

## Features

- Low switching losses
- Extremely low on-resistance  $R_{DS(on)}$
- Easy to Parallel and Simple to Drive
- Qualified according to JEDEC criteria



## Applications

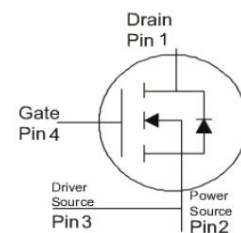
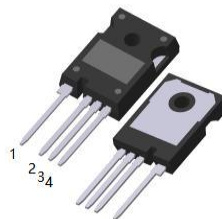
- High Voltage DC/DC Converters
- EV Charging
- String inverter
- Online UPS / Industrial UPS

**100% DVDS Tested**  
**100% Avalanche Tested**

## Product Summary

$V_{DS}$	650V
$R_{DS(on)}$ typ.	20mΩ
$I_D$	90A

TO-247-4L



## Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC025N65Y4-R	SC025N65Y4	TO-247-4L	Tube	N/A	N/A	30pcs

## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	650	V
Continuous drain current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	$I_D$	90 63	A
Pulsed drain current ( $T_C = 25^\circ\text{C}$ )	$I_{D\ pulse}$	269	A
Avalanche energy, single pulse ( $L=5\text{mH}$ )	$E_{AS}$	423	mJ
Gate-Source voltage,max.transient voltage	$V_{GSmax}$	-10/+22	V
Recommended operating values	$V_{GSsop}$	-5/+18	V
Power dissipation $T_C = 25^\circ\text{C}$	$P_{tot}$	238	W
Operating junction and storage temperature	$T_j, T_{stg}$	-55...+175	$^\circ\text{C}$
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.	$R_{thJC}$	-	-	0.6	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	$R_{thJA}$	-	-	50.0	°C/W	-

## Electrical Characteristic (at $T_j = 25\text{ °C}$ , unless otherwise specified)

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

## Static Characteristic

Drain-source breakdown voltage	$BV_{DSS}$	650	-	-	V	$V_{GS}=0V, I_D=100\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.2	-	4.2	V	$V_{DS}=V_{GS}, I_D=10mA$
Zero gate voltage drain current	$I_{DSS}$	-	-	10	$\mu A$	$V_{DS}=650V, V_{GS}=0V$ $T_j=25\text{ °C}$ $T_j=175\text{ °C}$
Gate-source leakage current	$I_{GSS}$	-	-	200	nA	$V_{GS}=22V, V_{DS}=0V$
		-	-	-100	nA	$V_{GS}=-10V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	20	25	mΩ	$V_{GS}=18V, I_D=40A$
Transconductance	$g_{fs}$	-	19	-	S	$V_{DS}=18V, I_D=20A$

## Dynamic Characteristic

Input Capacitance	$C_{iss}$	-	3059	-	pF	$V_{GS}=0V, V_{DS}=30V,$ $f=1MHz$
Output Capacitance	$C_{oss}$	-	559	-		
Reverse Transfer Capacitance	$C_{rss}$	-	11	-		
Gate Total Charge	$Q_G$	-	60	-	nC	$V_{DS}=400V, I_D=20A$ $, V_{GS}=-5/18V$
Gate-Source charge	$Q_{gs}$	-	23	-		
Gate-Drain charge	$Q_{gd}$	-	22	-		
Turn-on delay time	$t_{d(on)}$	-	15	-	ns	$V_{GS}=-5/18V,$ $V_{DD}=400V,$ $R_{G\_ext}=5\Omega, I_D=20A$
Rise time	$t_r$	-	45	-		
Turn-off delay time	$t_{d(off)}$	-	13	-		
Fall time	$t_f$	-	10	-		
Gate resistance	$R_G$	-	1.5	-	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	$V_{SD}$	-	2.8	5	V	$V_{GS}=0V, I_{SD}=20A$ $T_j=25^{\circ}C$ $T_j=175^{\circ}C$
Body Diode Continuous Forward Current	$I_S$	-	-	67	A	$T_C = 25^{\circ}C$
Body Diode Pulsed Current	$I_S$ pulse	-	-	269	A	$T_C = 25^{\circ}C$
Body Diode Reverse Recovery Time	$t_{rr}$	-	30	-	ns	$V_{GS}=-5V, I_{SD}=15A,$ $V_R=400V$
Body Diode Reverse Recovery Charge	$Q_{rr}$	-	120	-	nC	$di/dt=1200A/\mu s$

