



ACTRON TECHNOLOGY CORP.

Features

- Best thermal conductivity and behavior
- High speed switching
- High robustness of dv/dt
- Low capacitances and low gate charge
- Low gate resistance for high-frequency switching
- Easy to parallel

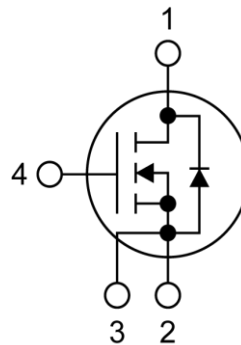
Outline (TO247-4L)



Applications

- Switching mode power supply
- PV inverter
- Uninterruptible Power Supply
- Motor Drives
- DC/DC converters
- EV charging

Circuit Diagram

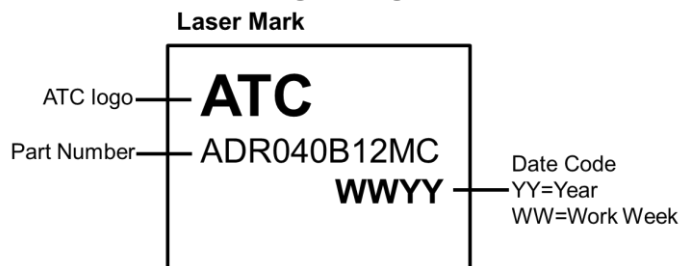


- 1: Drain
- 2: Power Source
- 3: Driver Source
- 4: Gate
- *1: Body Diode

Mechanical Characteristics

- TO247-4L package
- Halogen Free
- Pb free lead plating ; RoHS compliant
- Packaging: Tube

Marking Diagram



**Absolute Maximum Rating ($T_a = 25^\circ\text{C}$)**

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source voltage	1200	V
V_{GSS}	Gate-Source voltage (DC)	-4 to 20	V
I_D	Continuous Drain Current	55	A
T_j	Junction temperature	175	$^\circ\text{C}$
T_{STG}	Storage temperature	-55/+175	$^\circ\text{C}$
P_D	Power dissipation	288	W

Thermal characteristics

Parameter	Symbol	Condition	Typ.	Unit
Thermal resistance	θ_{jc}	Junction - Case	0.4	$^\circ\text{C} / \text{W}$

Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Condition
$V_{(BR)DSS}$	Drain-Source breakdown voltage	1200	-	-	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
I_{DSS}	Zero gate voltage drain current	-	2.8 5.6	30 -	μA	$V_{DS} = 1200\text{V}, V_{GS} = 0\text{V}, T_j = 25^\circ\text{C}$ $V_{DS} = 1200\text{V}, V_{GS} = 0\text{V}, T_j = 150^\circ\text{C}$
$R_{DS(on)}$	Drain-Source on-state resistance	-	40 65	52	$\text{m}\Omega$	$V_{GS} = 18\text{V}, I_D = 27.5\text{A}, T_j = 25^\circ\text{C}$ $V_{GS} = 18\text{V}, I_D = 27.5\text{A}, T_j = 125^\circ\text{C}$
$V_{GS(th)}$	Gate threshold voltage	2.0	-	3.0	V	$V_{DS} = 10\text{V}, I_D = 5\text{mA}$
I_{GSS+}	Gate-Source leakage current	-	-	100	nA	$V_{GD} = 20\text{V}, V_{DS} = 0\text{V}$
I_{GSS-}	Gate-Source leakage current	-	-	-100	nA	$V_{GD} = -4\text{V}, V_{DS} = 0\text{V}$
R_G	Gate resistance	-	4.0	-	Ω	$f = 1\text{MHz}, \text{open drain}$



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Electrical Characteristics ($T_a = 25\text{ }^\circ\text{C}$)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Condition
C_{iss}	Input capacitance	-	2600	-	pF	$V_{GS} = 0V,$ $V_{DS} = 800V,$ $f = 1MHz$
C_{oss}	Output capacitance	-	100	-	pF	
C_{riss}	Reverse capacitance	-	16	-	pF	
Q_g	Total gate charge	-	150	-	nC	$V_{DD} = 600V$ $I_D = 27.5A$ $V_{GS} = 18V$
Q_{gs}	Gate to source charge	-	23	-	nC	
Q_{gd}	Gate to drain charge	-	68	-	nC	

