SC040N120Y4

68 Amps,1200 Volts N-Channel Sic Power MOSFET

Features

- 68A,1200V,$R_{DS(ON)MAX}$=53mΩ @V_{GS}=18V/33.3A
- High Blocking Voltage with low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive

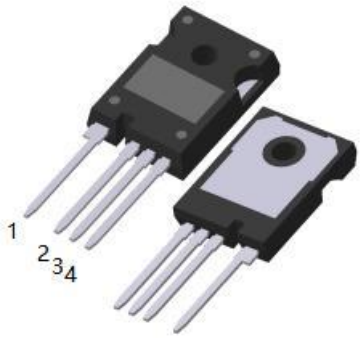
Benefits

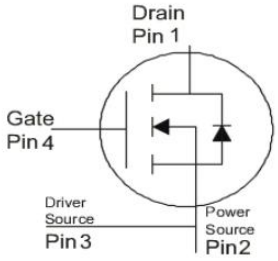
- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequencytance

Applications

- Renewable Energy
- EV Battery Chargers
- High Voltage DC/DC Converters
- Switch Mode Power Supplies

TO-247-4L





Absolute Maximum Ratings(T_C=25℃,unless otherwise noted)

Parameter	Symbol	Value	UNIT	Test Conditions
Drain-Source Voltage	V_{DSmax}	1200	V	V_{GS}=0V, I_{DS}=100μA
Gate-Source Voltage(dynamic)	V_{GSmax}	-8/+22		Absolute maximum values
Gate-Source Voltage (static)	V_{GSop}	-4/+18		Recommended operational values
Continuous Drain Current	I_D	68	A	V_{GS}=18V,Tc=25℃
		49		V_{GS}=18V,Tc=100℃
Pulsed Drain Current	$I_{D(pulse)}$	100	A	Pulse width t_p limited by T_{Jmax}
Power Dissipation	P_D	340	W	T_c=25℃, T_J=150℃
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to +175	℃	

Thermal Characteristics

Parameter	Symbol	SC040N120Y4	Units
Maximum Junction-to-Case	R_{thJC}	0.44	℃/W

Electrical Characteristics (T_c=25℃,unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=100uA	1200	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=1200V,V_{GS}=0V	—	1	100	μA
Gate-Body Leakage Current,Forward	I_{GSSF}	V_{GS}=22V,V_{DS}=0V	—	10	250	nA
Gate-Body Leakage Current,Reverse	I_{GSSR}	V_{GS}=-8V,V_{DS}=0V	—	10	250	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=9.5mA	1.9	2.6	4.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=18V,I_D=33.3A	—	40	53	mΩ
		V_{GS}=18V,I_D=33.3A, T_J=175℃	—	65	—	
Input Capacitance	C_{iss}	V_{DS}=1000V,	—	2070	—	pF
Output Capacitance	C_{oss}	V_{GS}=0V,	—	112	—	pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHZ,	—	11	—	pF
Coss Stored Energy	Eoss	V_{AC}=25mV	—	66	—	uJ
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=800V,V_{GS}=-4V/18V,	—	17	—	ns
Turn-On Rise Time	t_r	I_D=33A,R_g=2.5Ω,R_L=20Ω	—	58	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	26	—	ns
Turn-Off Fall Time	t_f		—	15	—	ns
Turn-On Switching Energy	E_{ON}	V_{DS}=800V,V_{GS}=-4V/18V	—	1410	—	uJ
Turn-Off Switching Energy	E_{OFF}	I_D=33A,Rg=2.5 Ω ,L=100uH	—	750	—	uJ
Internal Gate Resistance	R_G	f=1MHz, V_{AC}=25mV	—	4.9	—	Ω
Total Gate Charge	Qg	V_{DS}=800V,I_D=33A,	—	121	—	nC
Gate-Source Charge	Qgs	V_{GS}=-4V/18V	—	34	—	
Gate-Drain Charge	Qgd		—	20	—	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	V_{GS}=-4V, I_{SD}=20A	—	4.5	—	V
		V_{GS}=-4V, I_{SD}=20A, T_J=175℃	—	4.2	—	
Continuous Diode Forward Current	I_S	T_C=25℃	—	—	51	A
Reverse Recover Time	t_{rr}	V_R=800V, I_{SD}=33A	—	38	—	ns
Reverse Recovery Charge	Q_{rr}		—	109	—	nc
Peak Reverse Recovery Current	I_{rrm}		—	5	—	A

