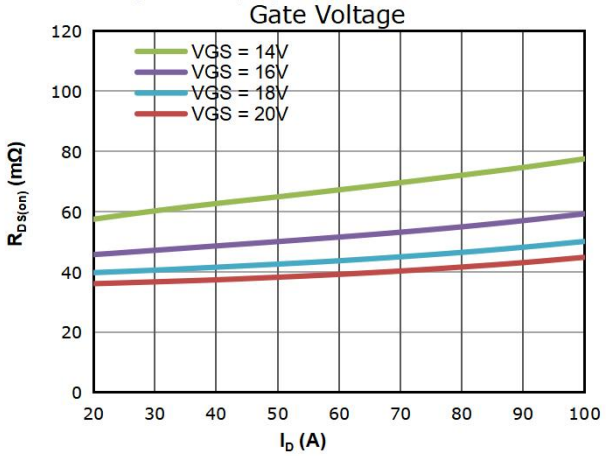


Fig 5: Rds(on) vs. Temperature

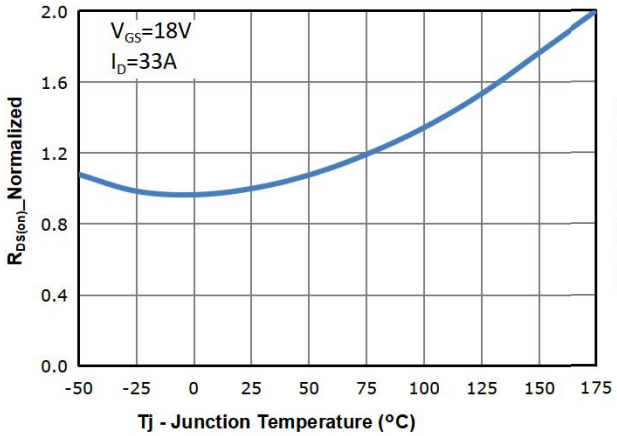


Fig 6: Vgs(th) vs. Temperature

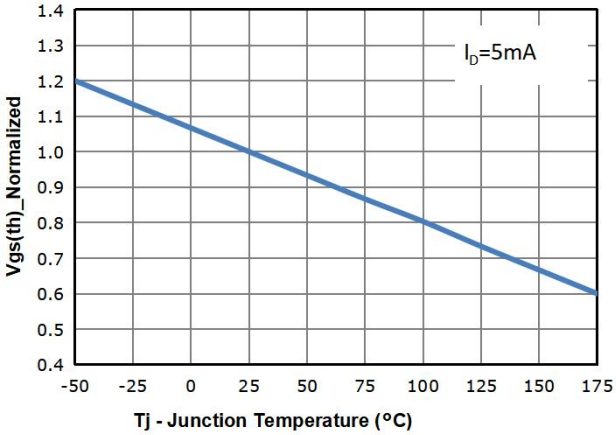


Fig 7: BVdss vs. Temperature

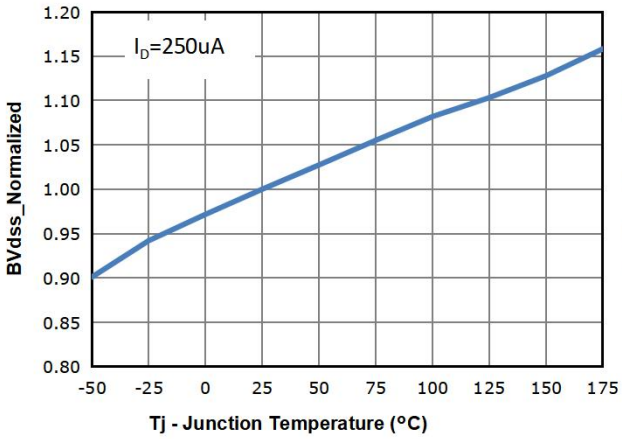