Body diode Electrical Characteristics ($T_a = 25\text{ }^\circ\text{C}$)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Condition
I_S	Body diode continuous, forward current	-	-	55	A	
V_{SD}	Diode forward voltage	-	4	-	V	$V_{GS} = 0V, I_S = 27.5A$



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Typical Output Characteristics (I)

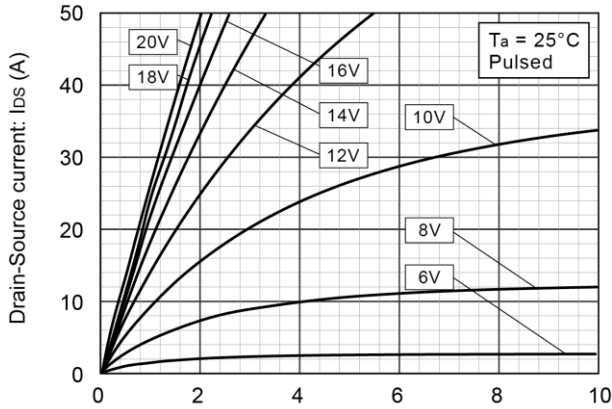


Figure1. Drain - Source Voltage: V_{DS} (V)

Typical Output Characteristics (II)

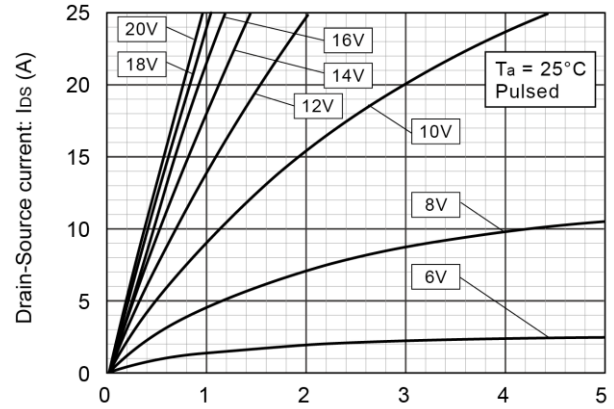


Figure2. Drain - Source Voltage: V_{DS} (V)

Typical Output Characteristics (III) $T_a = 150^\circ\text{C}$

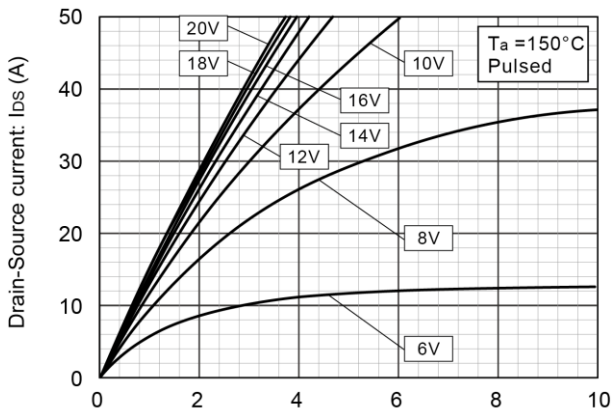


Figure3. Drain - Source Voltage: V_{DS} (V)

Typical Output Characteristics (IV) $T_a = 150^\circ\text{C}$

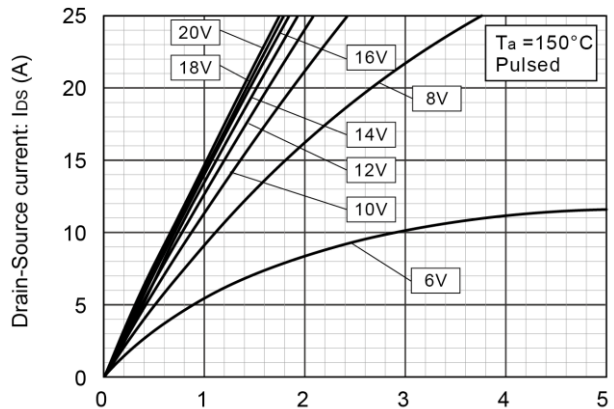


Figure4. Drain - Source Voltage: V_{DS} (V)

Typical Transfer Characteristics (I)