## Typical Performance Characteristics

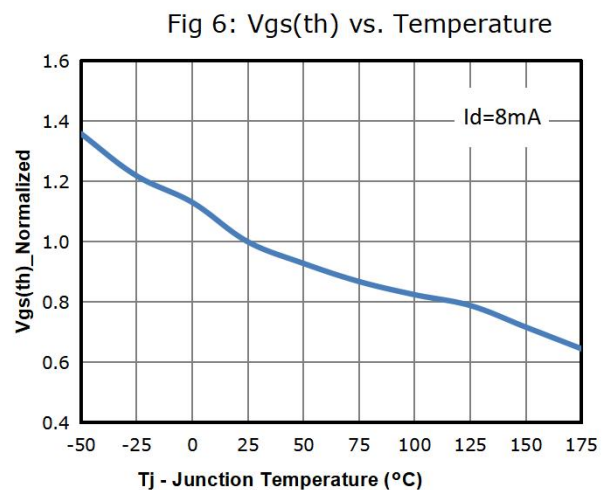
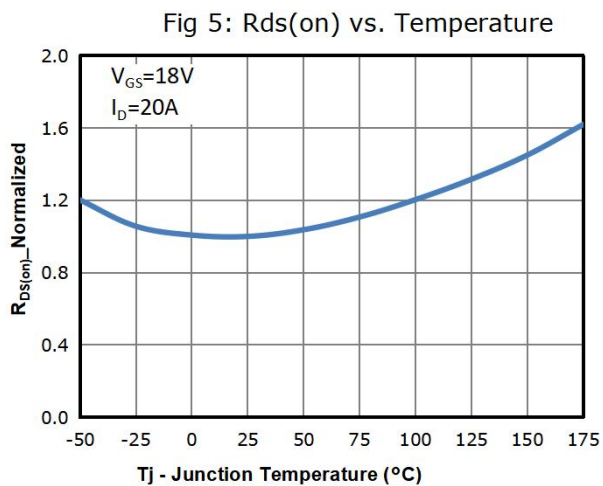
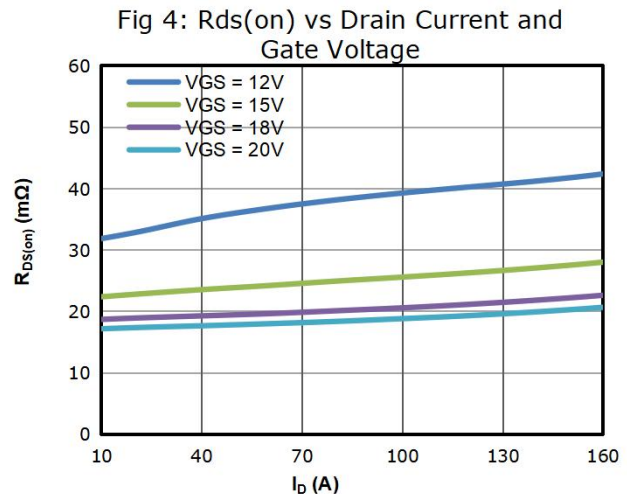
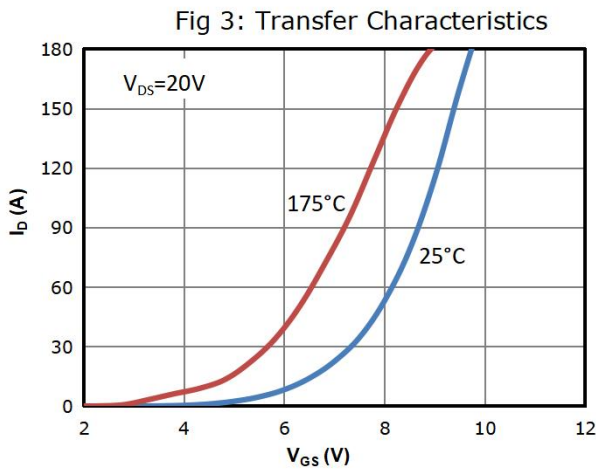
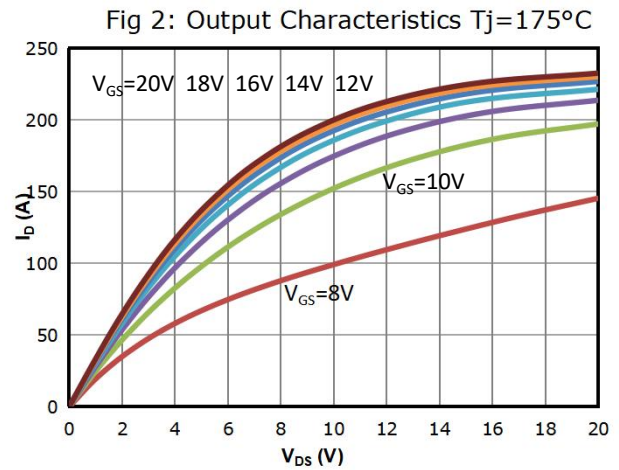
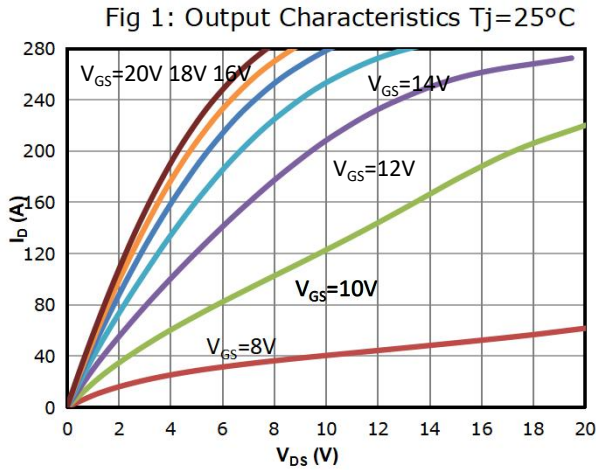