RATINGAND CHARACTERISTIC CURVES

Figure.1 Output Characteristics Tj=25℃

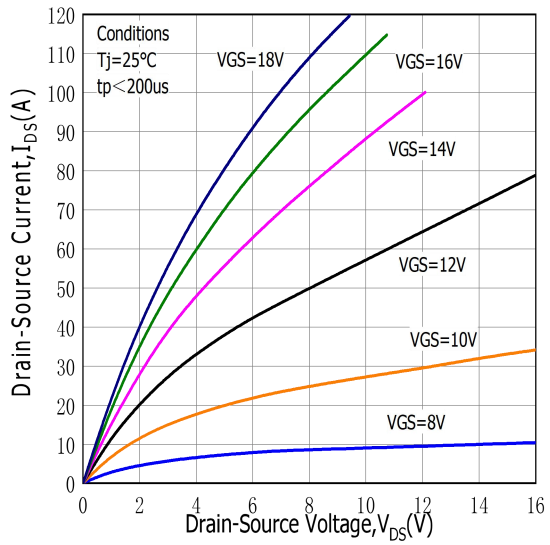


Figure.2 Output Characteristics Tj=175℃

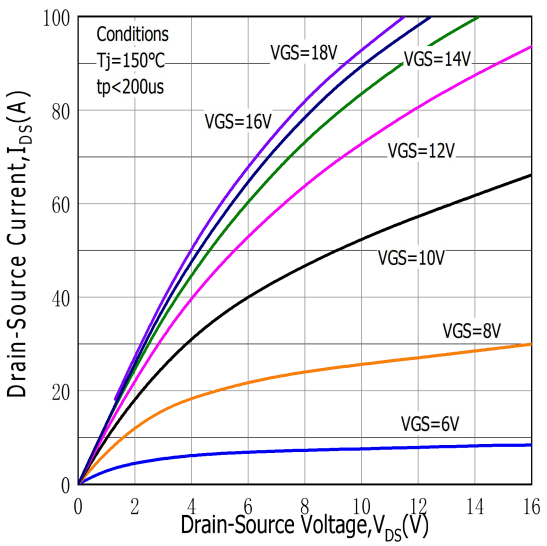


Figure.3 On-Resistance vs.Temperature

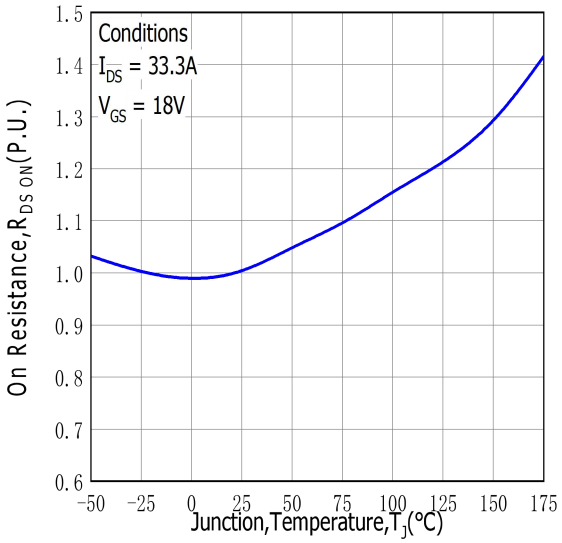


Figure.4 On-Resistance vs.Drain Current for Various Temperatures

