

SC060N120Y4-R

Silicon Carbide MOSFET 1200V, 60mΩ, 48A



重庆平伟半导体股份有限公司

Features

- 1200V turn-off gate voltage can be applied
- High Blocking Voltage with Low RDS(on)
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Qualified according to JEDEC criteria

Applications

- High Voltage DC/DC Converters
- EV Charging
- Online UPS / Industrial UPS
- String inverter
- Energy storage systems (ESS)

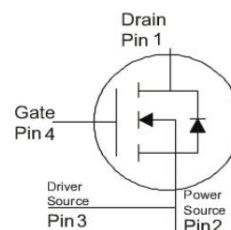


100% DVDS Tested
100%
Avalanche Tested

Product Summary

V_{DS}	1200V
$R_{DS(on)}$ typ.	60mΩ
I_D	48A

TO-247-4L



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC060N120Y4-R	SC060N120Y4	TO-247-4L	Tube	N/A	N/A	30pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_D	48 34	A
Pulsed drain current ($T_C = 25^\circ\text{C}$)	$I_{D \text{ pulse}}$	144	A
Avalanche energy, single pulse ($L=5\text{mH}$)	E_{AS}	123	mJ
Gate-Source voltage,max.transient voltage	$V_{GS\text{max}}$	-8/+22	V
Recommended operating values	$V_{GS\text{sop}}$	-5/+18	V
Power dissipation $T_C = 25^\circ\text{C}$	P_{tot}	172	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	0.58	0.9	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	R_{thJA}	-	-	50.0	°C/W	

Electrical Characteristic (at $T_j = 25\text{ °C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	1200	-	-	V	$V_{GS}=0V, I_D=100\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.2	V	$V_{DS}=V_{GS}, I_D=5mA$
Zero gate voltage drain current	I_{DSS}	-	1	100	μA	$V_{DS}=1200V, V_{GS}=0V$ $T_j=25\text{ °C}$
Gate-source leakage current	I_{GSS}	-	-	200	nA	$V_{GS}=20V, V_{DS}=0V$
		-	-	-200	nA	$V_{GS}=-5V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	60	70	mΩ	$V_{GS}=18V, I_D=20A, T_j=25\text{ °C}$
Drain-source on-state resistance	$R_{DS(on)}$	-	109	-	mΩ	$V_{GS}=18V, I_D=20A, T_j=175\text{ °C}$
Transconductance	g_{fs}	-	18.0	-	S	$V_{DS}=20V, I_D=20A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	1702	-	pF	$V_{GS}=0V, V_{DS}=800V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	77	-		
Reverse Transfer Capacitance	C_{rss}	-	8	-		
Gate Total Charge	Q_G	-	76	-	nC	$V_{DS}=800V, I_D=20A$ $V_{GS}=-5/18V$
Gate-Source charge	Q_{gs}	-	29	-		
Gate-Drain charge	Q_{gd}	-	21	-		
Turn-on delay time	$t_{d(on)}$	-	11	-	ns	$V_{GS}=-5/18V, V_{DD}=800V,$ $R_G=5\Omega, I_D=20A$
Rise time	t_r	-	8	-		
Turn-off delay time	$t_{d(off)}$	-	18	-		
Fall time	t_f	-	4	-		
Turn-on energy	E_{on}	-	98	-	uJ	
Turn-off energy	E_{off}	-	89	-		
Gate resistance	R_G	-	5.0	-	Ω	$V_{GS}=0V, f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.7	-	V	$V_{GS} = -5V, I_{SD} = 10A$ $T_j = 25^{\circ}C$
		-	3.35	-		$T_j = 175^{\circ}C$
Body Diode Continuous Forward Current	I_S	-	48	-	A	$T_C = 25^{\circ}C$
		-	34	-	A	$T_C = 100^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	23	-	ns	$V_{GS} = -5V, I_{SD} = 20A,$ $V_R = 800V$ $di/dt = 1200A/us$
Body Diode Reverse Recovery Charge	Q_{rr}	-	108	-	nC	
Peak Reverse Recovery Current	I_{RRM}	-	7.2	-	A	

