

1- Electrical Characteristics

➤ **Table 1 Absolute maximum ratings**

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-source voltage	650	V
V _{GSS}	Gate- source voltage	-20V ~ +20V	V
I _D	Drain current (continuous) at T _C = 25°C operation	52	A
	Drain current (continuous) at T _C = 100°C operation	33	A
I _{D,pulse}	Pulsed drain current (pulse width: 10μs)	195	A
P _D	Maximum power dissipation T _C =25°C	192	W
T _C	Operating temperature	Case	-55 to +150 °C
T _J		Junction	-55 to +150 °C
T _S	Storage temperature	-55 to +150	°C
T _{SOLD}	Soldering peak temperature ^b	260	°C
MSL	Moisture sensitivity level	MSL3	

- a. In off-state, spike duty cycle D<0.01, spike duration <1μs
b. For 10 sec., 1.6mm from the case

➤ **Table 2 Thermal Characteristics**

Symbol	Parameter	Value	Unit
R _{θJA}	Thermal resistance junction-ambient	55	°C/W
R _{θJC}	Thermal resistance junction-case	0.65	°C/W

Table 3 Electrical Characteristics ($T_{CASE} = 25\text{ }^{\circ}\text{C}$ unless otherwise stated)

Symbol	Parameter	Conditions	Values			Unit
			min.	typ.	max.	
$V_{(BL)DSS}$	Drain-source voltage	$V_{GS}=0V$	650	-	-	V
$V_{GS(th)}$	Gate threshold voltage	$V_{GS}=V_{DS}, I_D=1mA$	2.0	3.0	4.0	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS}=10V, I_D=20A, T_J=25^{\circ}\text{C}$	-	34	42	mΩ
		$V_{GS}=10V, I_D=20A, T_J=150^{\circ}\text{C}$	-	64	-	
I_{DSS}	Drain-source leakage current	$V_{GS}=0V, V_{DS}=650V, T_J=25^{\circ}\text{C}$	-	3.5	70	μA
		$V_{GS}=0V, V_{DS}=650V, T_J=150^{\circ}\text{C}$	-	17.5	-	
I_{GSS}	Gate-to-source forward leakage current	$V_{GS}=20V$	-	-	400	nA
	Gate-to-source reverse leakage current	$V_{GS}=-20V$	-	-	-400	
C_{ISS}	Input capacitance	$V_{GS}=0V, V_{DS}=400V, f=1MHz$	-	1490	-	pF
C_{OSS}	Output capacitance		-	96	-	
C_{RSS}	Reverse transfer capacitance		-	4.7	-	
Q_G	Gate charge	$V_{GS}=0\sim 10V, V_{DS}=400V, I_{DS}=20A$	-	23.5	-	nC
Q_{GS}	Gate-source charge		-	5.8	-	
Q_{GD}	Gate-drain charge		-	5.3	-	
Q_{OSS}	Output charge	$V_{GS}=0V, V_{DS}=0\sim 400V$	-	147	-	
$t_{D(on)}$	Turn-on delay time	$V_{DS}=400V, V_{GS}=0\text{ to }10V, I_{DS}=20A, R_G=25\Omega$	-	24.5	-	ns
$t_{D(off)}$	Turn-off delay time		-	53	-	
Q_{RR}	Reverse recovery charge	$I_S=20A, V_{DS}=400V$	-	18	-	nC