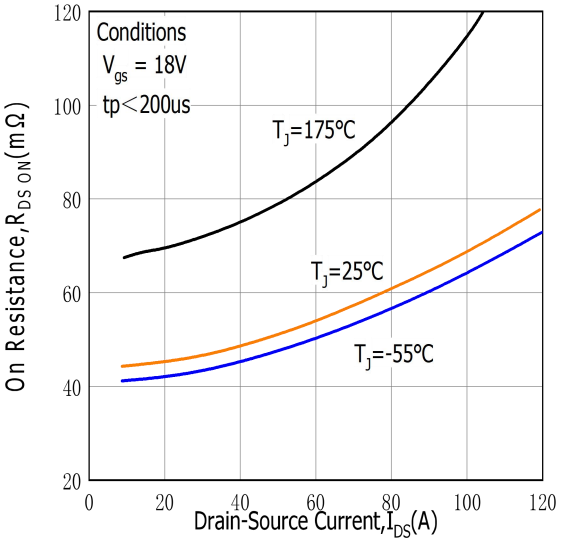


Figure.5 On-Resistance vs.Temperature for Various Gate Voltage

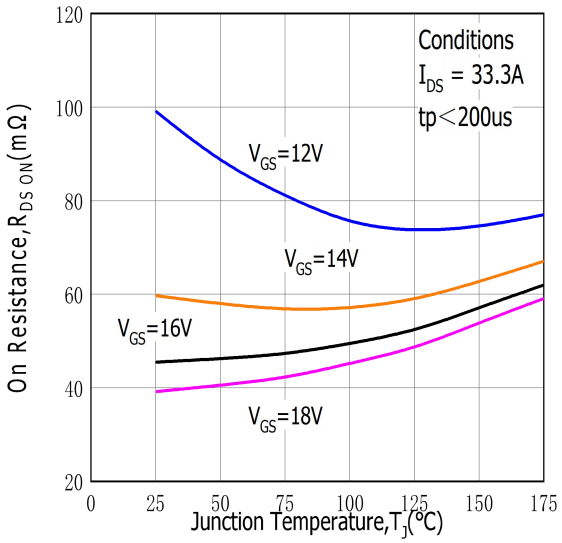


Figure.6 Transfer Characteristic for Various Junction Temperatures

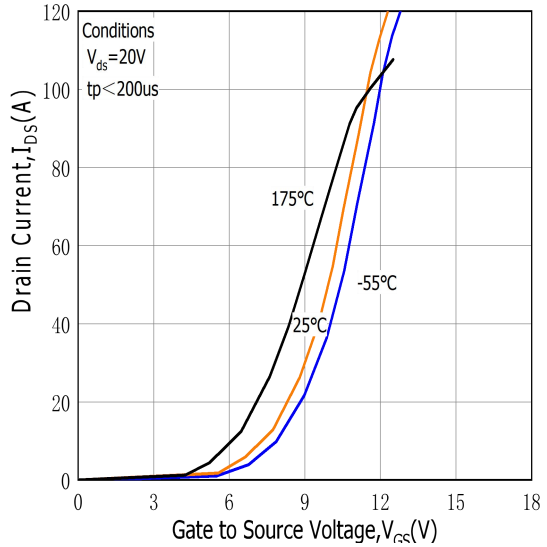


Figure.7 Body Diode Characteristic at 25℃