Fig 7: BVdss vs. Temperature

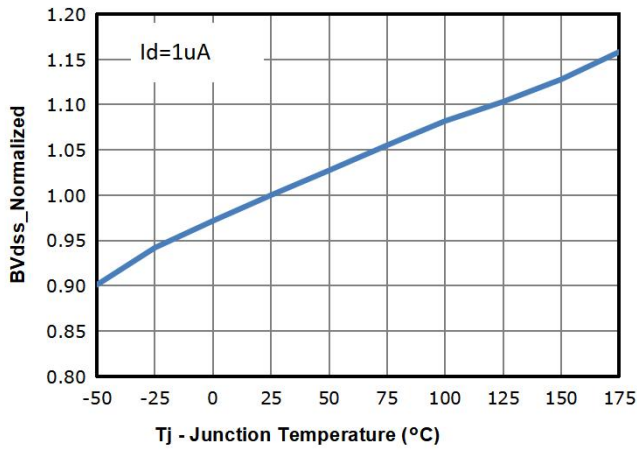


Fig 8: Capacitance Characteristics

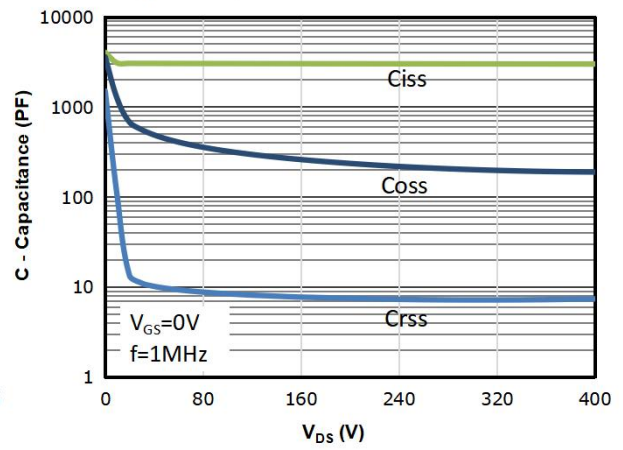


Fig 9: Gate Charge Characteristics

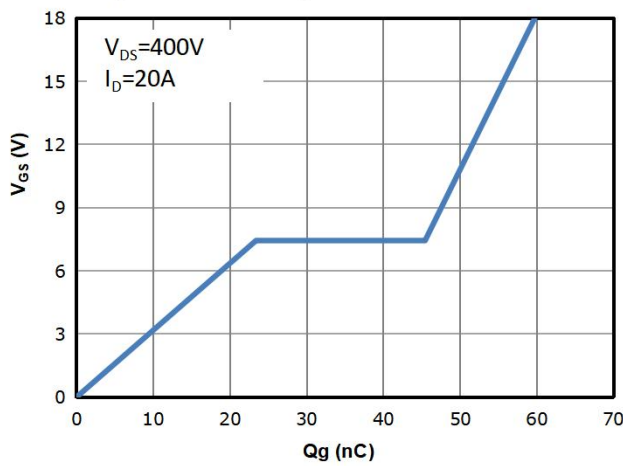


Fig 10: Body-diode Forward Characteristics