2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

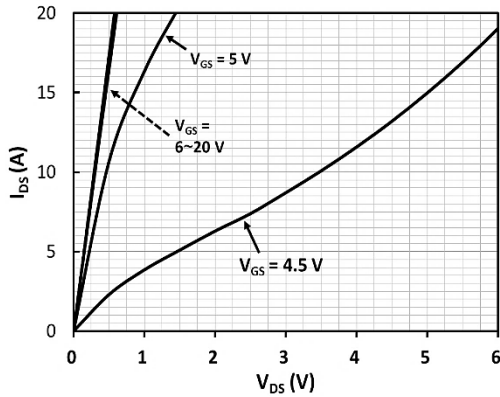


Fig 2. On-Resistance vs Drain Current and Temperature

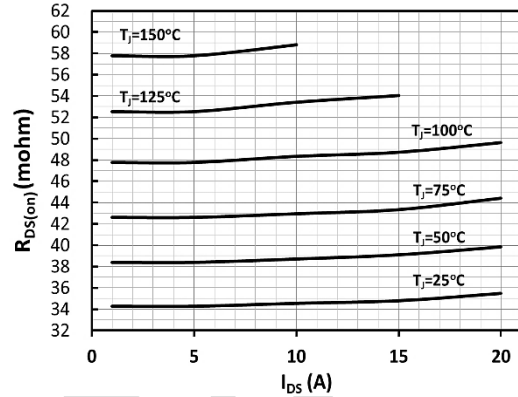


Fig 3. On-Resistance with Drain Current

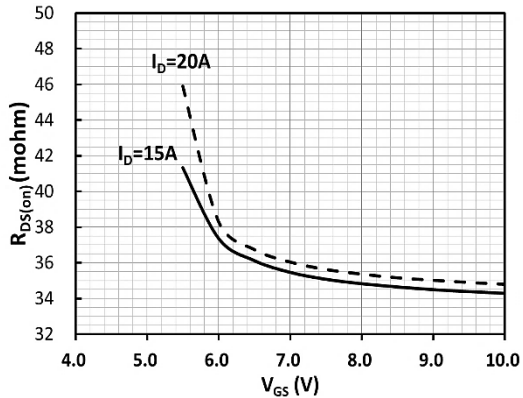


Fig 4. On-Resistance Variation with Temperature

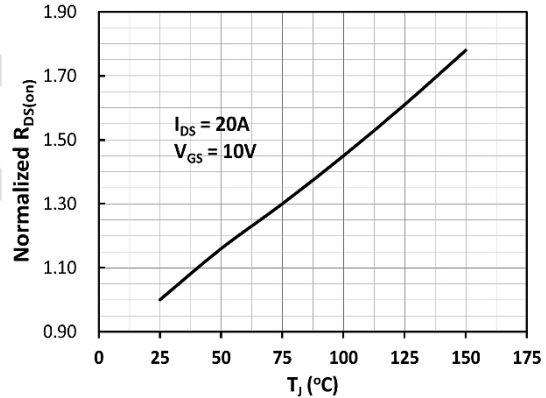