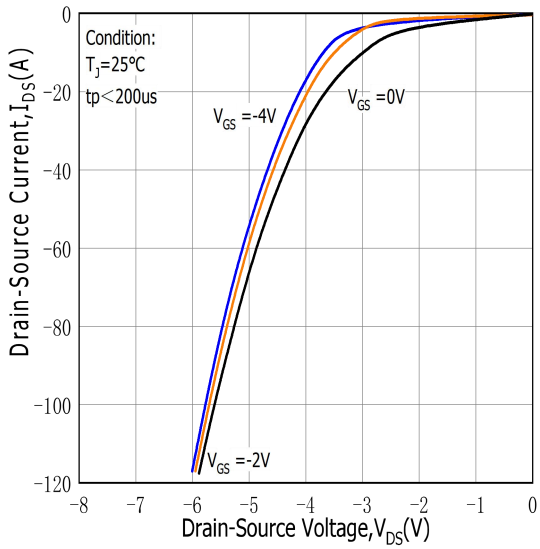


Figure.8 Body Diode Characteristic at 175℃

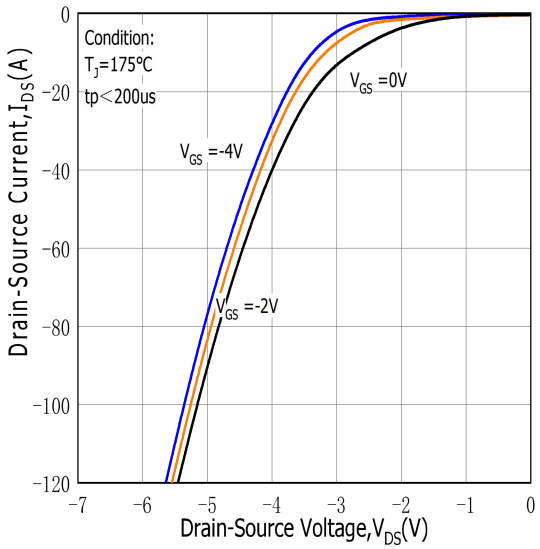


Figure.9 Threshold Voltage vs.Temperature

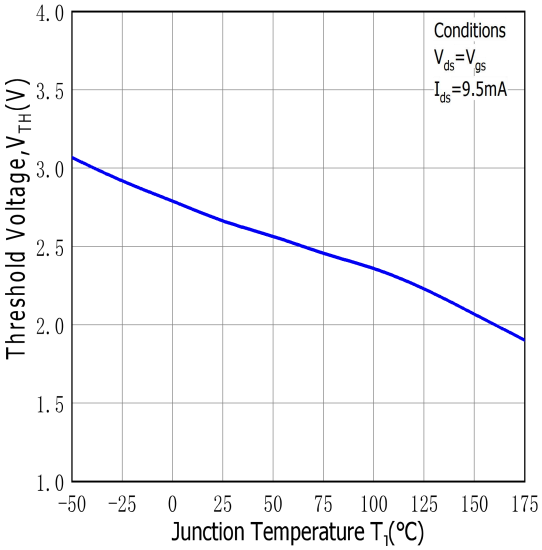


Figure.10 Gate Charge Characteristics

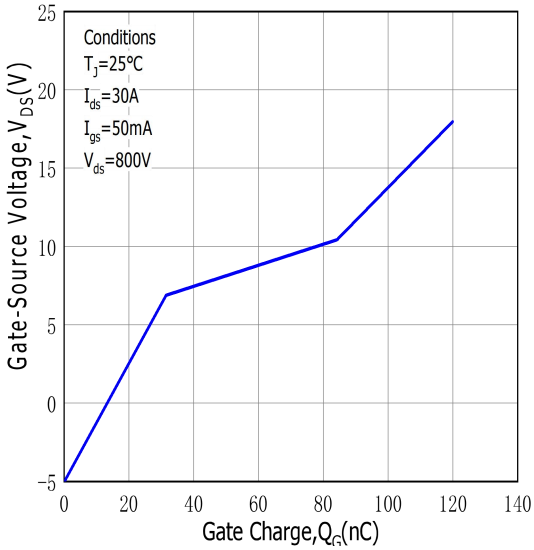


Figure.11 3rd Quadrant Characteristic at 25℃

