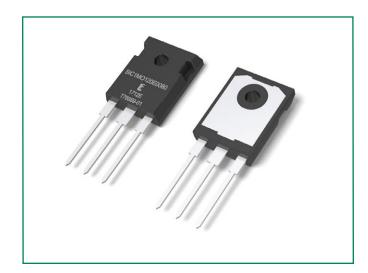
LSIC1M0120E0080 1200 V N-channel, Enhancement-mode SiC MOSFET HF ROHS



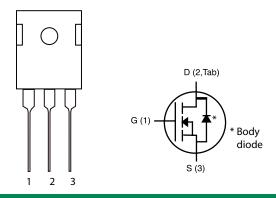






Product Summary					
Characteristics	Value	Unit			
V _{DS}	1200	V			
Typical R _{DS(ON)}	80	mΩ			
$I_D (T_C \le 100 \text{ °C})$	25	A			

Circuit Diagram TO-247-3L



Features

- Optimized for highfrequency, high-efficiency applications
- Extremely low gate charge and output capacitance
- Low gate resistance for high-frequency switching
- Normally-off operation at all temperatures
- Ultra-low on-resistance

Environmental

- Littelfuse "RoHS" logo = RoHS RoHS conform
- Littelfuse "HF" logo = HF Halogen Free
- Littelfuse "Pb-free" logo = Po Pb-free lead plating

Applications

- High-frequency applications
- Solar Inverters
- Switch Mode Power Supplies
- UPS

- Motor Drives
- High Voltage DC/DC Converters
- Battery Chargers
- Induction Heating



SIC MOSFET

LSIC1MO120E0080, 1200 V, 80 mOhm, TO-247-3L

Maximum Ratings						
Characteristics	Symbol	Conditions	Value	Unit		
Continuous Drain Current		$V_{GS} = 20 \text{ V}, T_{C} = 25 ^{\circ}\text{C}$	39	A		
Continuous Diain Current	D D	$V_{GS} = 20 \text{ V, } T_{C} = 100 \text{ °C}$	25			
Pulsed Drain Current ¹	D(pulse)	T _c = 25 °C	80	А		
Power Dissipation	P _D	$T_{\rm C} = 25 {\rm ^{\circ}C}, T_{\rm J} = 150 {\rm ^{\circ}C}$	179	W		
Operating Junction Temperature	T _J		-55 to 150	°C		
	$V_{\rm GS,MAX}$	Absolute maximum values	-6 to 22			
Gate-source Voltage	$V_{\rm GS,OP,TR}$	Transient, <1% duty cycle	-10 to 25	V		
, and the second	$V_{\rm GS,OP}$	Recommended DC operating values	-5 to 20			
Storage Temperature	T _{STG}	-	-55 to 150	°C		
Lead Temperature for Soldering	T _{sold}	-	260	°C		
Mounting Torque	N.4	M2 or 6 22 garage	0.6	Nm		
Mounting Torque	M_{D}	M3 or 6-32 screw	5.3	in-lb		

Footnote 1: Pulse width limited by T_{J,max}

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I herma	Chara	cteristics

Characteristics	Symbol	Value	Unit
Maximum Thermal Resistance, junction-to-case	R _{th,JC,max}	0.7	°C/W
Maximum Thermal Resistance, junction-to-ambient	R _{th,JA,max}	40	°C/W