Typical Performance Characteristics

Fig 1: Output Characteristics $T_j=25^{\circ}\text{C}$

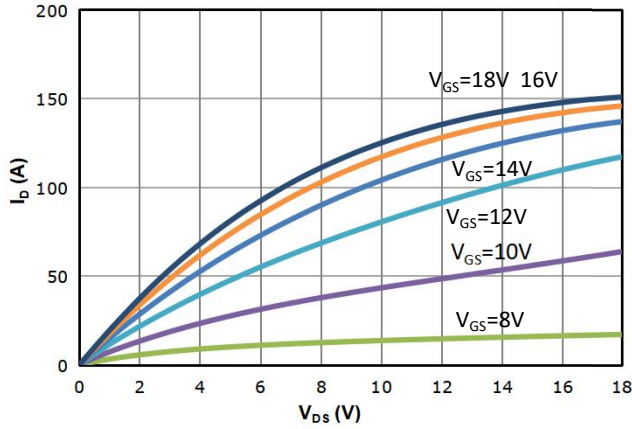


Fig 2: Output Characteristics $T_j=175^{\circ}\text{C}$

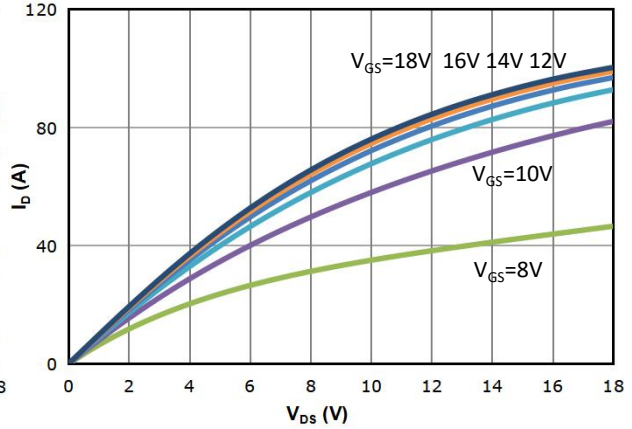


Fig 3: Transfer Characteristics

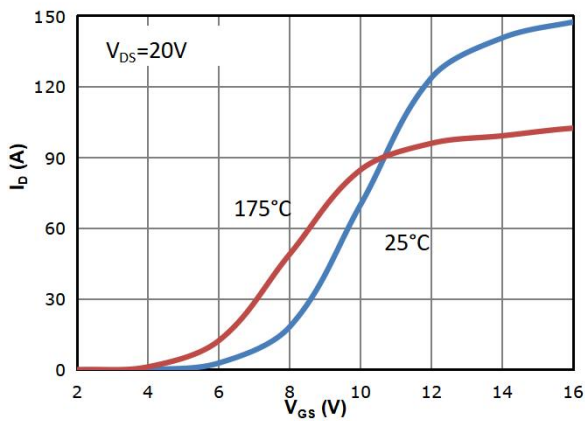