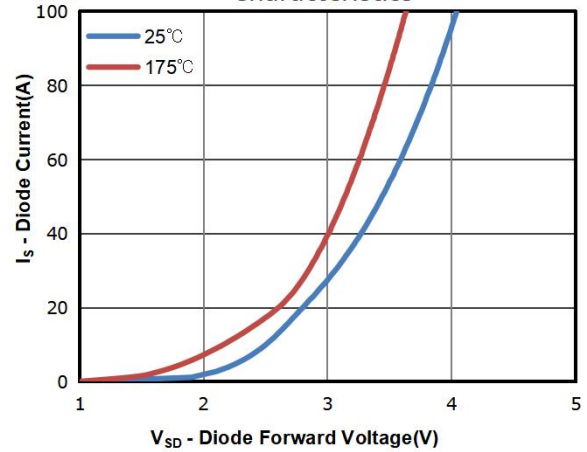


Fig 11: Power Dissipation

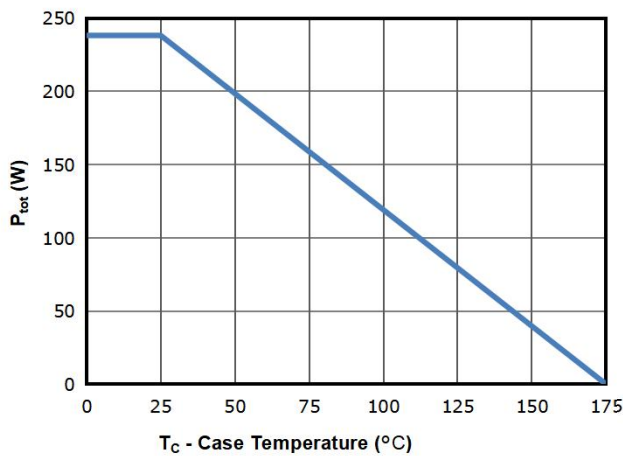


Fig 12: Drain Current Derating

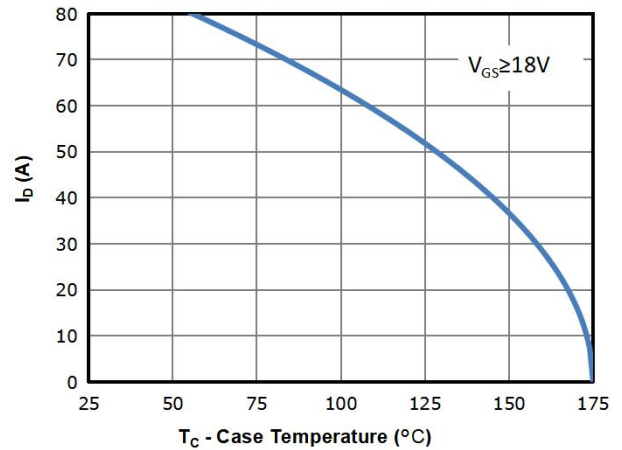


Fig 13: Safe Operating Area

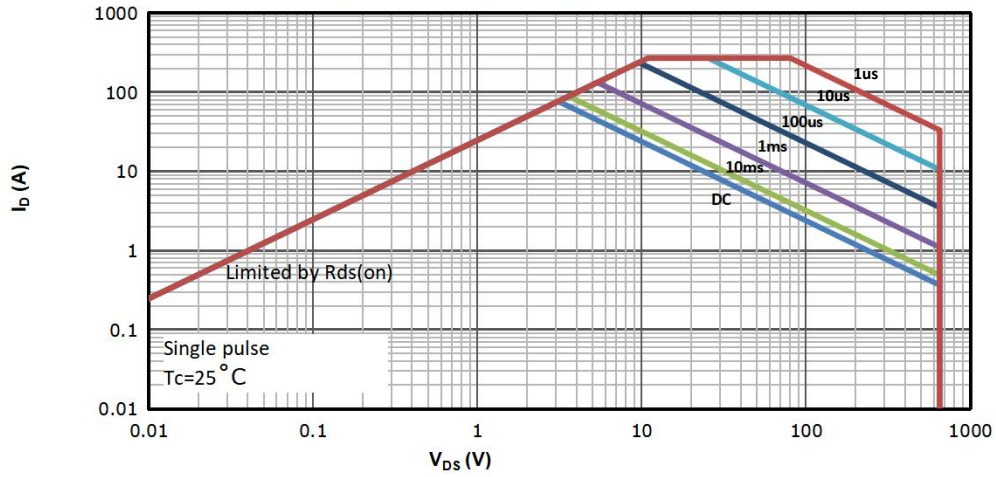