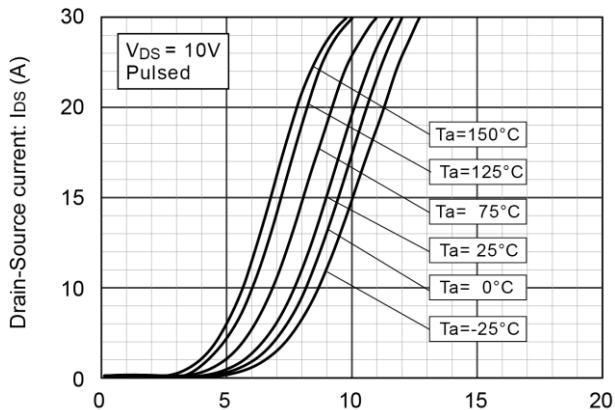


Figure5. Gate - Source Voltage: V_{GS} (V)

Typical Capacitance vs. Drain - Source Voltage

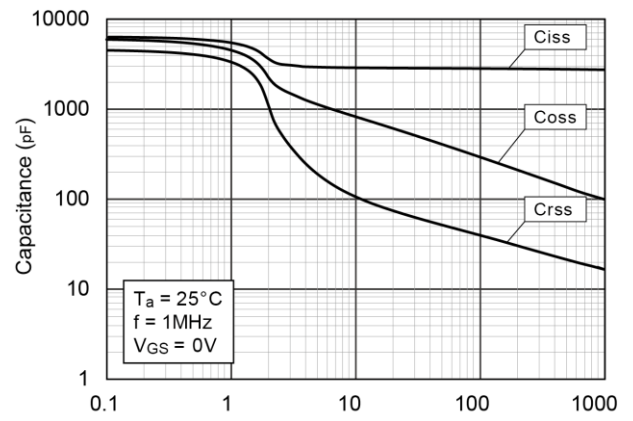


Figure6. Drain - Source Voltage: V_{DS} (V)



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Static Drain - Source On - State Resistance vs. Junction Temperature

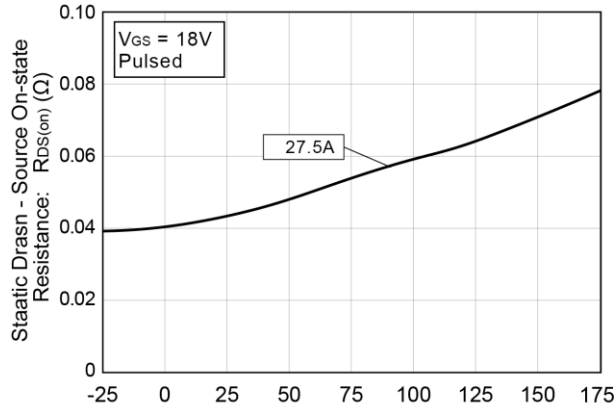


Figure7. Junction Temperature: T_j (°C)

Gate Threshold Voltage vs. Junction Temperature

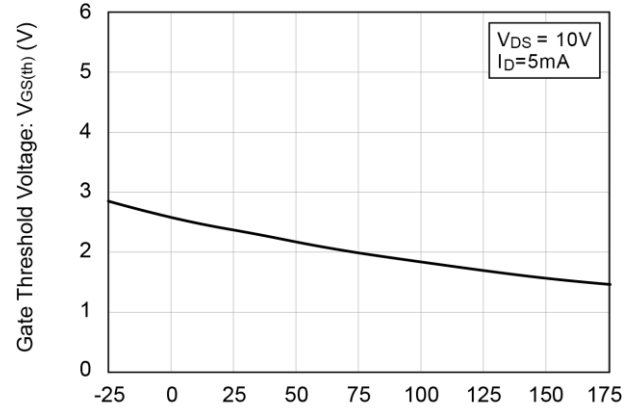
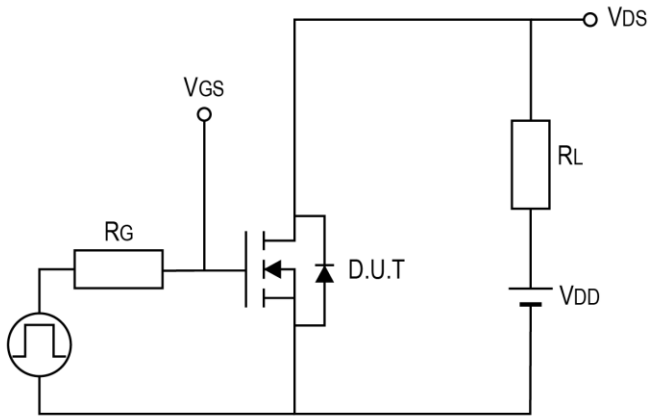