Electrical Characteristics $(T_J = 25 \text{ °C unless otherwise specified})$

Characteristics	Symbol	Conditions	Min	Тур	Max	Unit
Static Characteristics						
Drain-source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V, I}_{D} = 250 \mu\text{A}$	1200	-	-	V
Zoro Cata Valtaga Drain Current		$V_{DS} = 1200 \text{ V}, V_{GS} = 0 \text{ V}$	-	1	100	^
Zero Gate Voltage Drain Current	DSS	$V_{DS} = 1200 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 150 \text{ °C}$	-	2	-	μΑ
Cata Laglaca Comment	I _{GSS,F}	$V_{GS} = 20 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	100	nA
Gate Leakage Current	I _{GSS,R}	$V_{GS} = -10 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	100	IIA
Drain-source On-state Resistance	R _{DS(ON)}	$I_{D} = 20 \text{ A}, V_{GS} = 20 \text{ V}$	-	80	100	mΩ
Didiii-source Oii-state nesistance		$I_D = 20 \text{ A}, V_{GS} = 20 \text{ V}, T_J = 150 \text{ °C}$	-	105	-	11122
Cata Thrankald Valtage		$V_{DS} = V_{GS}$, $I_{D} = 10 \text{ mA}$	1.8	2.8	4.0	V
Gate Threshold Voltage	V _{GS,(th)}	$V_{DS} = V_{GS}$, $I_{D} = 10$ mA, $T_{J} = 150$ °C	-	1.9	-	V
Gate Resistance	R_{G}	f = 1 MHz, V _{AC} = 25 mV	-	1.0	-	Ω

LSIC1MO120E0080, 1200 V, 80 m Ohm, TO-247-3L



Electrical Characteristics (T_J = 25 °C unless otherwise specified)

Characteristics	Symbol	Conditions		Value		· Unit
Characteristics	Зушьог	Conditions	Min	Тур	Max	Offic
Dynamic Characteristics						
Turn-on Switching Energy	E _{on}	$V_{DD} = 800 \text{ V}, I_{D} = 20 \text{ A},$	-	270	-	
Turn-off Switching Energy	E _{OFF}	$V_{DD} = 660 \text{ V}, I_{D} = 267 \text{ V},$ $V_{GS} = -5/+20 \text{ V},$ $R_{G.ext} = 2 \Omega, L = 1.4 \text{ mH}$	-	60	-	μJ
Total Per-cycle Switching Energy	E _{TS}	$R_{G,ext} = 2 \Omega, L = 1.4 \text{ mH}$	-	330	-	
Input Capacitance	C _{ISS}		-	1825	-	
Output Capacitance	C _{oss}	$V_{DD} = 800 \text{ V}, V_{GS} = 0 \text{ V},$ $f = 1 \text{ MHz}, V_{AC} = 25 \text{ mV}$	-	75	-	pF
Reverse Transfer Capacitance	C _{RSS}		-	15	-	
C _{oss} Stored Energy	E _{oss}		-	25	-	μJ
Total Gate Charge	O _g		-	95	-	
Gate-source Charge	Q _{gs}	$V_{DD} = 800 \text{ V}, I_{D} = 20 \text{ A},$ $V_{GS} = -5/+20 \text{ V}$	-	29	-	nC
Gate-drain Charge	O _{gd}	V _{GS} = 3,123 V	-	39	-	
Turn-on Delay Time	t _{d(on)}		-	10	-	
Rise Time	t,	$V_{DD} = 800 \text{ V}, V_{GS} = -5/+20 \text{ V},$ $I_{D} = 20 \text{ A}, R_{G,ext} = 2 \Omega,$ $R_{L} = 40 \Omega,$	-	10	-]
Turn-off Delay Time	t _{d(off)}		-	16	-	ns
Fall Time	t _f	Timing relative to V _{DS}	-	6	-	

Reverse Diode Characteristics

Characteristics	Symbol Conditions	Value			Unit	
Citatacteristics	Syllibol	Conditions	Min	Тур	Max	Offic
Diada Fannad Valtaria	.,	$I_{s} = 10 \text{ A}, V_{GS} = 0 \text{ V}$		3.8	-	V
Diode Forward Voltage	V _{SD}	$I_{S} = 10 \text{ A}, V_{GS} = 0 \text{ V}, T_{J} = 150 \text{ °C}$	-	3.4	-	V
Continuous Diode Forward Current	I _s	V 0VT 25.90	-	-	35	^
Peak Diode Forward Current ¹	I _{SP}	$V_{GS} = 0 \text{ V, } T_{C} = 25 ^{\circ}\text{C}$	-	-	85	A
Reverse Recovery Time	t _{rr}	V - 5VI - 20 A	-	25	-	ns
Reverse Recovery Charge	O _{rr}	$V_{GS} = -5 \text{ V}, I_{S} = 20 \text{ A},$ $V_{R} = 800 \text{ V},$	-	185	-	nC
Peak Reverse Recovery Current	l _{rrm}	dl/dt = 5.3 A/ns	-	16	-	А