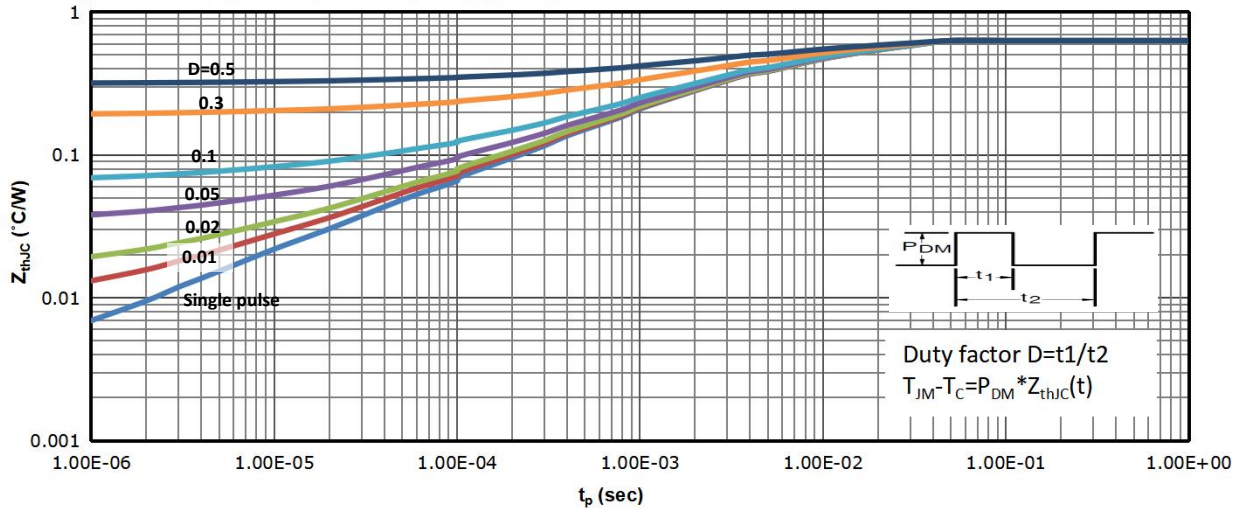
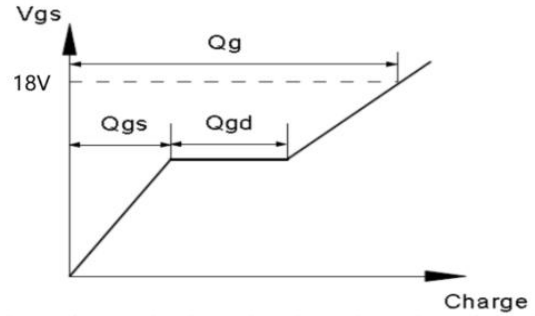
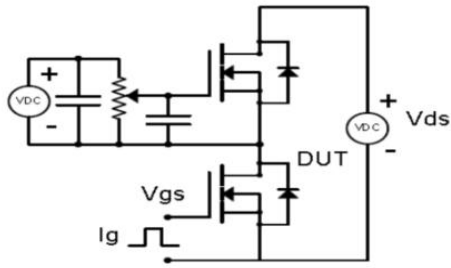


Fig 14: Max. Transient Thermal Impedance

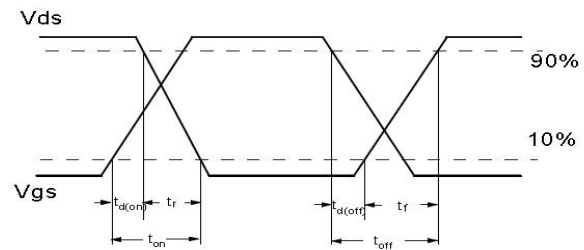
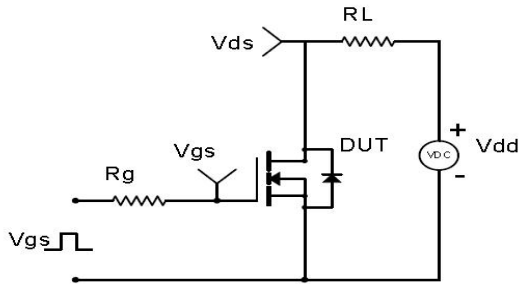