Fig 4: $R_{ds(on)}$ vs Drain Current and Gate Voltage

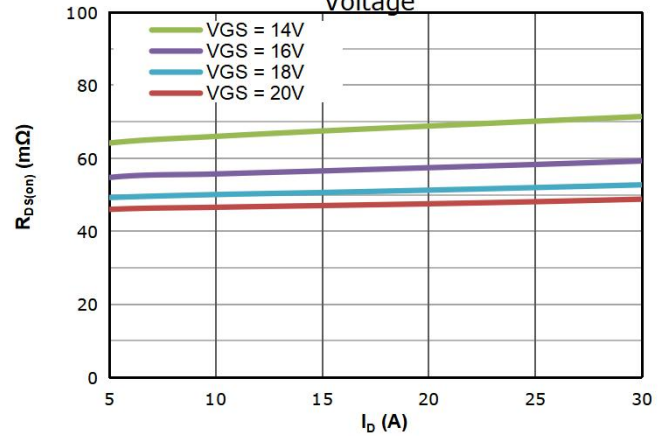


Fig 5: $R_{ds(on)}$ vs. Temperature

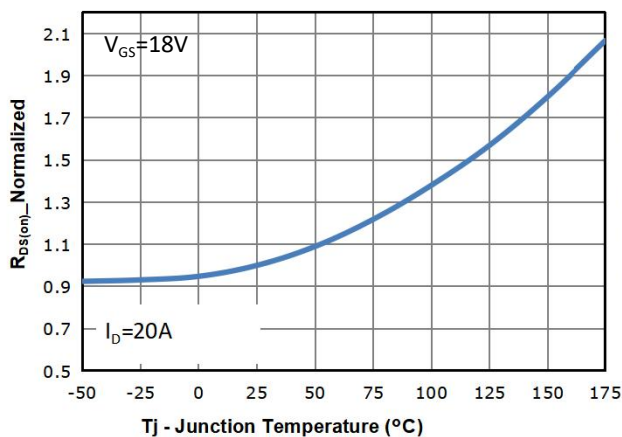


Fig 6: $V_{gs(th)}$ vs. Temperature

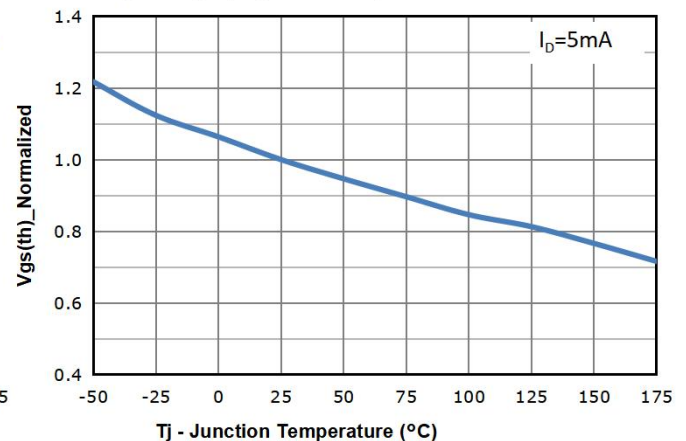


Fig 7: BVdss vs. Temperature