Footnote 1: Pulse width limited by $T_{\rm J,max}$



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Figure 1: Maximum Power Dissipation (T₁ = 150 °C)

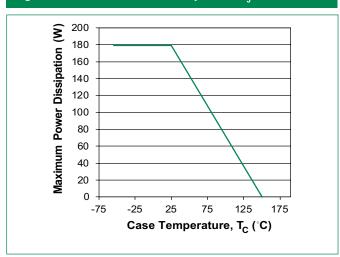


Figure 2: Transfer Characteristics ($V_{ps} = 10 \text{ V}$)

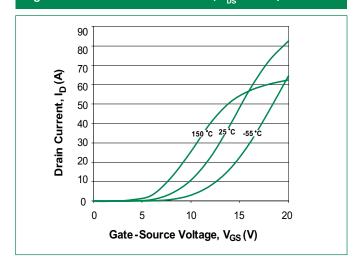


Figure 3: Output Characteristics (T, = 25 °C)

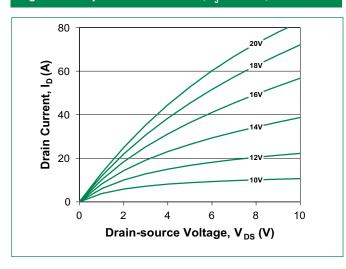


Figure 4: Output Characteristics (T₁ = 150 °C)

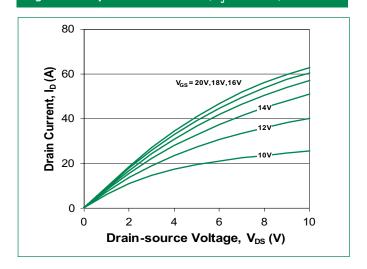


Figure 5: Output Characteristics (T, = -55 °C)

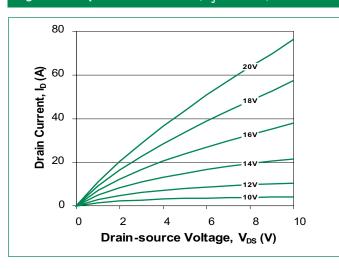


Figure 6: Reverse Conduction Characteristics (T₁ = 25 °C)

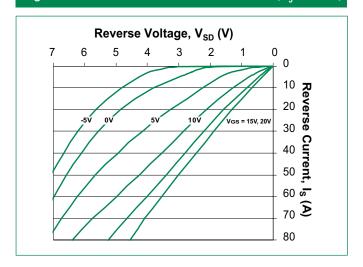




Figure 7: Reverse Conduction Characteristics (T_J = 150 °C)

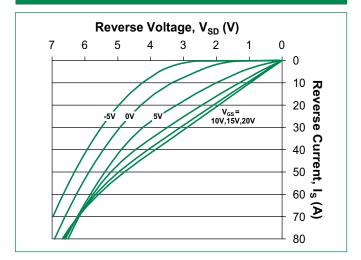


Figure 8: Reverse Conduction Characteristics (T₁ = -55 °C)

