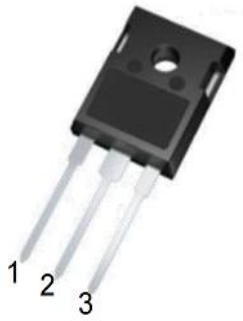
SC059N120J3

1200V 43A N-CHANNEL POWER MOSFET

1.Features

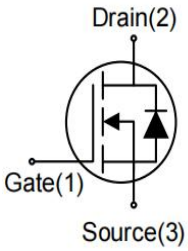
- V_{DS} 1200V
- I_D 43A
- $R_{DS(ON)}$ 59 mΩ

TO-247-3



2.Mechanical Data

- Case:Molded Plastic,TO-247-3;
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Plated Leads Solderable per MIL-STD-750,Method-2026.
- Marking: marked on body.
- Mounting Position : Any.



3.Maximum Ratings and Electrical Characteristics

Rating at 25℃ Cambient temperature unless otherwise specified

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	1200	V
Drain Current Continuous	T_C=25°C	I_D	43	A
	T_C=100°C		31	
PeakDrain Current		I_{DM}	105	A
Gate-Source Voltage		V_{GSmax}	-8/+22	V
Recommend Gate-Source Voltage		V_{GSop}	-4/+18	V
Power Dissipation	T_C=25°C	P_{tot}	234	W
	T_C=100°C		117	
Maximum Junction Temperature		T_J	-40~175	°C
Storage Temperature Range		T_{stg}	-40~175	°C
Thermal Resistance from Junction to Case		$R_{th(j-c)}$	0.64	°C/W

Characteristics		Symbol	Test conditions	Min	TYP	Max	Unit
Static Characteristics							
Drain -Source Breakdown Voltage		BV_{DSS}	V_{GS}= 0V,I_D=0.1mA	1200	-	-	V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}= 1200V,V_{GS}= 0V	-	1	-	uA
Gate-Source Leakage Current		I_{GSS}	V_{GS}= 0V,V_{DS}=18V	-	-	250	nA
Gate Threshold Voltage	T_j=25°C	$V_{GS\ (th)}$	V_{GS}= V_{DS}, I_D=5mA	2.0	2.80	4.0	V
	T_j=150°C			-	2.20	-	
	T_j=175°C			-	2.1	-	
Drain-Source On-State Resistance	T_j=25°C	$R_{DS(on)}$	V_{GS}=15V, I_D=20A	-	72	-	mΩ
	T_j=175°C			-	95	-	
	T_j=25°C		V_{GS}=15V, I_D=20A	-	59	-	
	T_j=150°C			-	81	-	
	T_j=175°C			-	90	-	
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS} =1000V V_{GS}=0V f = 1MHz	-	2415	-	pF
Output Capacitance		C_{oss}		-	79	-	
Reverse Transfer Capacitance		C_{rss}		-	6	-	
Total Gate Charge		Q_g	V_{DS}=800V, V_{GS}=-4/18V I_D=20A	-	103	-	nc
Gate-Source Charge		Q_{gs}		-	29	-	
Gate-Drain Charge		Q_{gd}		-	36	-	
Internal Gate Resistance		$R_{G(int)}$	f=1MHz	-	0.98	-	Ω
Switching Characteristics							
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=800V, V_{GS}=-4V/18V I_D=20A ,R_G =0Ω	-	16	-	ns
Turn-on Rise Time		t_r		-	17	-	
Turn-off Delay Time		$t_{d(off)}$		-	22	-	
Turn-off Fail Time		t_f		-	9	-	
Turn-On Energy		E_{on}		-	230	-	uJ
Turn-Off Energy		E_{off}		-	27	-	
Drain-Source Diode Characteristics							
Diode Forward Voltage	T_j=25°C	V_{SD}	V_{GS}=-4V, I_{SD}=20A	-	4.6	-	V
	T_j=175°C			-	4.2	-	
Continuous Diode Forward Current	T_j=25°C	I_S	V_{GS}=-4V	-	43	-	A
	T_j=100°C			-	23	-	
Reverse Recovery Time		T_{rr}	V_{GS}=-4V, I_{SD}=20A, V_R=800V, di/dt=5476A/μs	-	8	-	ns
Reverse Recovery Charge		Q_{rr}		-	94	-	nC
Peak reverse recovery current		I_{rrm}		-	18	-	A