Fig 8: Capacitance Characteristics

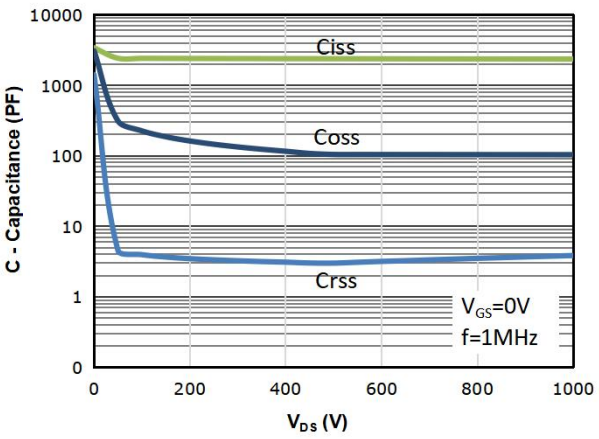


Fig 9: Gate ChargeCharacteristics

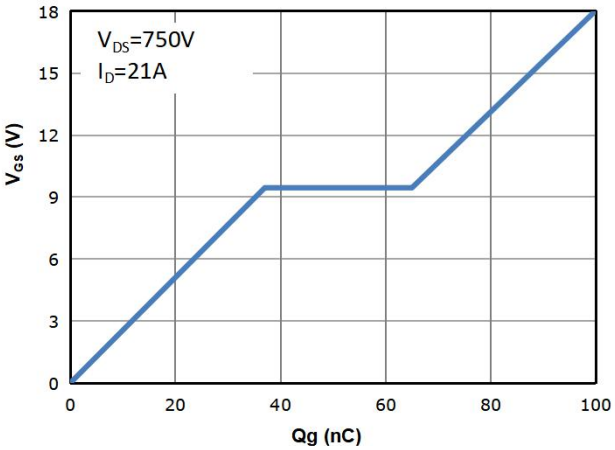


Fig 10: Body-diode Forward Characteristics

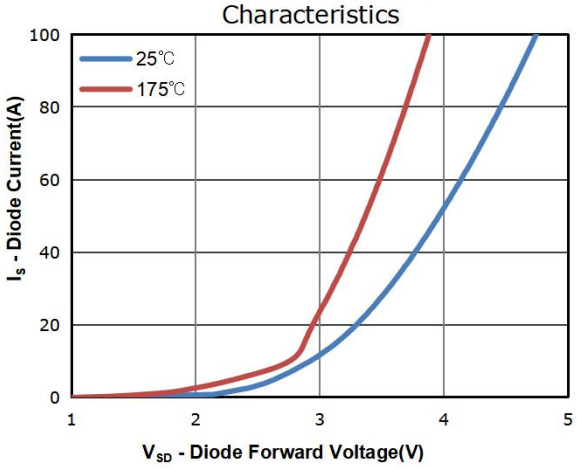


Fig 11: Power Dissipation