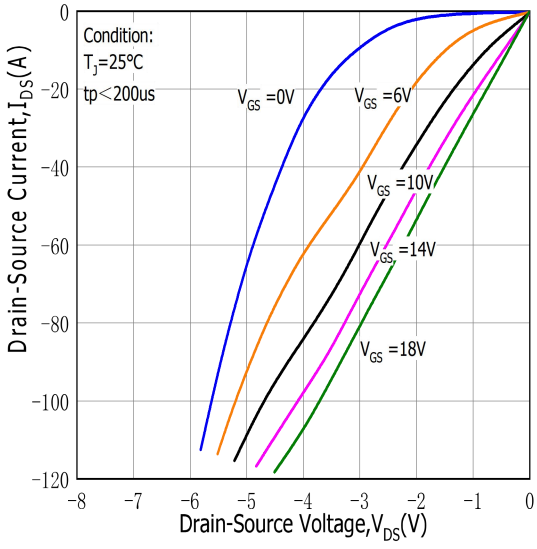


Figure.12 3rd Quadrant Characteristic at 175℃

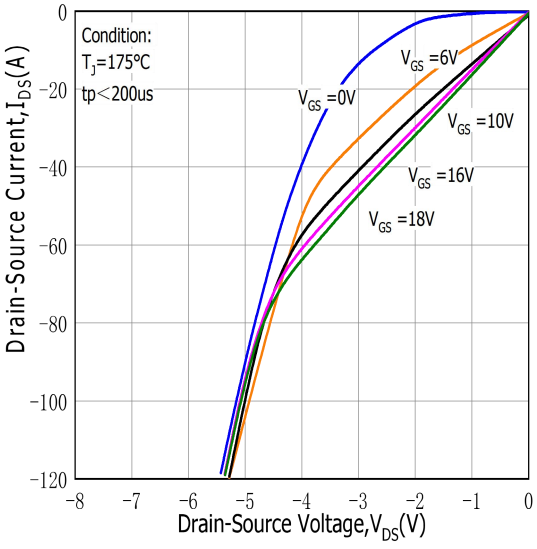


Figure.13 Capacitances vs. Drain-Source Voltage(0-200V)

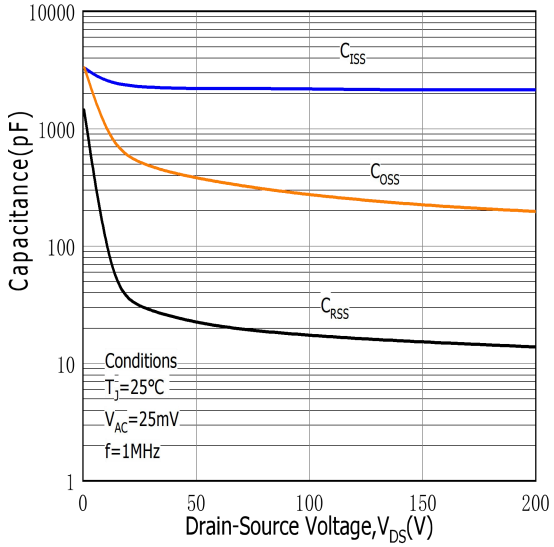
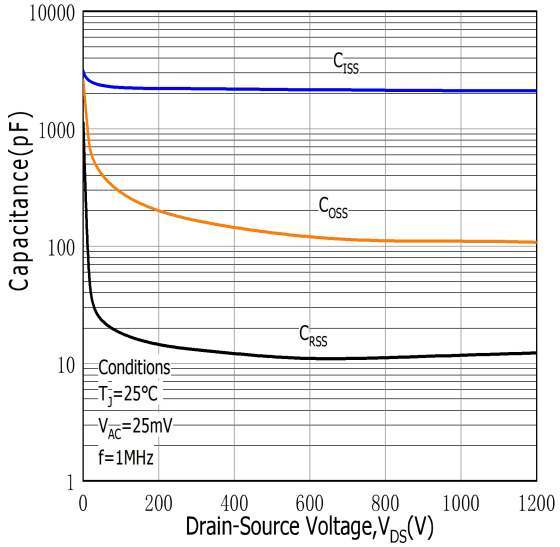


Figure.14 Capacitances vs. Drain-Source Voltage(0-1200V)