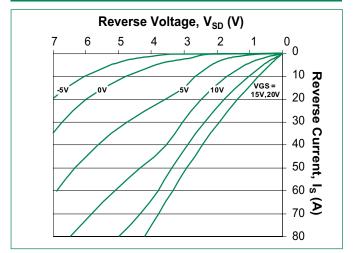


Figure 9: Transient Thermal Impedance

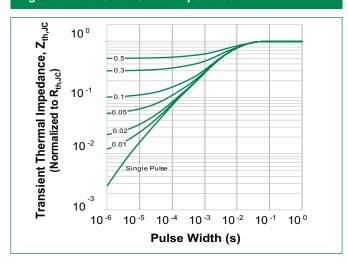


Figure 10: Safe Operating Area ($T_c = 25$ °C)

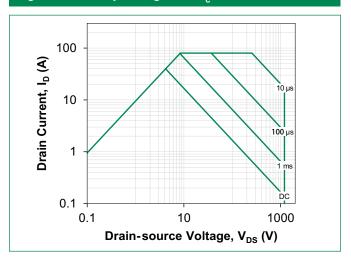


Figure 11: On-resistance vs. Drain Current

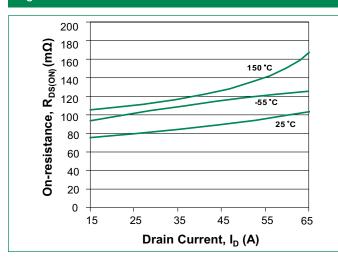
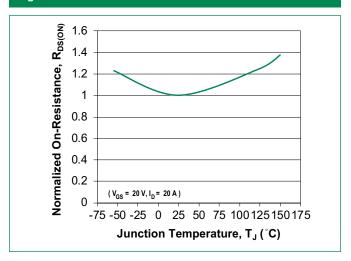


Figure 12: Normalized On-resistance





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Figure 13: Threshold Voltage