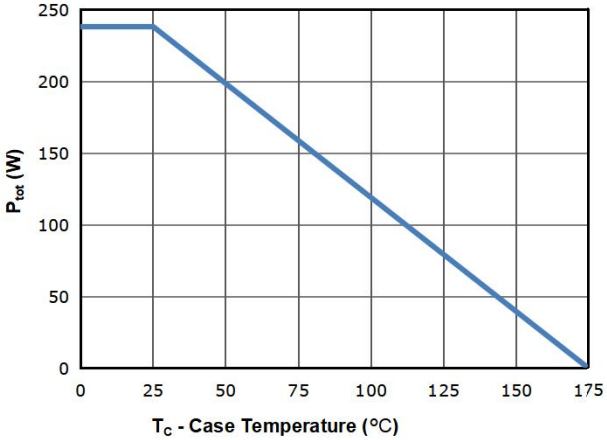


Fig 12: Drain Current Derating

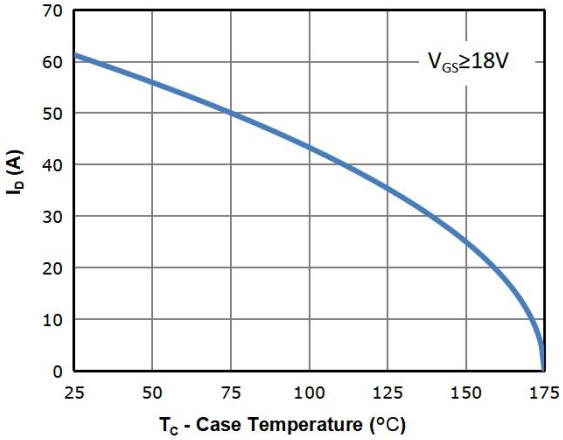


Fig 13: Safe Operating Area

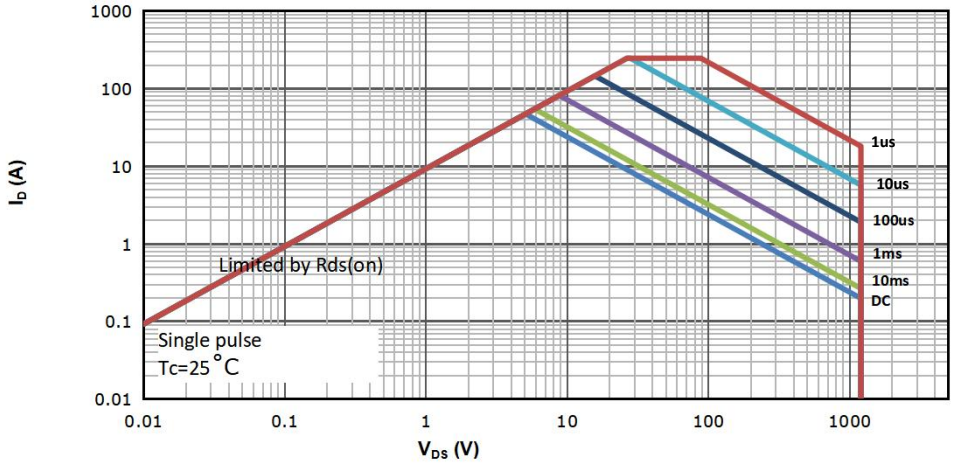
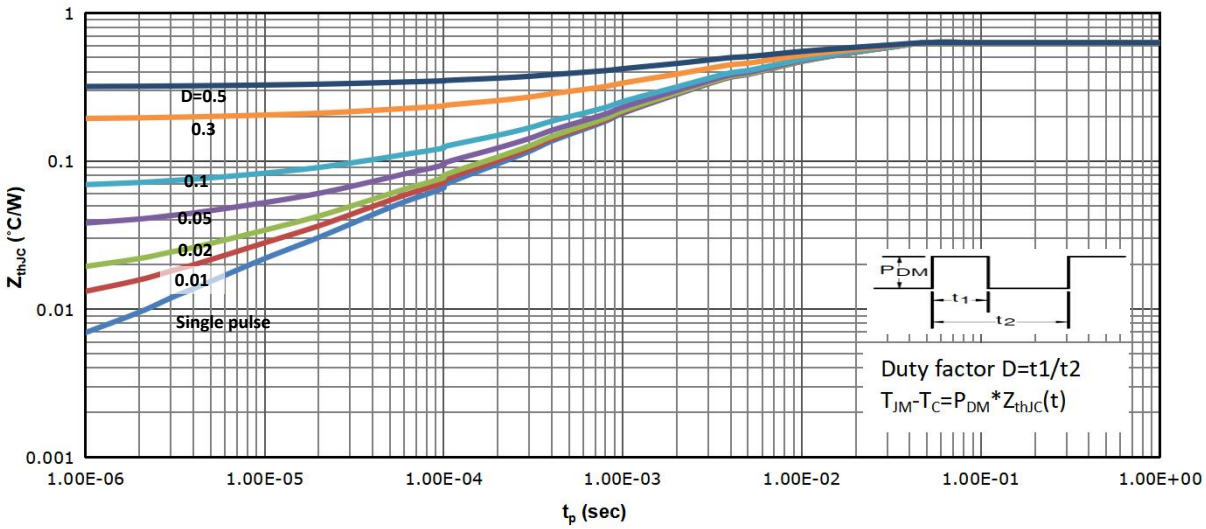
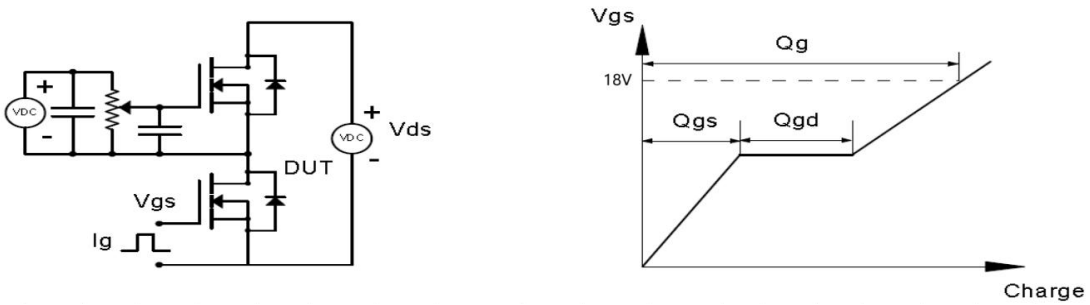