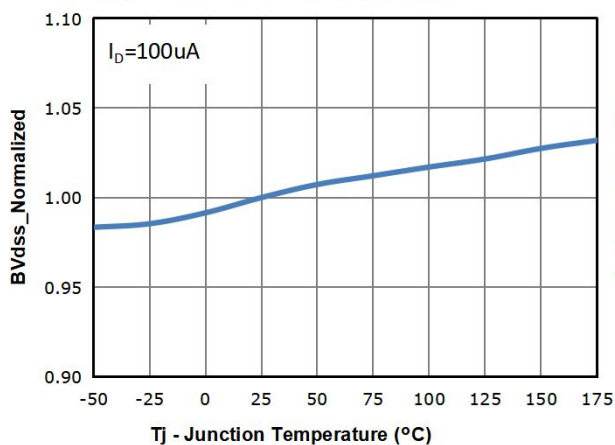


Fig 8: Capacitance Characteristics

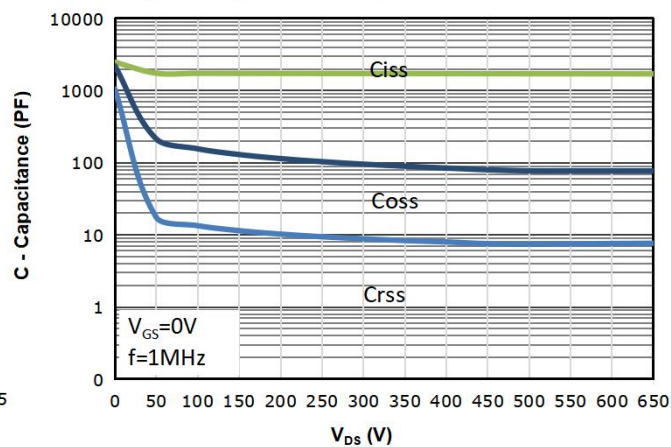


Fig 9: Gate Charge Characteristics

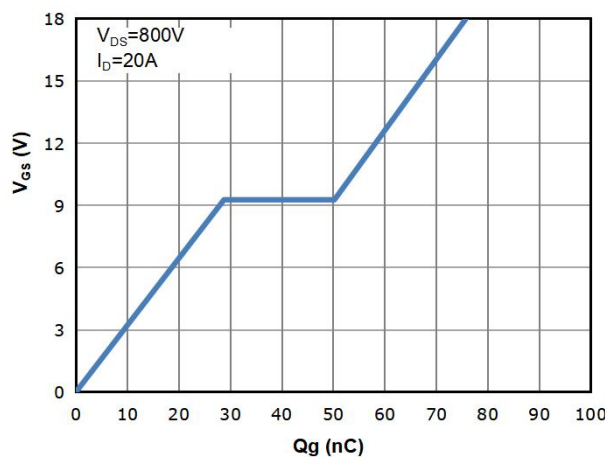


Fig 10: Body-diode Forward Characteristics

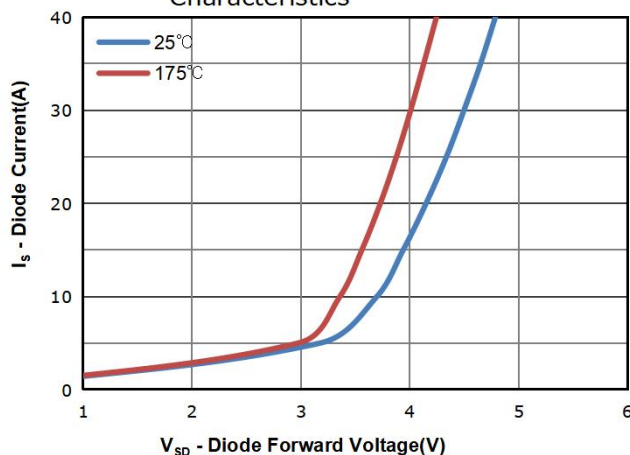


Fig 11: Power Dissipation