4.Rating And Characteristic Curves

Fig.1 Output Characteristics Tj=-40°C

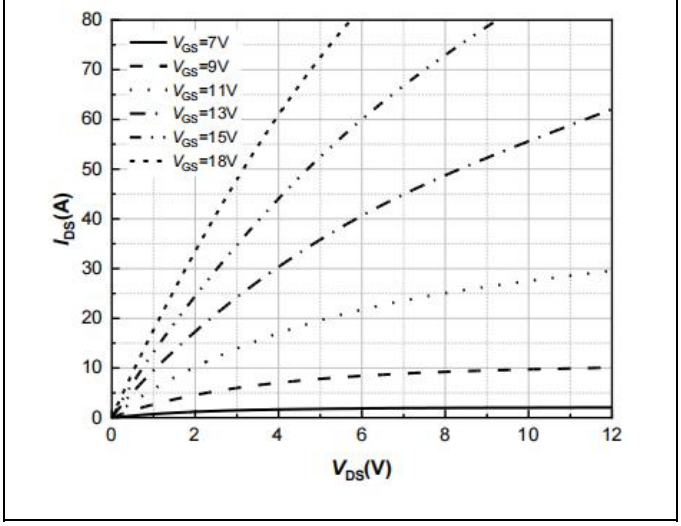


Fig.2 Output Characteristics Tj=25°C

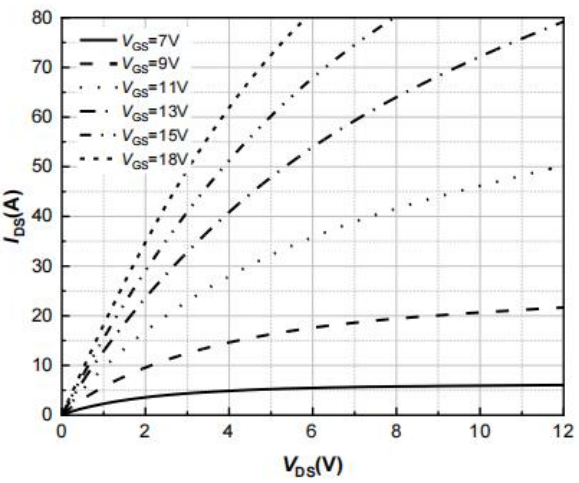


Fig.3 Output Characteristics Tj=175°C