Fig 14: Max. Transient Thermal Impedance

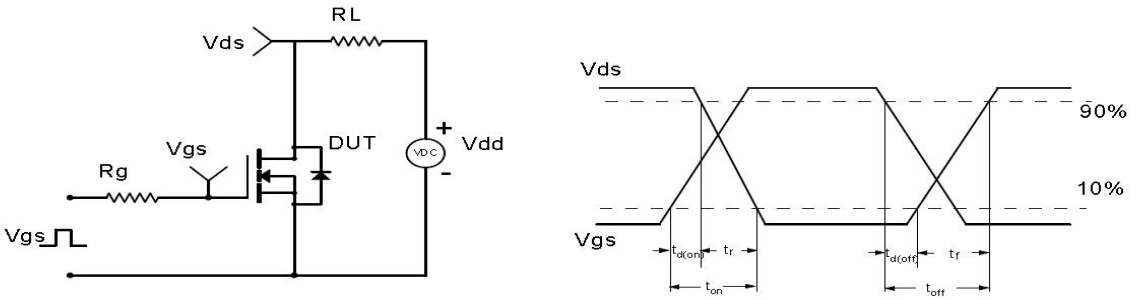


Test Circuit & Waveform

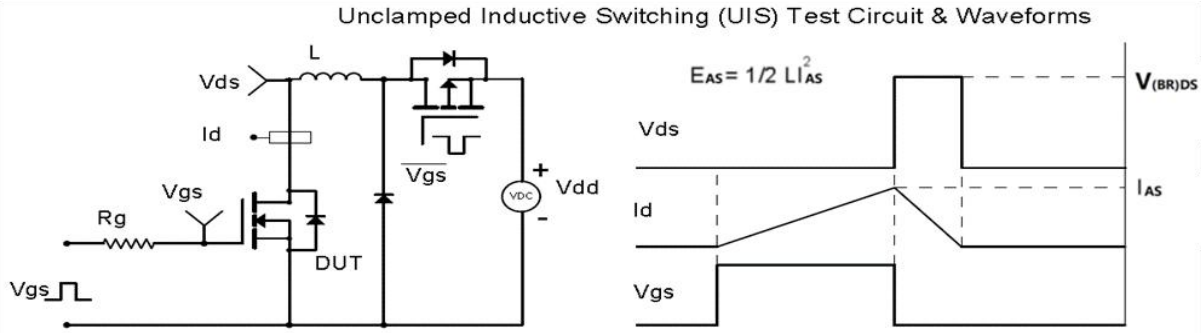
Gate Charge Test Circuit & Waveform



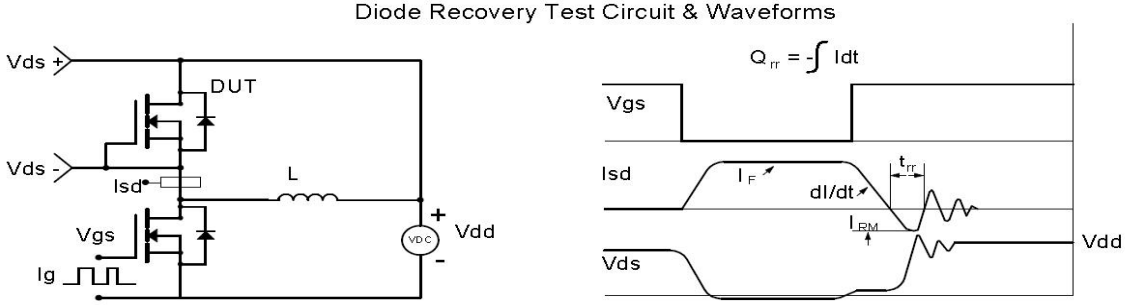
Resistive Switching Test Circuit & Waveforms



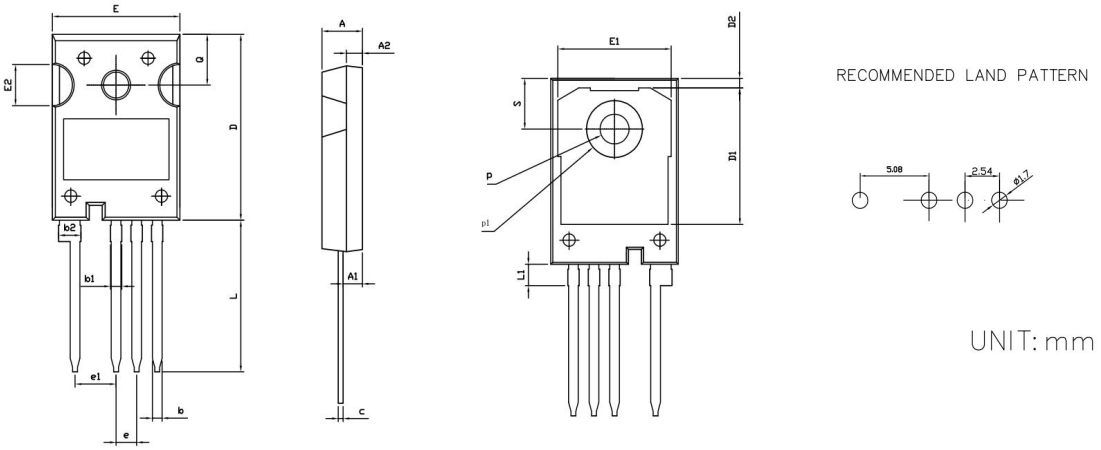
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-247-4L



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.20	0.189	0.205
A1	2.25	2.45	0.089	0.096
A2	1.85	2.15	0.073	0.085
b	1.05	1.35	0.041	0.053
b1	1.00	1.60	0.039	0.063
b2	2.35	2.95	0.093	0.116
c	0.50	0.70	0.020	0.028
D	22.34	22.74	0.880	0.895
D1	16.00	17.00	0.630	0.669
D2	0.97	1.37	0.038	0.054
e	2.34	2.74	0.092	0.108
e1	4.88	5.28	0.192	0.208
E	15.60	16.00	0.614	0.630
E1	13.50	14.50	0.531	0.571
E2	4.80	5.20	0.189	0.205
L	18.08	18.68	0.712	0.735
L1	2.38	2.78	0.094	0.109
p	3.50	3.70	0.138	0.146
p1	6.60	7.00	0.260	0.276
Q	6.00	6.30	0.236	0.248
S	6.00	6.30	0.236	0.248

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