Fig 5. Threshold Voltage with Temperature

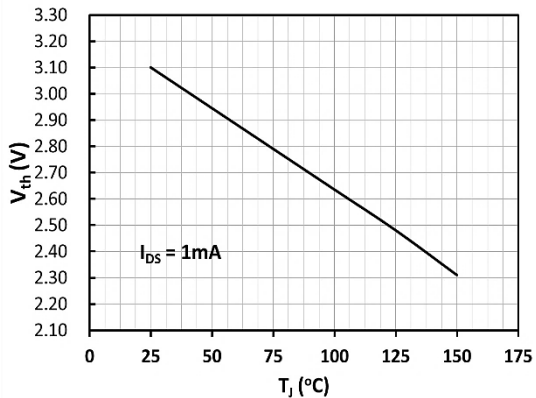


Fig 6. Capacitance Characteristics

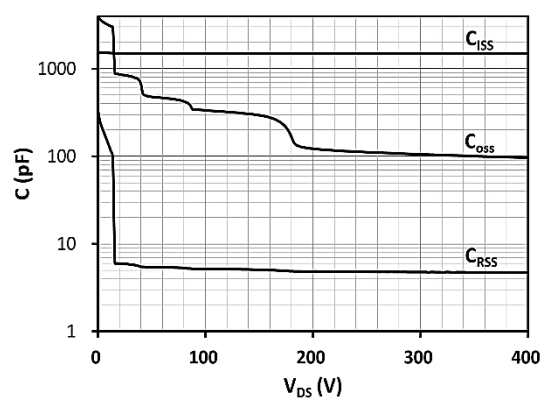


Fig 7. Gate Charge Characteristics, Qg

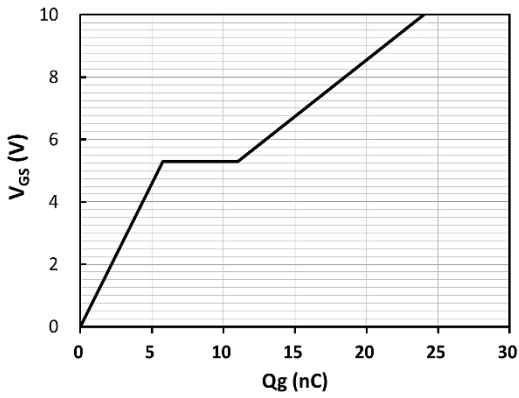


Fig 8. Capacitance Characteristics, Qoss

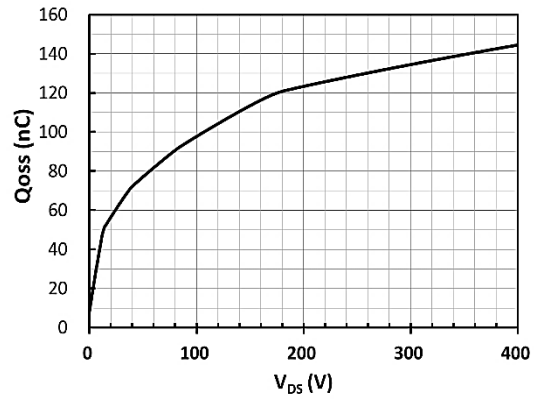
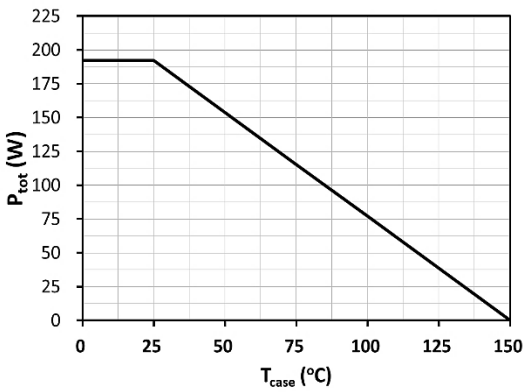
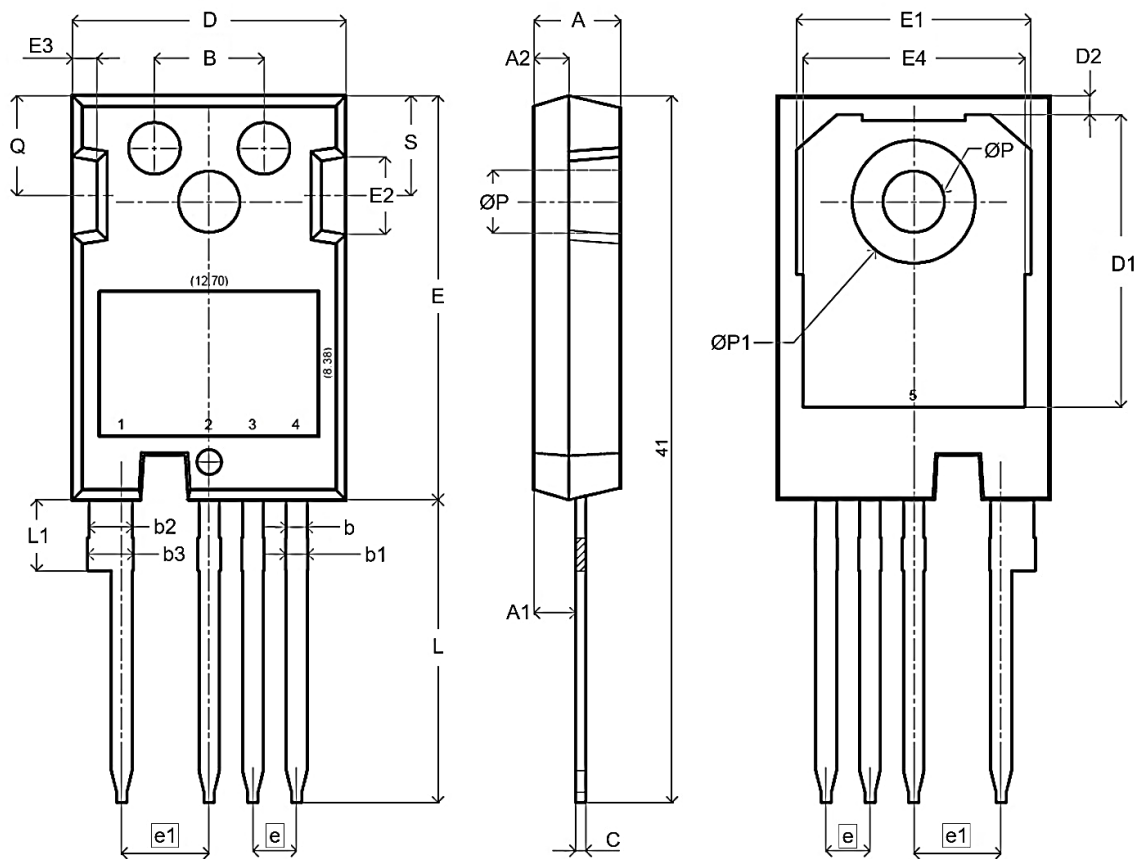