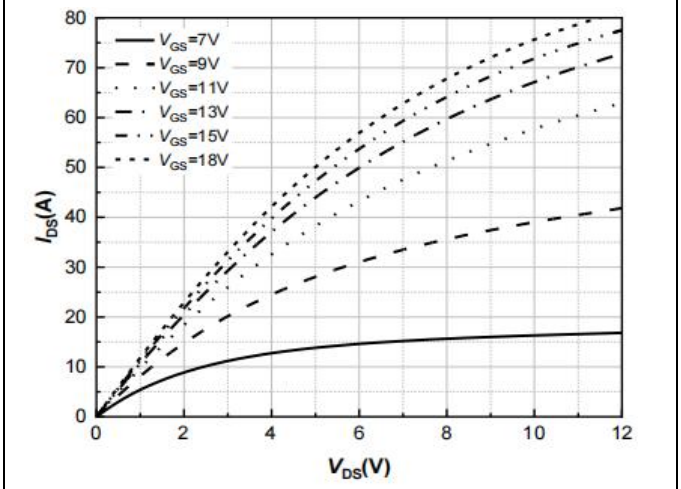


Fig.4 Normalized $R_{DS(on)}$ DS vs.Temperature

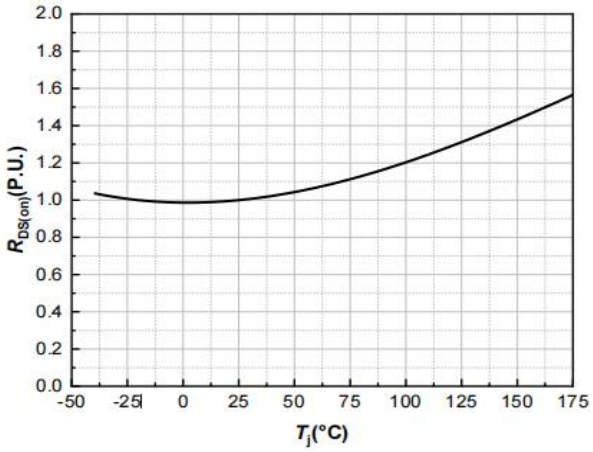


Fig.5 $R_{DS(on)}$VS I_{DS}(A)

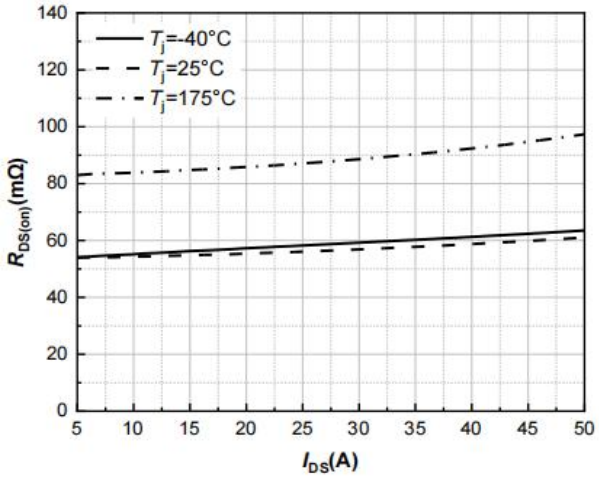


Fig.6 $R_{DS(on)}$ VS T_j(°C)