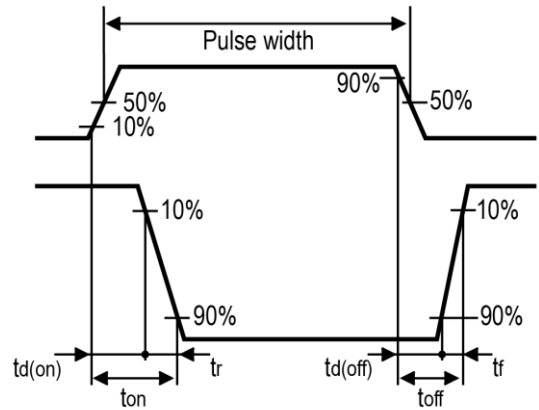
Figure8. Junction Temperature: T_j (°C)



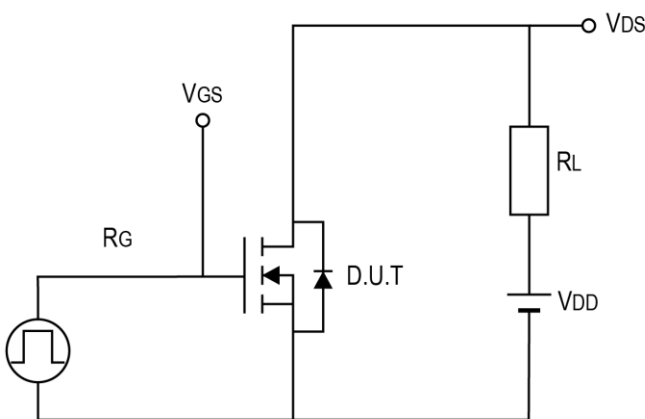
Switching Time Measurement Circuit



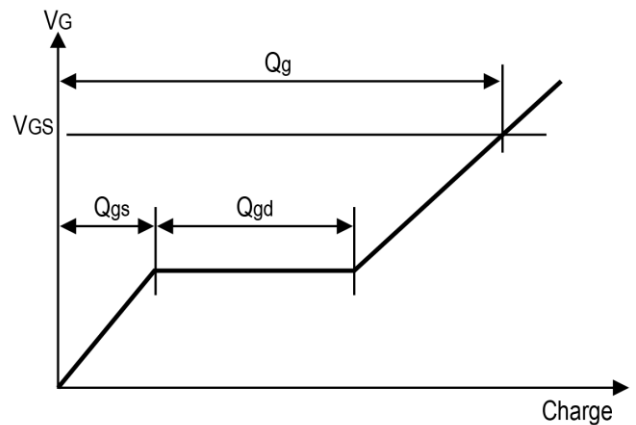
Switching Waveform



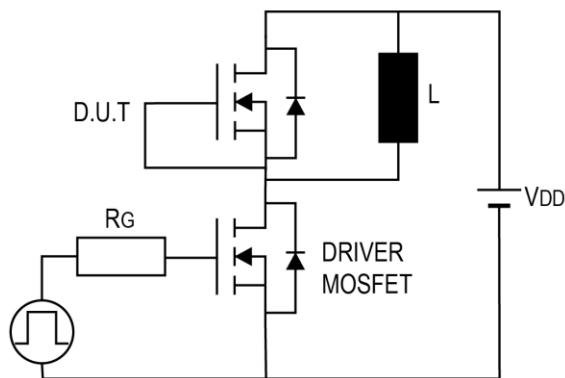
Gate Charge Measurement Circuit



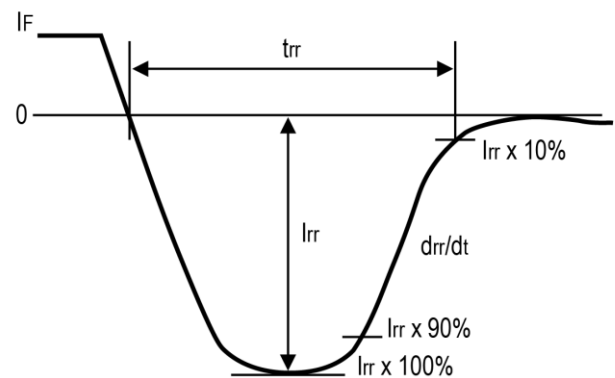
Gate Charge Waveform



Reverse Recovery Time Measurement Circuit



Reverse Recovery Time Waveform

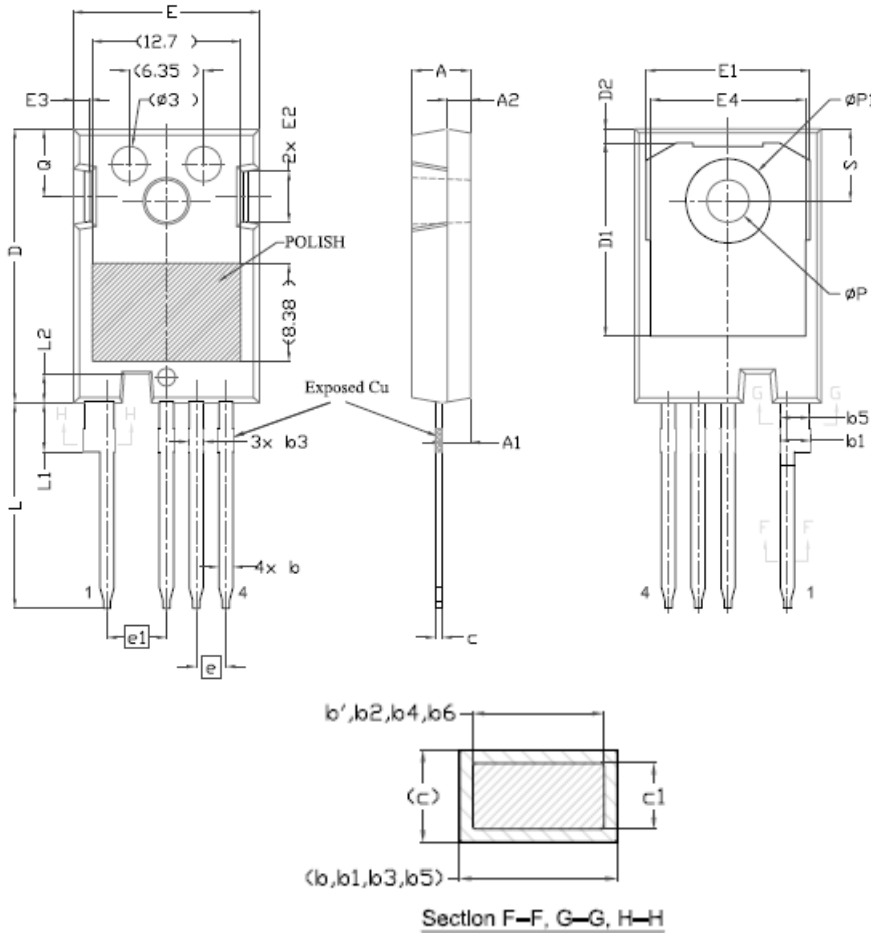




Package Outline

TO-247-4L

Unit : mm



SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	4,83	5,02	5,21
A1	2,29	2,41	2,54
A2	1,91	2,00	2,16
b'	1,07	1,20	1,28
b	1,07	1,20	1,33
b1	2,39	2,57	2,94
b2	2,39	2,57	2,84
b3	1,07	1,30	1,60
b4	1,07	1,30	1,50
b5	2,39	2,53	2,69
b6	2,39	2,53	2,64
c	0,55	0,60	0,68
c1	0,55	0,60	0,65
D	23,30	23,45	23,60
D1	16,25	16,55	17,65
D2	0,95	1,19	1,25
E	15,75	15,94	16,13
E1	13,10	14,02	14,15
E2	3,68	4,40	5,10
E3	1,00	1,45	1,90
E4	12,38	13,26	13,43
e	2,54 BSC		
e1	5,08 BSC		
L	17,31	17,57	17,82
L1	3,97	4,19	4,37
L2	2,35	2,50	2,65
ØP	3,51	3,51	3,65
ØP1	7,18 REF.		
Q	5,49	5,79	6,00
S	6,04	6,17	6,30