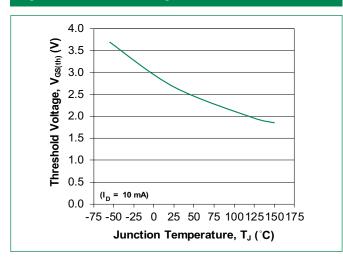


Figure 14: Drain-source Blocking Voltage

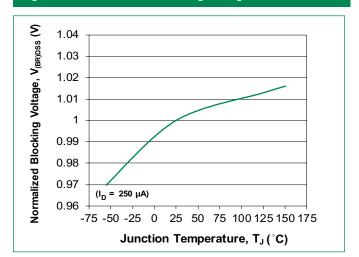


Figure 15: Junction Capacitances

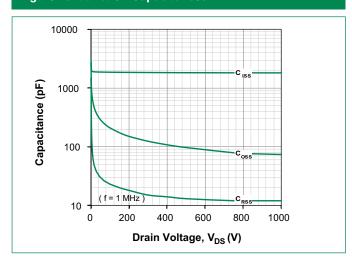


Figure 16: Junction Capacitances

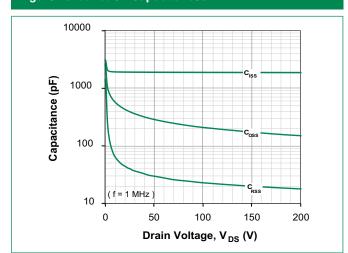


Figure 17: C_{oss} Stored Energy E_{oss}

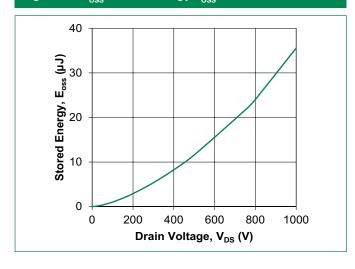


Figure 18: Gate Charge

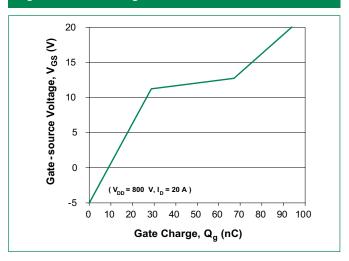




Figure 19: Switching Energy vs. Drain Current

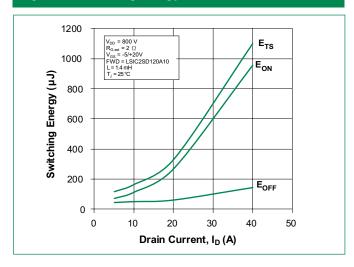
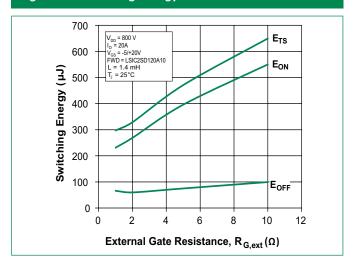
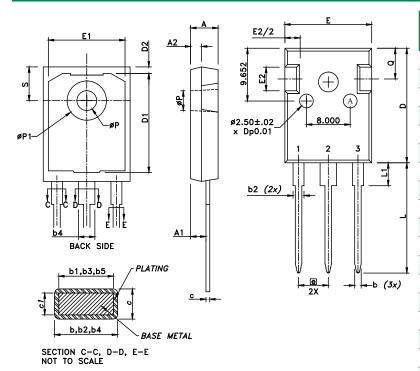


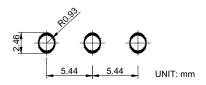
Figure 20: Switching Energy vs. Gate Resistance



Package Dimensions TO-247-3L



Recommended Hole	Pattern	Layout



Notes:

- 1. Dimensions are in millimeters
- Dimension D, E do not include mold flash.
 Mold flash shall not exceed 0.127 mm per side measured at outer most extreme of plastic body.
- 3.øP to have a maximum draft angle of 38.1 mm to the top of the part with a maximum hole diameter of 3.912 mm.

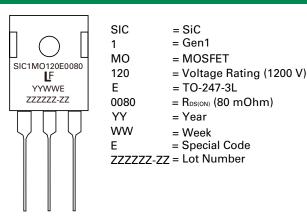
Cumbal	Millimeters			
Symbol	Min	Nom	Max	
А	4.902	5.029	5.156	
A1	2.253	2.380	2.507	
A2	1.854	1.981	2.108	
D	20.828	20.955	21.082	
E	15.773	15.900	16.027	
E2	4.191	4.318	4.445	
E2/2	1.473	1.524	1.575	
е		5.436		
L	20.066	20.193	20.320	
L1	3.937	4.191	4.445	
øΡ	3.556	3.067	3.658	
Q	5.486	5.613	5.740	
S	6.045	6.172	6.299	
b	0.991	-	1.397	
b1	0.991	1.199	1.346	
b2	1.651	-	2.387	
b3	1.651	1.999	2.336	
b4	2.591	-	3.429	
b5	2.591	3.000	3.378	
С	0.381	0.635	0.889	
c1	0.381	0.610	0.838	
D1	17.399	17.526	17.653	
D2	1.067	1.194	1.321	
E1	13.894	14.021	14.148	
øP1	7.061	7.188	7.315	



SIC MOSFET

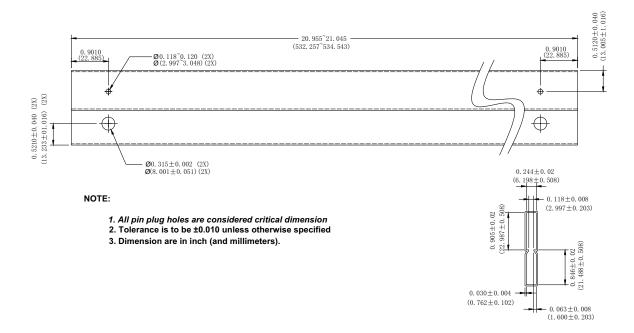
LSIC1MO120E0080, 1200 V, 80 mOhm, TO-247-3L

Part Numbering and Marking System



P	acking Options			
	Part Number	Marking	Packing Mode	M.O.Q
	LSIC1MO120E0080	SIC1MO120E0080	Tube(30pcs)	450

Packing Specification TO-247-3L



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