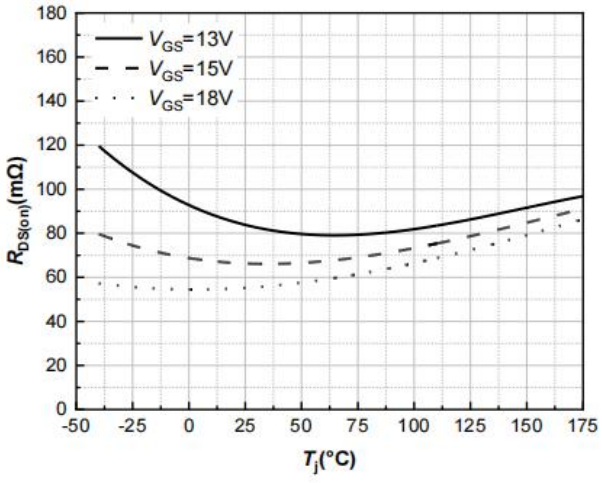


Fig.7 $I_{DS\,(A)}$ vs V_{GS} V_{DS}=20V

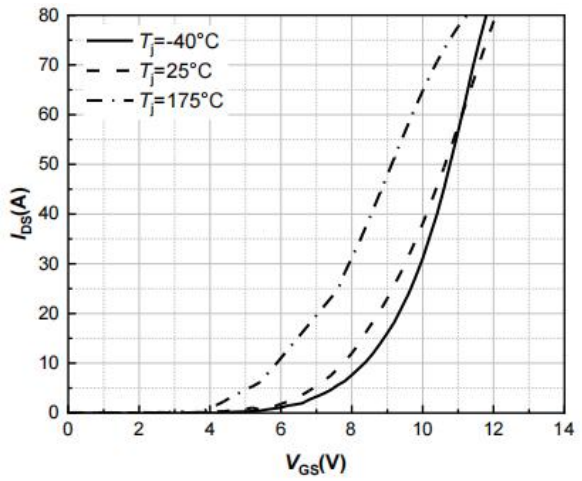


Fig.8 Body Diode Characteristic Tj=-40°C

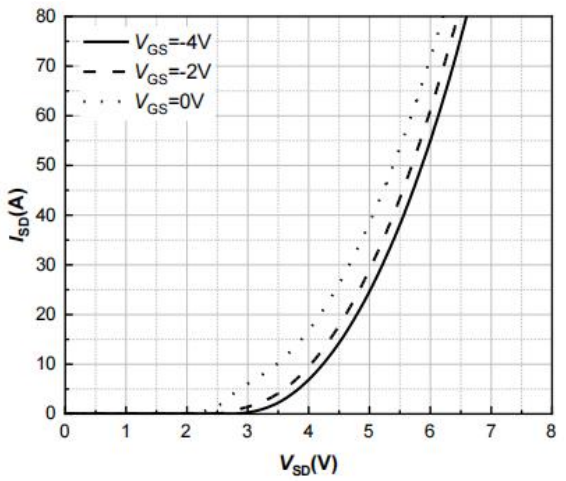


Fig.9 Body Diode Characteristic Tj=25°C

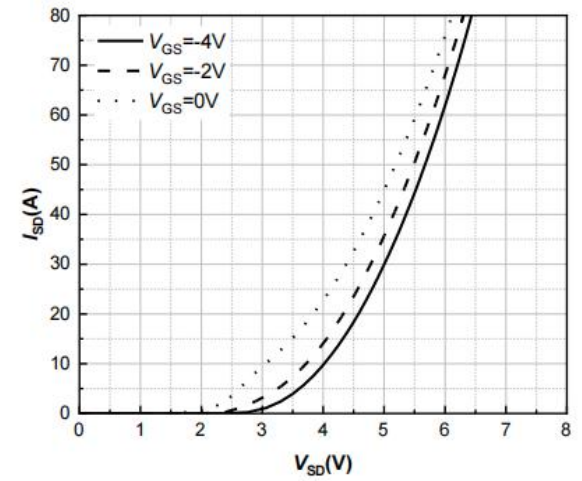


Fig.10 Body Diode Characteristic Tj=175°C

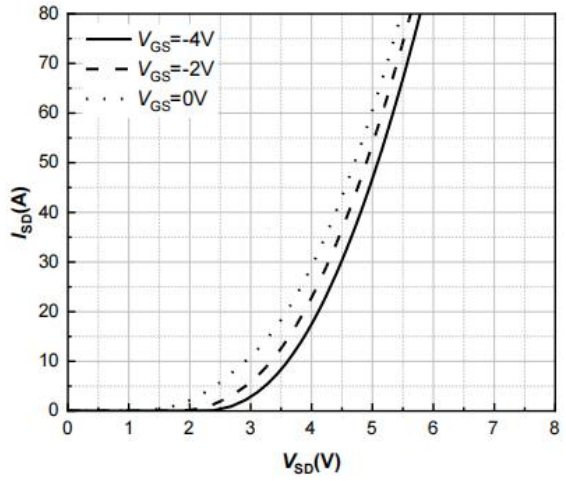


Fig.11 Threshold Voltage vs. Temperature

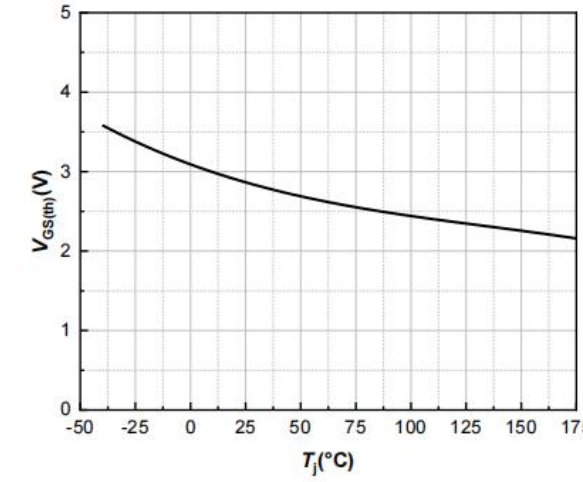


Fig.12 Gate Charge Characteristics

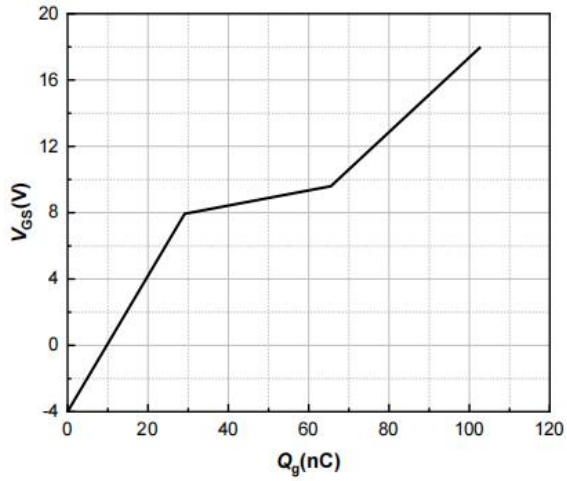


Fig.13 3rd Quadrant Characteristic Tj=-40°C

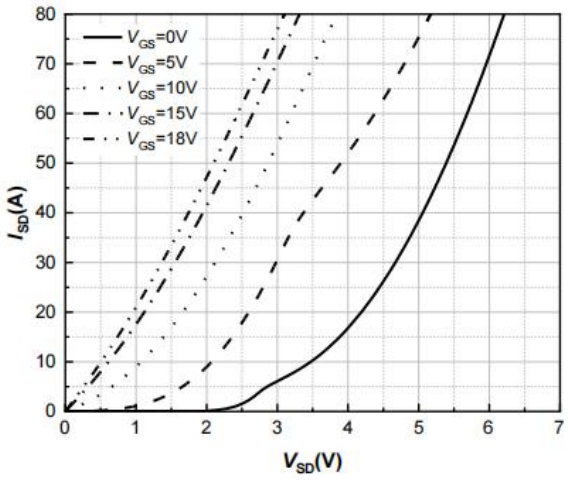


Fig.14. 3rd Quadrant Characteristic Tj=25°C

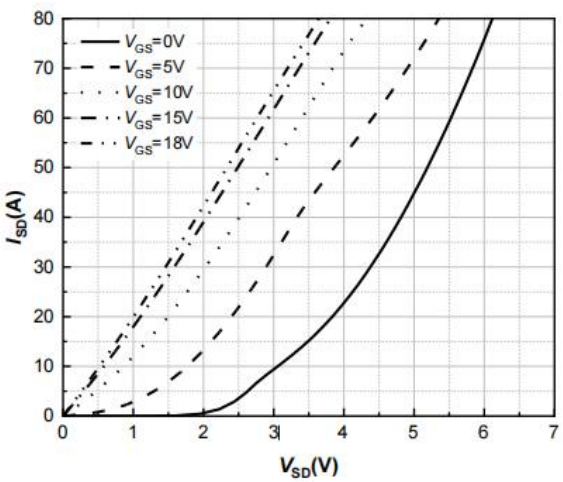


Fig.15 3rd Quadrant Characteristic Tj=175°C

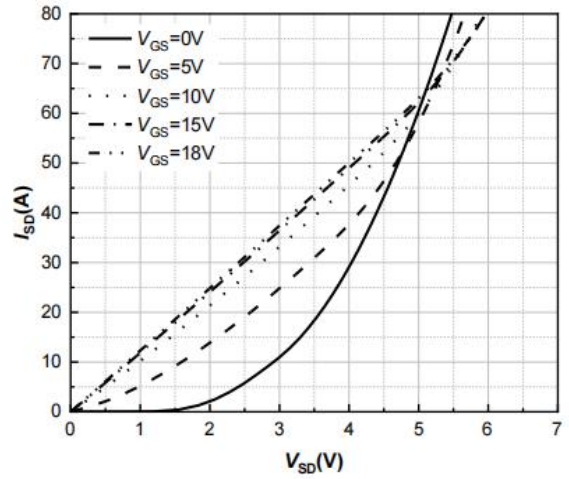


Fig.16 Output Capacitor Stored Energy

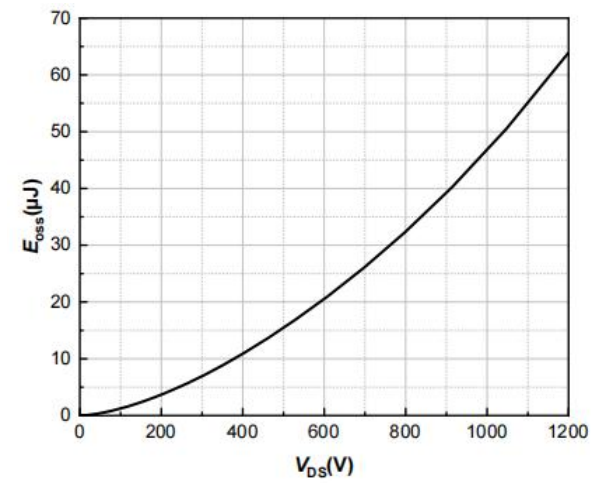


Fig.17 Capacitances vs. Drain-Source

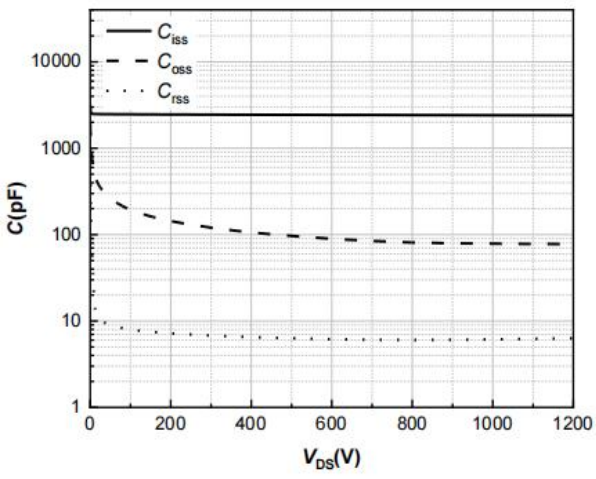


Fig.18 I_{DS}(A) vs. T_c(°C)

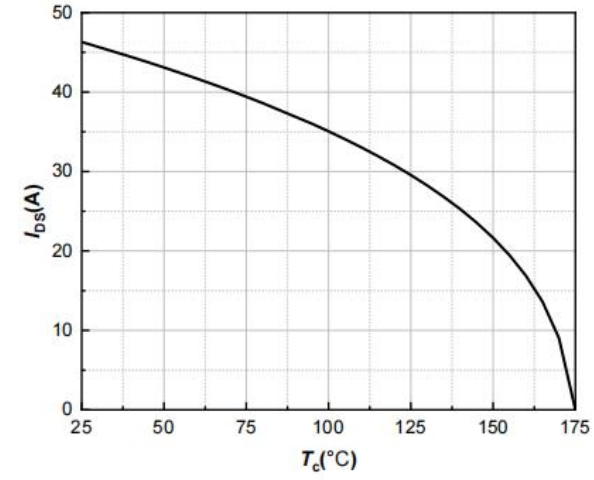


Fig.19 P_{tot} t vs Tc(°C)