## Test Circuit & Waveform

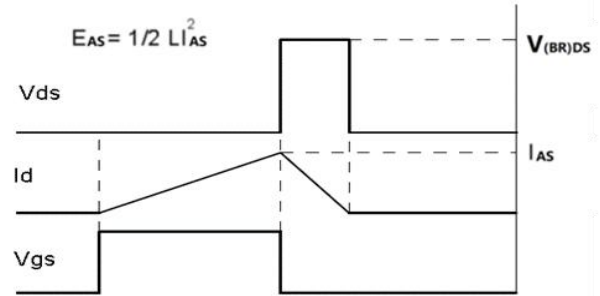
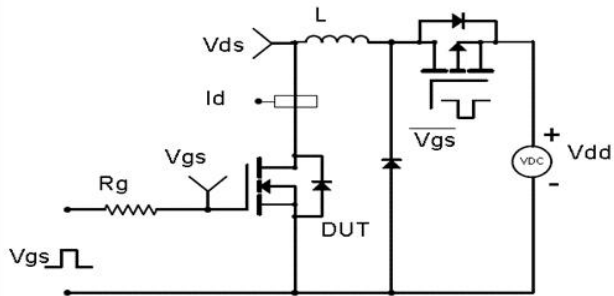
Gate Charge Test Circuit & Waveform



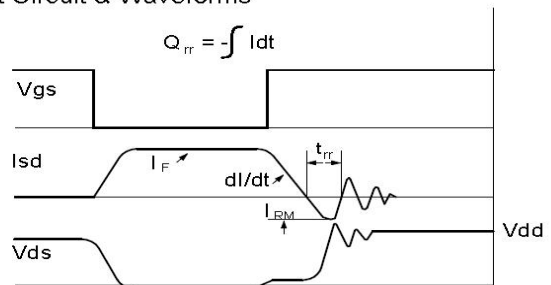
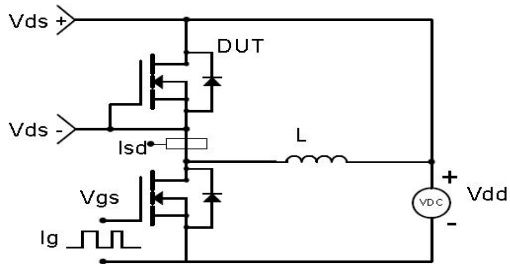
Resistive Switching Test Circuit & Waveforms



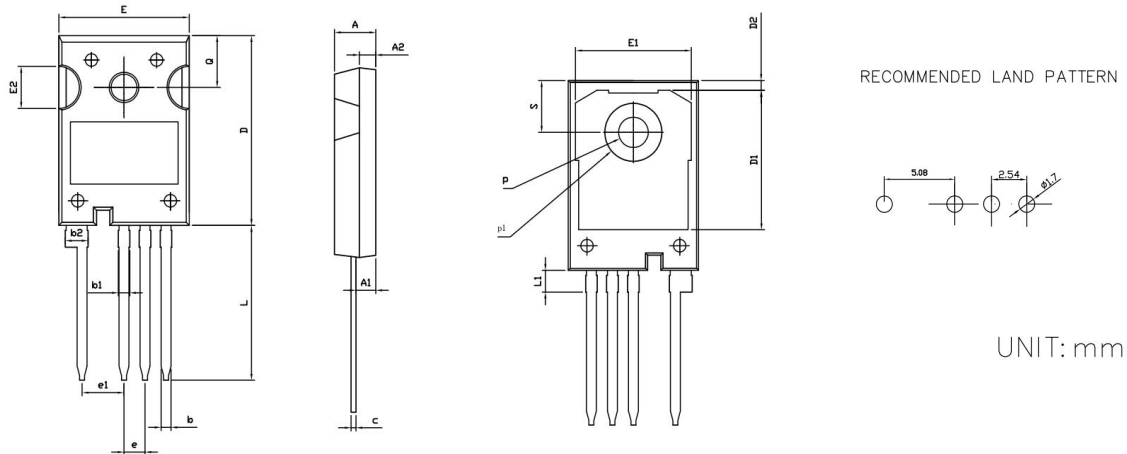
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



## Package Outline: TO-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

## Disclaimer

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

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