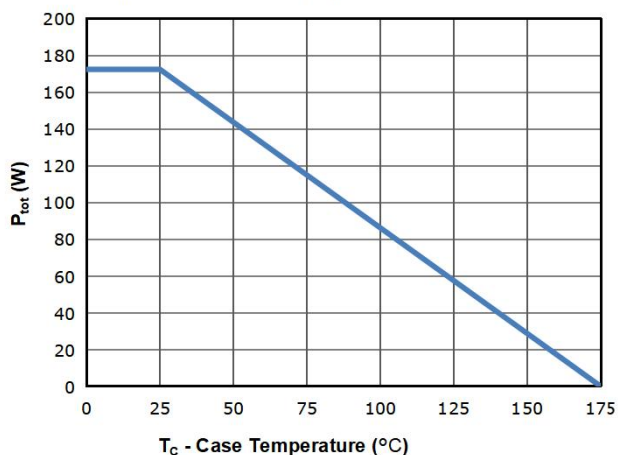


Fig 12: Drain Current Derating

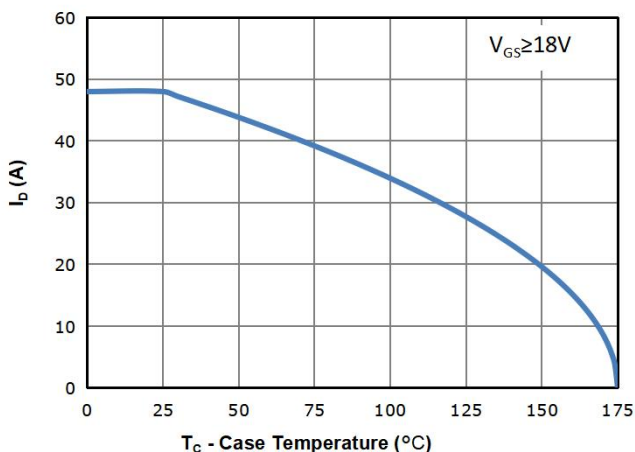


Fig 13: Safe Operating Area

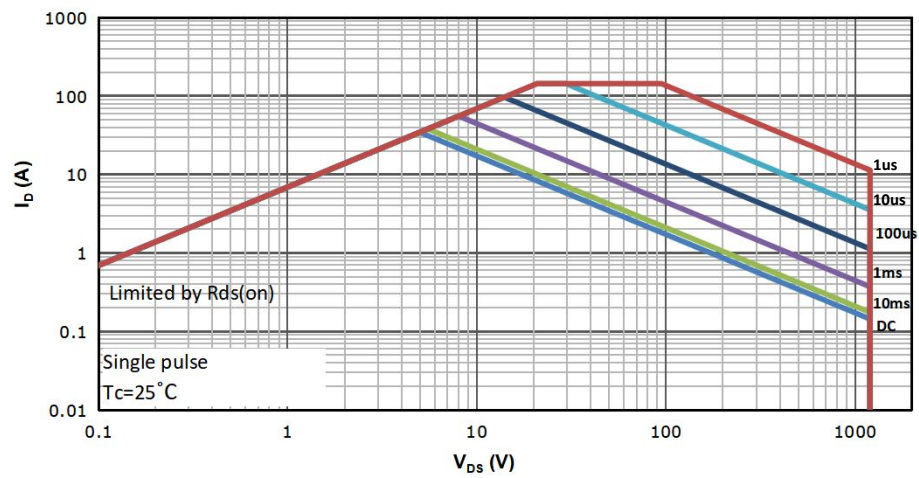
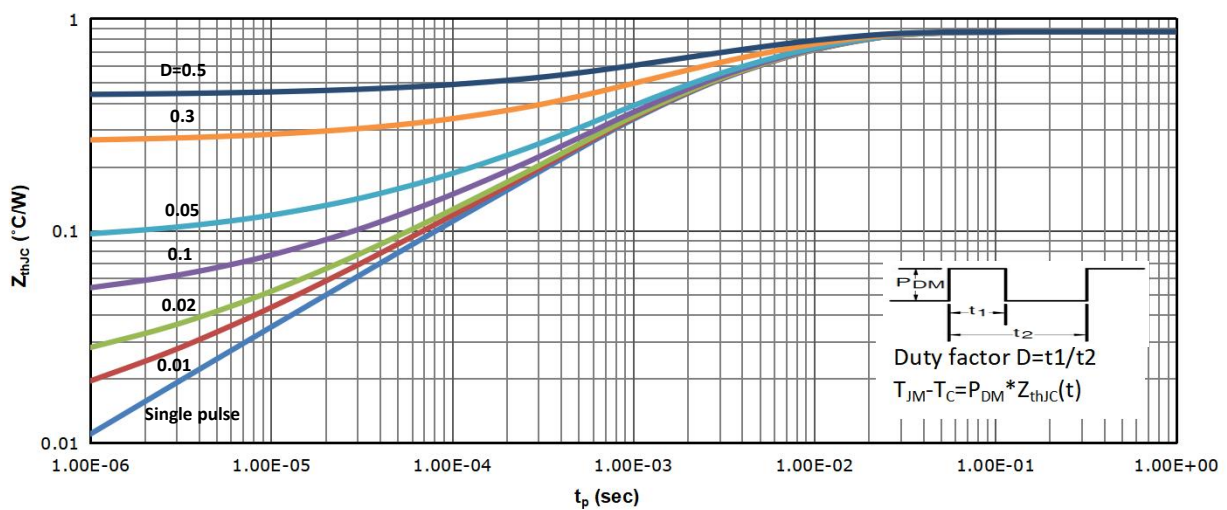
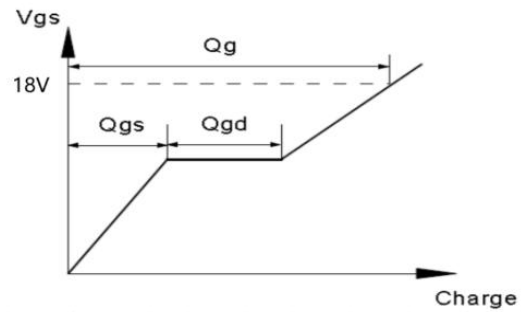
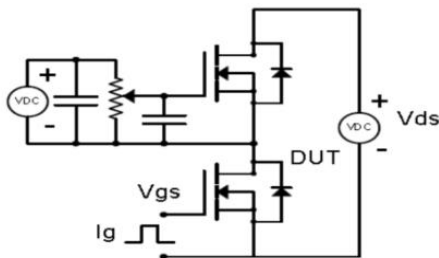


