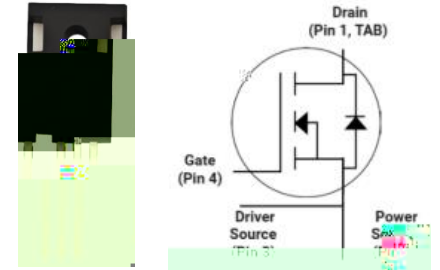


## N Channel Enhancement

- High speed switching
- Very low switching losses
- Fully controllable dv/dt
- High blocking voltage with low on-resistance
- Fast intrinsic diode with low reverse recovery ( $Q_{rr}$ )
- Temperature independent turn-off switching losses
- Halogen free, RoHS compliant



TO-247-4L

- Cooling effort reduction
- Efficiency improvement
- Reduced cooling requirements
- Increased power density
- Increased system switching frequency



- On-board charger/PFC
- EV battery chargers
- Booster/DC-DC converter
- Switch mode power supplies

		( $T_C = 25^\circ\text{C}$ , $R_{th(j-c),max}$ )	( $V_{GS} = 18\text{V}$ , $I_D = 49\text{A}$ , $T_J = 25^\circ\text{C}$ )			
SG2M023120UJ	1200V	97A	23m	175	SG2M023120UJ	TO-247-4L



(Tc = 25°C unless otherwise specified)

$V_{DS,max}$	Drain source voltage	1200	V	$V_{GS} = 0V, I_D = 100\mu A$	
$V_{GS,max}$	Gate source voltage	8 / +22	V	Absolute maximum values	Note 1
$V_{GS,pulse}$	Gate-source voltage,max. transient voltage	-10 / +25	V	$t_p = 0.5\mu s, D = 0.01$	
$V_{GSop}$	Gate source voltage	-4 / +18	V	Recommended operational values	
$I_D$	Continuous drain current	97	A	$V_{GS} = 18V, T_C = 25^\circ C$	Fig.19
		68		$V_{GS} = 18V, T_C = 100^\circ C$	
$I_D(pulse)$	Pulsed drain current	266	A	Pulse width $t_p = 100\mu s$ limited by $T_{J,max}$	Fig.22
$P_D$	Power dissipation	395	W	$T_C = 25^\circ C, T_J = 175^\circ C$	Fig.20
$T_{J,Stg}$	Operating Junction and storage temperature	-55 to +175	°C		
$T_L$	Soldering temperature	260	°C	1.6mm (0.063") from case for 10s	
$T_M$	Mounting torque	1	Nm	M3 or 6-32 screw	
		8.8	lbf-in		

01 226

Λ

$Q_{gs}$	Gate source charge	-	28	-	nC	$V_{DS} = 800V, V_{GS} = -4/+18V$ $I_D = 49A$	Fig.12
$Q_{gd}$	Gate drain charge	-	26	-			
$Q_g$	Gate charge	-	95	-			

( $T_c = 25^\circ C$  unless otherwise specified)

e/ X 00 6 B

$\lambda$

\*  $D\lambda$

g i n g

8



Figure 1. Output characteristics  $T_J = -55\text{ }^\circ\text{C}$

Figure 2. Output characteristics  $T_J = 25\text{ }^\circ\text{C}$

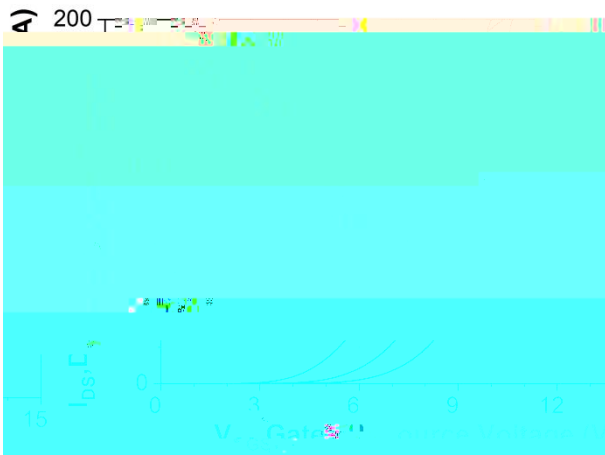


Figure 7. Transfer characteristic for various junction temperatures

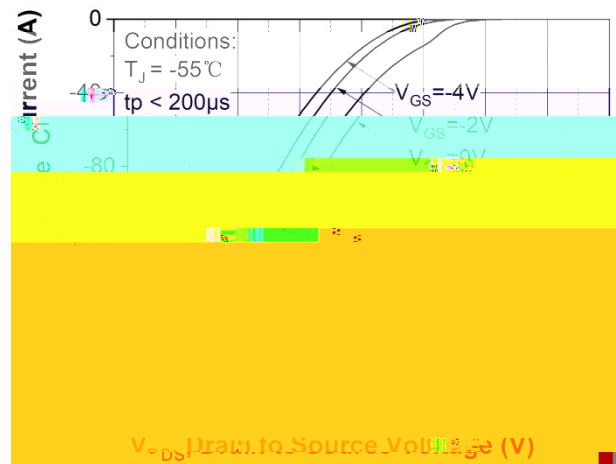


Figure 8. Body diode characteristic at  $T_j = -55\text{ }^\circ\text{C}$

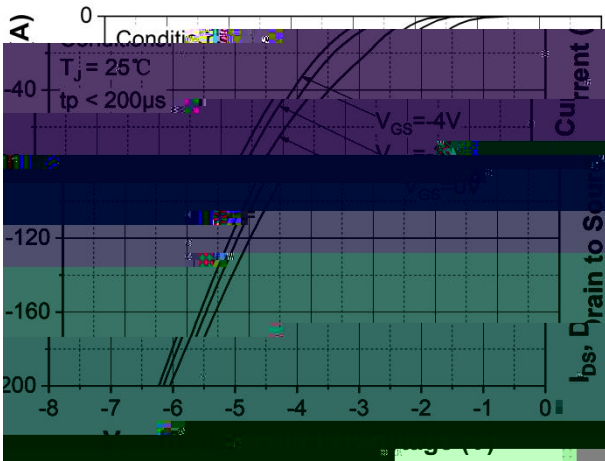


Figure 9. Body diode characteristic at  $T_j = 25\text{ }^\circ\text{C}$

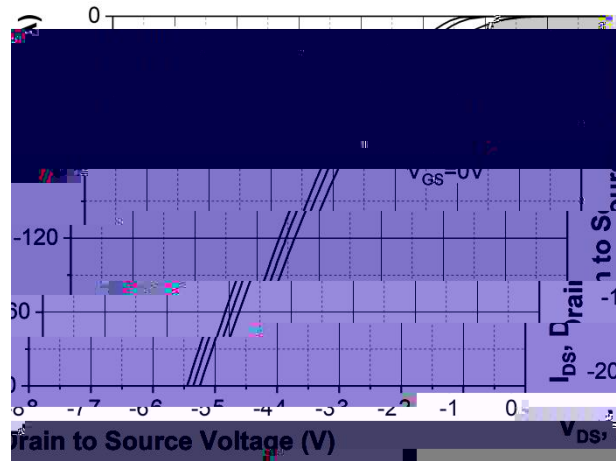


Figure 10. Body diode characteristic at  $T_j = 175\text{ }^\circ\text{C}$

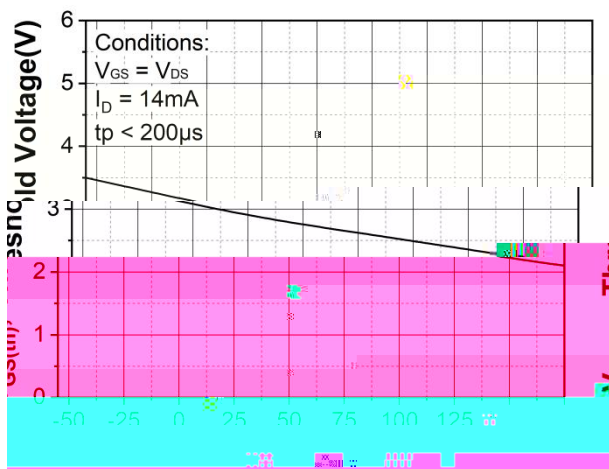


Figure 11. Threshold voltage vs. temperature

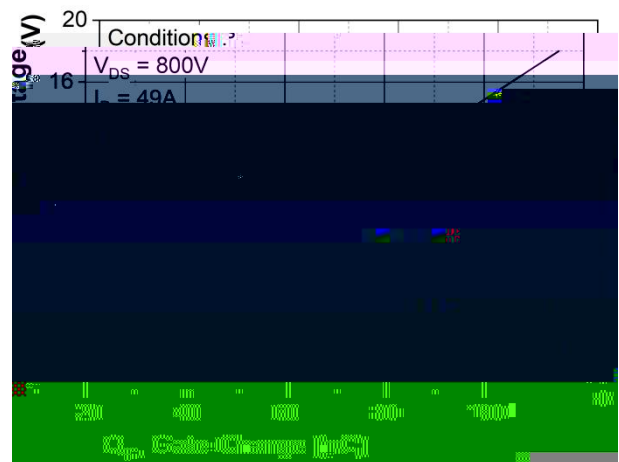


Figure 12. Gate charge characteristic

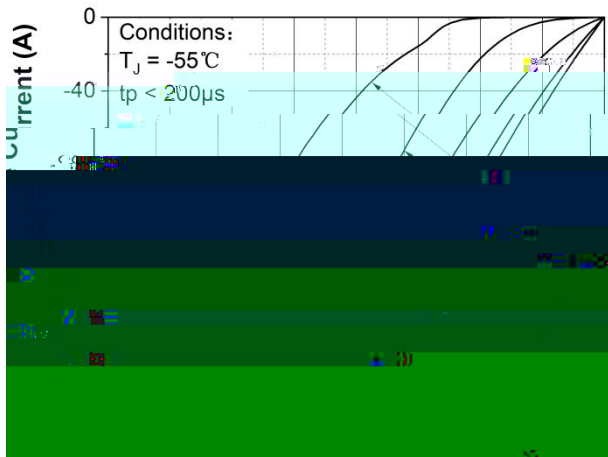


Figure 13. 3rd quadrant characteristic at  $T_J = -55\text{ }^\circ\text{C}$

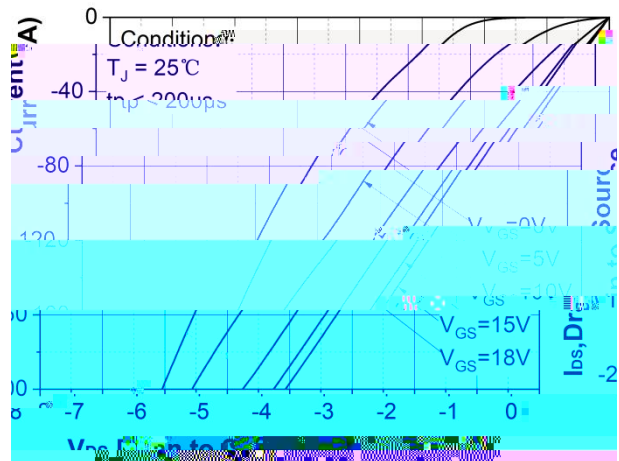


Figure 14. 3rd quadrant characteristic at  $T_J = 25\text{ }^\circ\text{C}$

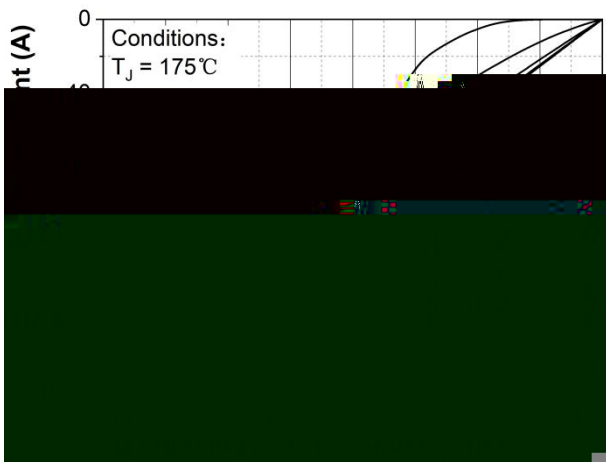


Figure 15. 3rd quadrant characteristic at  $T_J = 175\text{ }^\circ\text{C}$

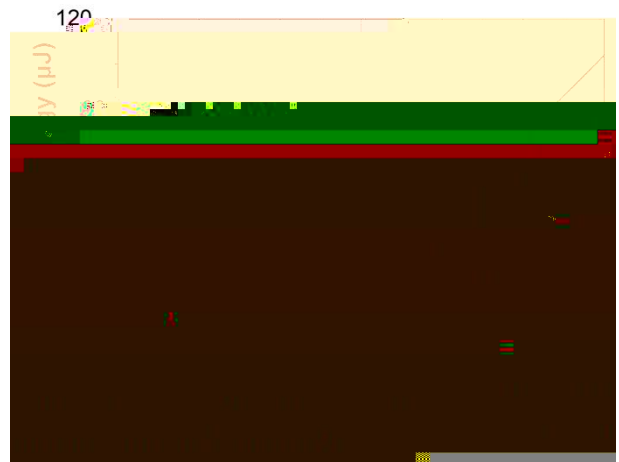


Figure 16. Output capacitor stored energy

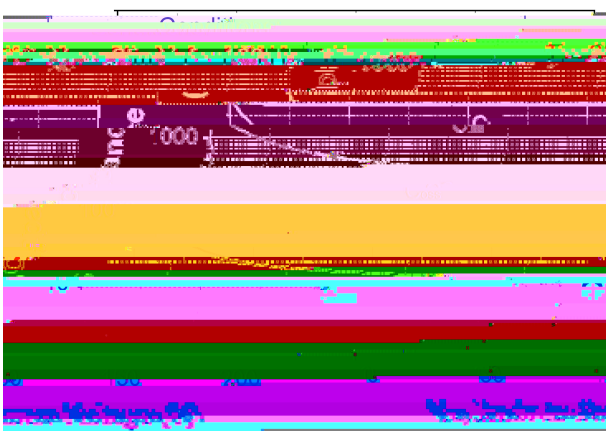


Figure 17. Capacitances vs. drain-source voltage (0 - 200V)

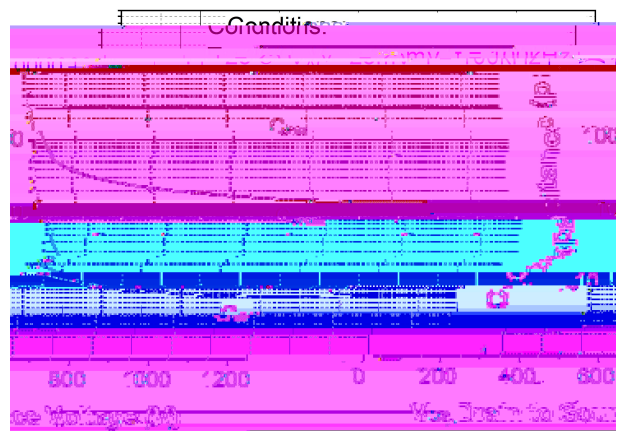


Figure 18. Capacitances vs. drain-source voltage (0 - 1200V)

Figure 19. Continuous drain current derating vs.  
case temperature

Figure 20. Maximum power dissipation derating vs.  
case temperature

Figure 23. Clamped Inductive switching energy vs.  
drain current ( $V_{DD} = 600V$ )

Figure 24. ~

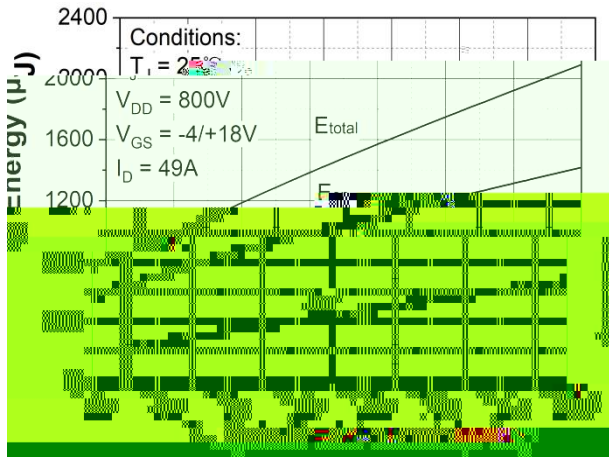


Figure 25. Clamped inductive switching energy vs.  $R_G(\text{ext})$

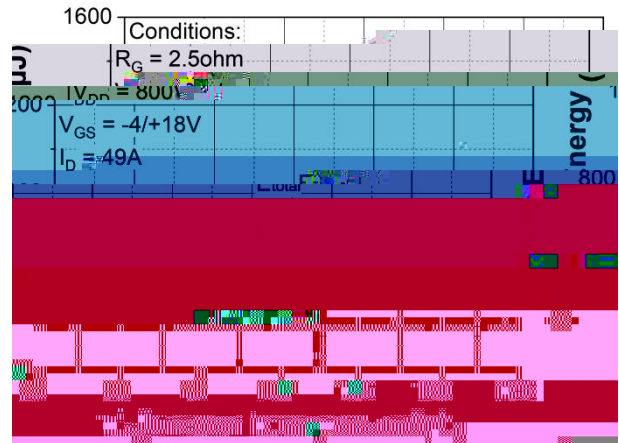


Figure 26. Clamped inductive switching energy vs. temperature

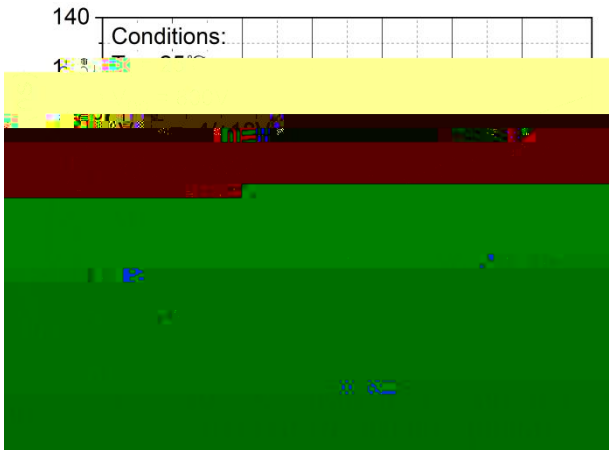


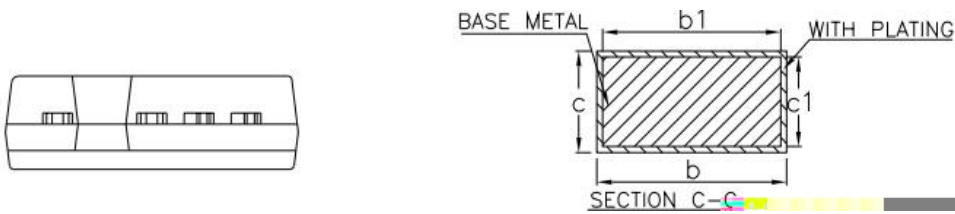
Figure 27. Switching times vs.  $R_G(\text{ext})$

( TO-247-4L-D )



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	4.90	5.00	5.10
A1	2.51	2.41	2.51
A2	1.90	2.00	2.10
b	1.16	-	1.29
b1	1.15	1.29	1.25
b2	1.16	-	1.29
c	0.58	-	0.66
c1	0.58	0.60	0.62
D	22.30	22.40	22.50
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
D3	24.97	25.12	25.27
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	4.95	5.08	5.18
e1	2.44	2.54	2.64
H	9.20	9.30	9.40
H1	2.48	2.58	2.68
H2	0.90	1.00	1.10
H3	3.82	3.92	4.02
K	0	-	0.20
L	18.40	18.52	18.70
L1	1.60	1.70	1.80



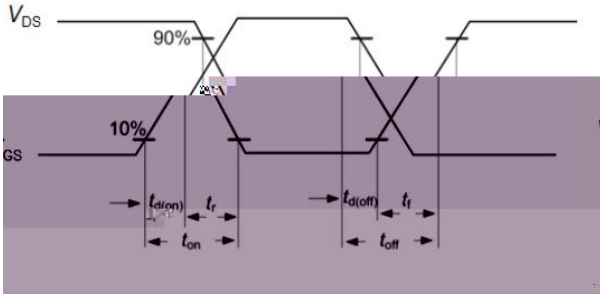


Figure A. Definition of switching times

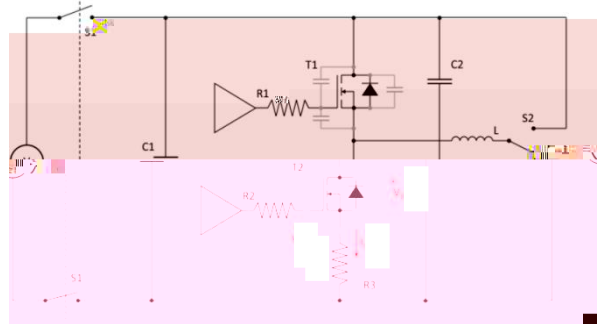


Figure B. Dynamic test circuit

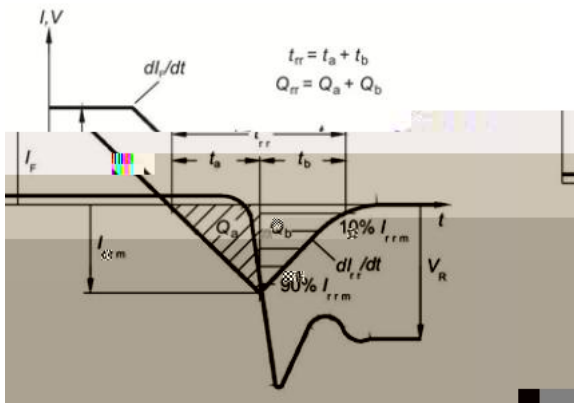


Figure C. Definition of body diode switching characteristics



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8. For use of our products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a Sichain representatives, for example but not limited to: transportation equipment, primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, and power transmission systems.