Fig 9. Source-drain diode forward characteristics



3- Package Outline Dimensions, GR-TO-247-4L

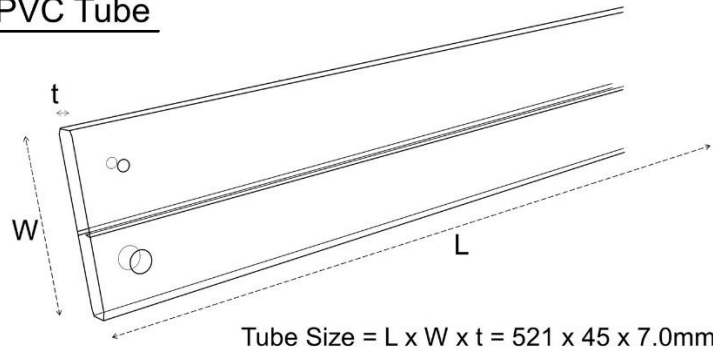


➤ **Table 4 Dimension of GR-TO-247-4L**

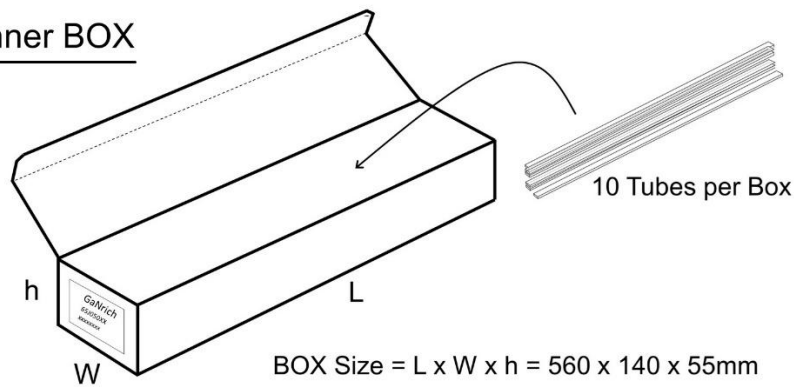
SYMBOL	DIMENSION (IN MM)			SYMBOL	DIMENSION (IN MM)		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	4.80	5.02	5.24	E	23.20	23.45	23.70
A1	2.20	2.40	2.60	E1	13.10	13.60	14.10
A2	1.90	2.00	2.10	E2	4.30	4.50	4.70
B	6.10	6.35	6.60	E3	1.20	1.45	1.70
b	1.00	1.20	1.40	E4	12.5	12.9	13.3
b1	1.10	1.30	1.50	e	2.54 BSC		
b2	2.40	2.50	2.60	e1	5.08 BSC		
b3	2.50	2.65	2.80	L	40.5	40.95	41.4
C	0.50	0.60	0.70	L1	19.7	19.95	20.2
D	15.70	15.90	16.10	ØP	3.40	3.60	3.80
D1	16.25	16.95	17.65	ØP1	7.00	7.20	7.40
D2	0.95	1.10	1.25	S	6.00	6.15	6.30
-	-	-	-	Q	5.50	5.75	6.00

4- Tube Package Information

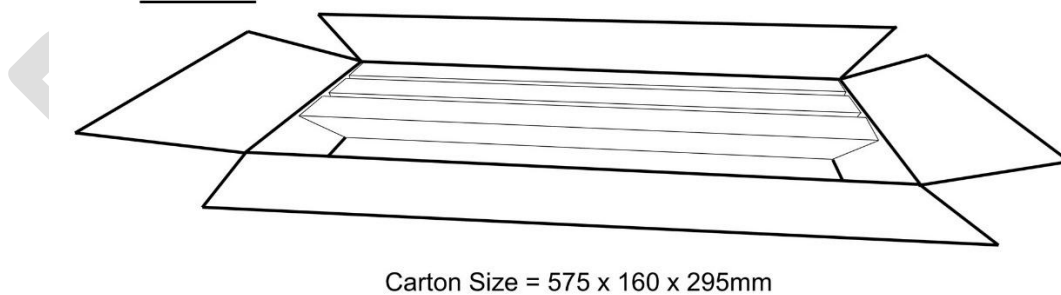
TO-247-3L, TO-247-4L
PVC Tube



Inner BOX



Carton



Package Type	Tube	Inner Box	Carton
TO-247-3L TO-247-4L	30 EA	300 EA	1500 EA
-	-	X10 Tube	X5 Box

5- Change Log

Version	Date	Description
01	Nov 28, 2023	Initial version
02	March 27, 2025	Electrical characteristics, Curve and Package information revised
03	April 16, 2026	Electrical characteristics revised

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