Fig 14: Max. Transient Thermal Impedance

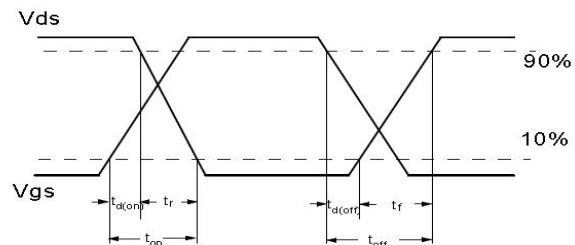
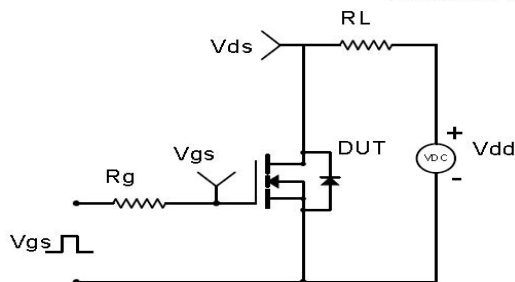


Test Circuit & Waveform

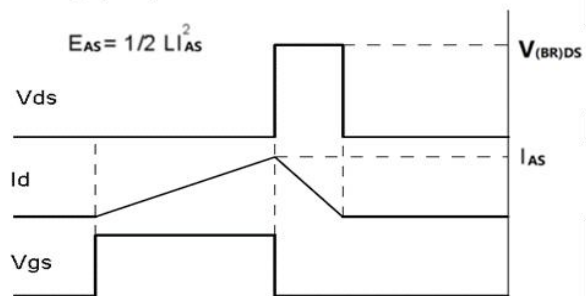
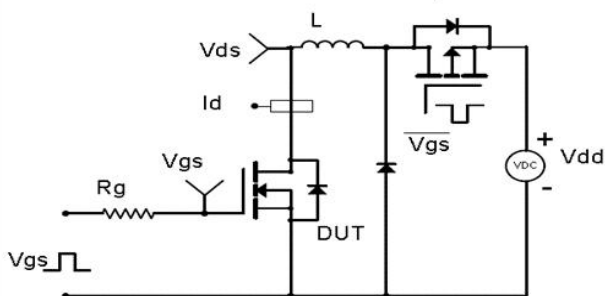
Gate Charge Test Circuit & Waveform