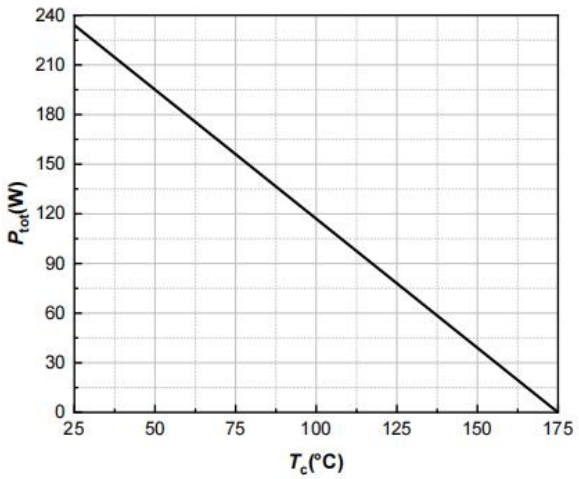


Fig.20 Transient Thermal Impedance

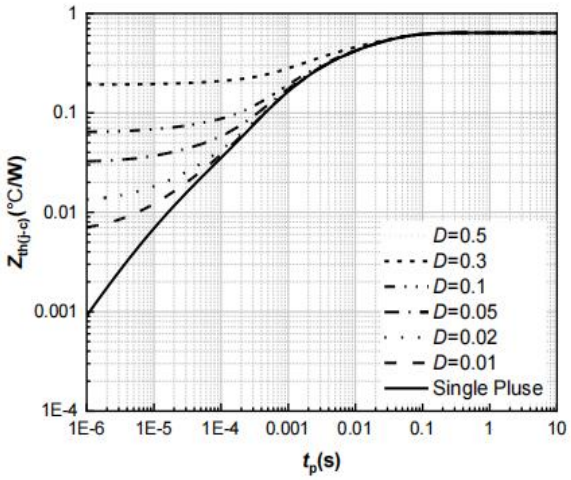


Fig.21 Clamped Inductive Switching Energy vs. Drain Current

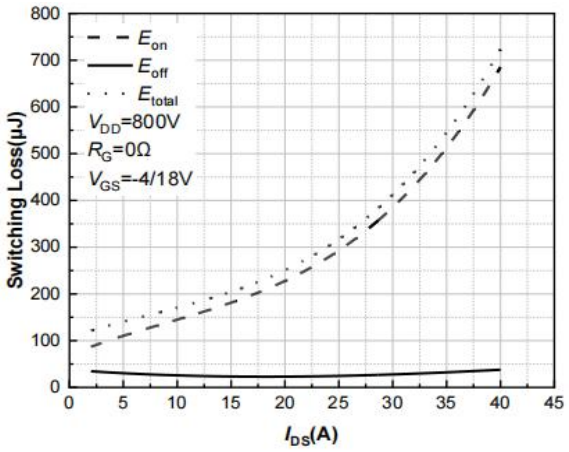


Fig.22 Clamped Inductive Switching Energy vs. RG

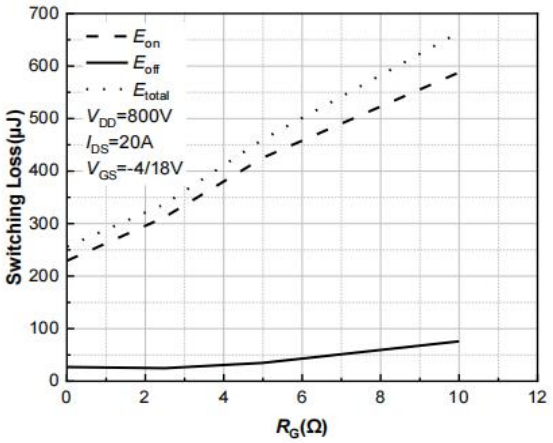


Fig.23 Switching Times vs. R_G

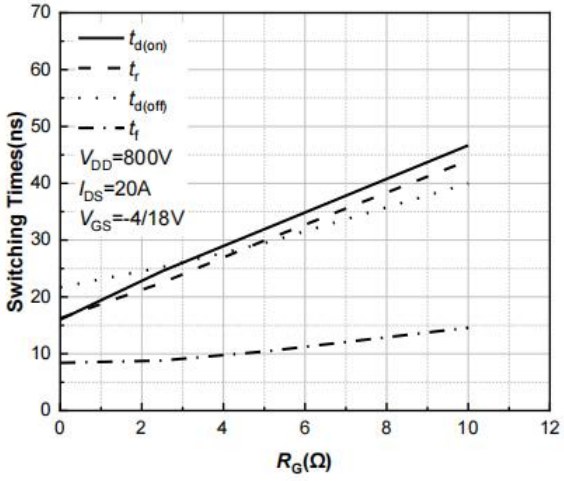
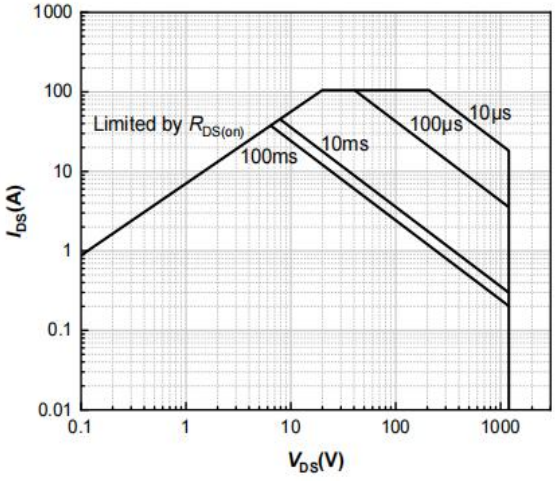
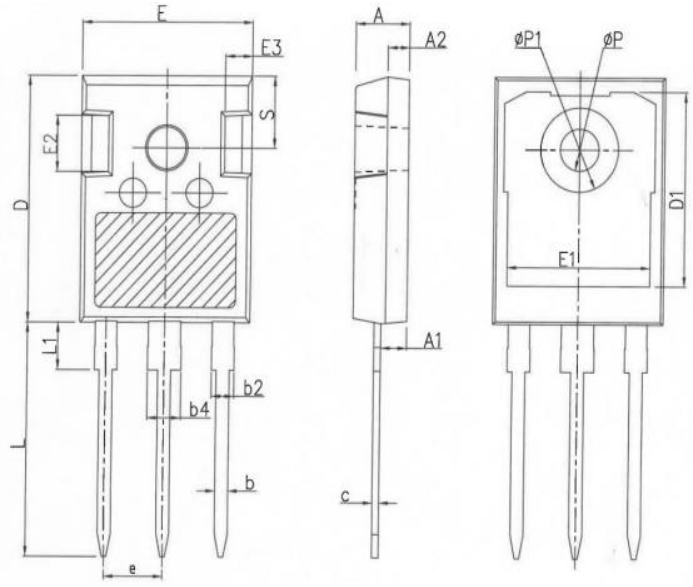


Fig.24 Safe Operating Area

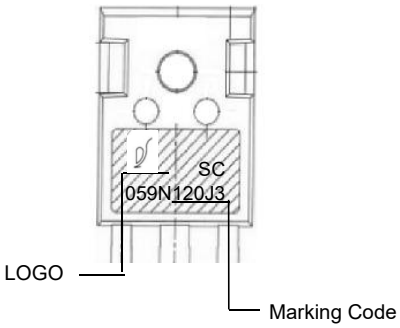


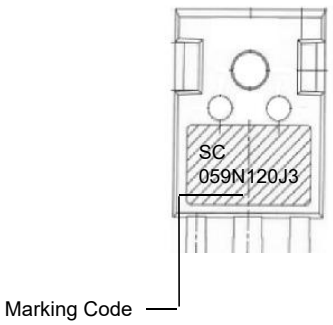
5.Dimensions



DIM	Unit(inch)		Unit(mm)	
	MIN	MAX	MIN	MAX
A	0.189	0.205	4.80	5.20
A1	0.087	0.102	2.21	2.59
A2	0.073	0.085	1.85	2.15
b	0.044	0.054	1.11	1.36
b2	0.075	0.087	1.91	2.21
b4	0.115	0.126	2.91	3.21
c	0.020	0.030	0.51	0.75
D	0.815	0.839	20.70	21.30
D1	0.640	0.663	16.25	16.85
E	0.610	0.634	15.50	16.10
E1	0.512	0.535	13.00	13.60
E2	0.189	0.205	4.80	5.20
E3	0.091	0.106	2.30	2.70
e	2.54 BSC			
L	0.758	0.796	19.26	20.22
L1	-	0.169	-	4.30
θp	0.134	0.150	3.40	3.80
θp1	-	0.287	-	7.30
S	6.15 BSC			

6. Part Marking System





7. Package Information

Package	Packing Type	Quantity(pcs)
TO-247	Tube	25

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