



1500V N-Channel MOSFET

Description

Silicon Carbide (SiC) MOSFET use a completely new technology that provide superior switching performance and higher reliability compared to Silicon. In addition, the low ON resistance and compact chip size ensure low capacitance and gate charge. Consequently, system benefits include highest efficiency, faster operating frequency, increased power density, reduced EMI, and reduced system size.

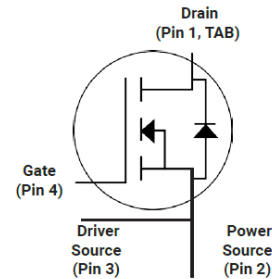
Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low RDS(on)
- Simple to drive with Standard Gate Drive
- 100% avalanche tested
- Maximum junction temperature of 150°C
- ROHS Compliant



Application

- EV Charging
- DC-AC Inverters
- High Voltage DC/DC Converters
- Switch Mode Power Supplies
- Power Factor Correction Modules
- Motor Drives



Ordering Information

Part Number	Marking	Package	Packaging
ASC45N1500MT4	ASC45N1500MT4	TO-247	Tube



ASC45N1500MT4

Absolute Maximum Ratings($T_c=25^\circ\text{C}$)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1500	V
I_D	Drain Current(continuous)at $T_c=25^\circ\text{C}$	45	A
I_D	Drain Current(continuous)at $T_c=100^\circ\text{C}$	20	A
I_{DM}	Drain Current (pulsed)	100	A
V_{GS}	Gate-Source Voltage	-10/+20	V
P_D	Power Dissipation $T_c = 25^\circ\text{C}$	198	W
T_J, T_{stg}	Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

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

Typical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	1500			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=1500\text{V}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$			100	μA
I_{GSS}	Gate-body Leakage Current	$V_{DS}=0\text{V}; V_{GS}=10\text{ to }20\text{V}$			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=5\text{mA}$	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS}=18\text{V}, I_D=20\text{A}$		75	90	$\text{m}\Omega$
R_G	Gate Resistance	$V_{GS}=0\text{V}, f=1\text{MHz}$		3		Ω

Typical Performance-Dynamic

C_{iss}	Input Capacitance	$V_{DS}=400\text{V}, f=1\text{MHz}, V_{GS}=0\text{V}$		1678		pF
C_{oss}	Output Capacitance			96		pF
C_{rss}	Reverse Transfer Capacitance			10		pF
Q_g	Total Gate Charge	$V_{DS}=800\text{V}, I_D=20\text{A}, V_{GS}=0\sim 20\text{V}$		86		nC
Q_{gs}	Gate-source Charge			18		nC
Q_{gd}	Gate-Drain Charge			20		nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=800\text{V}, I_D=20\text{A}, V_{GS}=-0\text{V}\sim 20\text{V}, R_G=0\Omega,$		18		ns
t_r	Rise Time			22		ns
$t_{d(off)}$	Turn-off Delay Time			38		ns
t_f	Fall Time			20		ns



ASC45N1500MT4

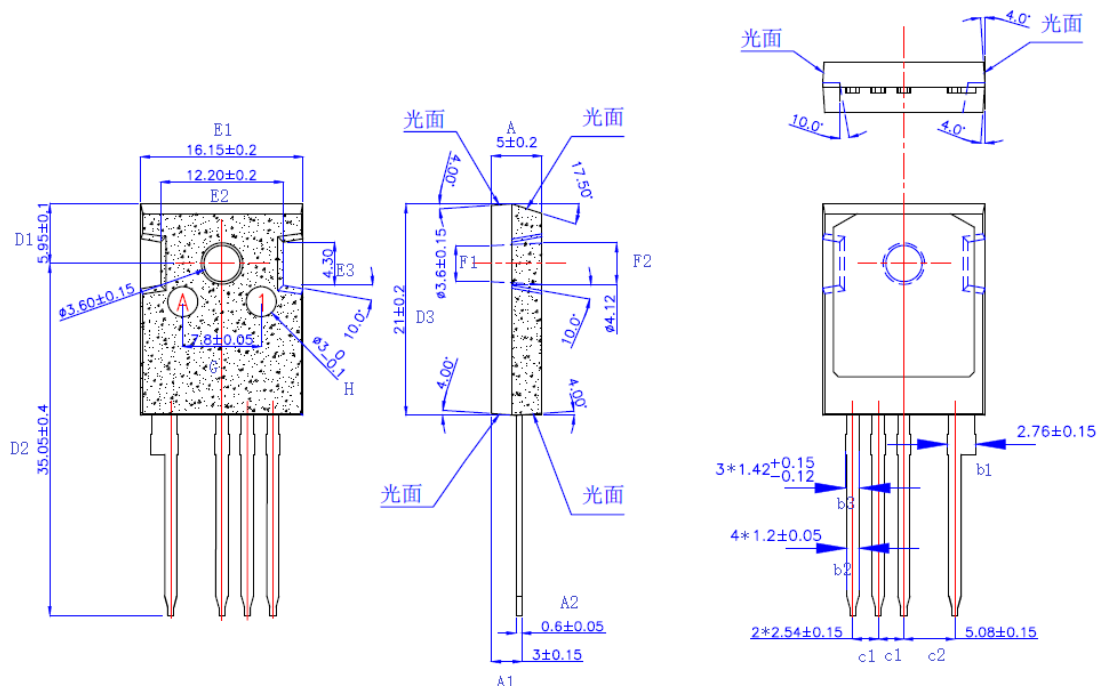
Typical Performance-Reverse Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{FSD}	Forward Voltage	$V_{GS}=0V, I_F=20A, T_J=25^{\circ}C$	3		6	V
		$V_{GS}=0V, I_F=20A, T_J=150^{\circ}C$	3		6	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_F=20A,$ $V_R=800V,$ $di/dt=100A/\mu s$		29		ns
Q_{rr}	Reverse Recovery Charge			238		nC
I_{rrm}	Peak Reverse Recovery Current			15		A

Thermal Characteristics

Symbol	Parameter	Value.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.6	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Air	40	$^{\circ}C/W$

The values are based on the junction-to case thermal impedance which is measured with the device mounted to a large heat sink assuming maximum junction temperature of $T_J(max)=150^{\circ}C$

Package Drawing:

Dimensions (UNIT: mm)

SYM	MILLIMETERS		SYM	MILLIMETERS	
	MIN	MAX		MIN	MAX
A	4.98	5.02	D2	34.65	35.45
A1	2.85	3.15	D3	20.80	21.20
A2	0.55	0.65	E1	15.95	16.35
b1	2.61	2.91	E2	12.00	12.40
b2	1.15	1.25	F1	3.45	3.75
b3	1.30	1.57	F2	4.12	4.12
c1	2.39	2.69	G	7.75	7.85
c2	4.93	5.23	H	2.90	3.10
D1	5.85	6.05			