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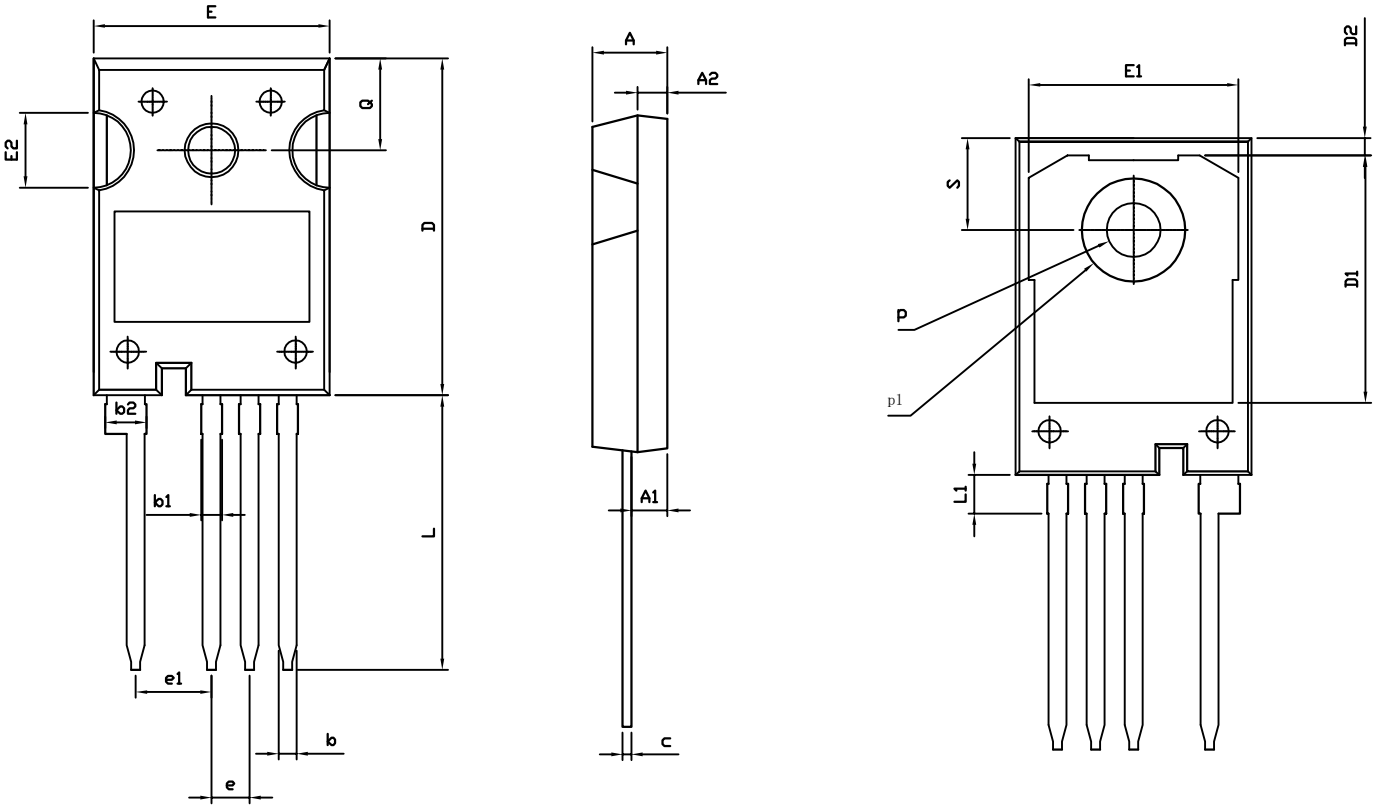
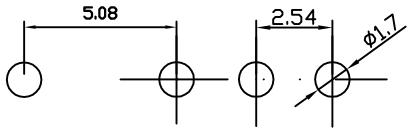
TO-247-4L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.25	2.40	2.45
A2	1.85	2.00	2.15
b	1.05	1.20	1.35
b1	1.00	1.30	1.60
b2	2.35	2.65	2.95
c	0.50	0.60	0.70
D	22.34	22.54	22.74
D1	16.00	16.50	17.00
D2	0.97	1.17	1.37
e	2.34	2.54	2.74
e1	4.88	5.08	5.28
E	15.60	15.80	16.00
E1	13.50	14.00	14.50
E2	4.80	5.00	5.20
L	18.08	18.38	18.68
L1	2.38	2.58	2.78
p	3.50	3.60	3.70
p1	6.60	6.80	7.00
Q	6.00	6.15	6.30
S	6.00	6.15	6.30