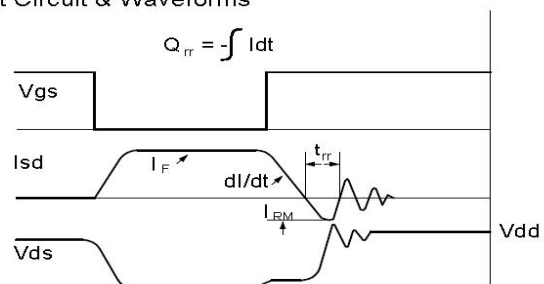
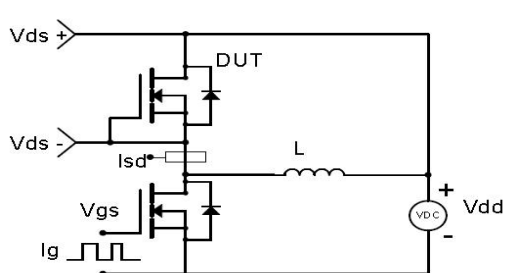
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



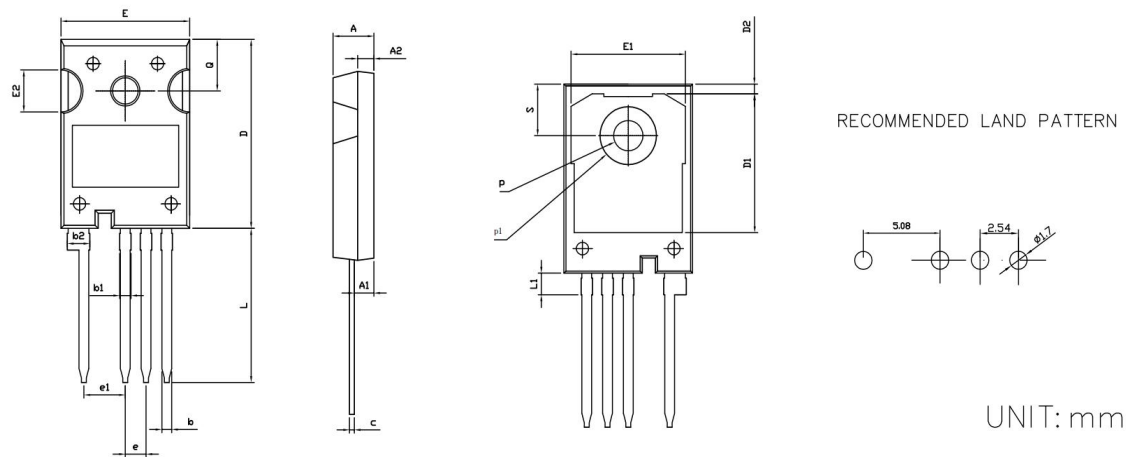
SC060N120Y4-R

Silicon Carbide MOSFET 1200V, 60mΩ, 48A



重庆平伟半导体股份有限公司

Package Outline: TO-247-4L



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.20	0.189	0.205
A1	2.25	2.45	0.089	0.096
A2	1.85	2.15	0.073	0.085
b	1.05	1.35	0.041	0.053
b1	1.00	1.60	0.039	0.063
b2	2.35	2.95	0.093	0.116
c	0.50	0.70	0.020	0.028
D	22.34	22.74	0.880	0.895
D1	16.00	17.00	0.630	0.669
D2	0.97	1.37	0.038	0.054
e	2.34	2.74	0.092	0.108
e1	4.88	5.28	0.192	0.208
E	15.60	16.00	0.614	0.630
E1	13.50	14.50	0.531	0.571
E2	4.80	5.20	0.189	0.205
L	18.08	18.68	0.712	0.735
L1	2.38	2.78	0.094	0.109
p	3.50	3.70	0.138	0.146
p1	6.60	7.00	0.260	0.276
Q	6.00	6.30	0.236	0.248
S	6.00	6.30	0.236	0.248

Disclaimer

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Buyer is responsible for its products and applications using PingWei products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by PingWei.

"Typical" parameters which may be provided in PingWei data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE