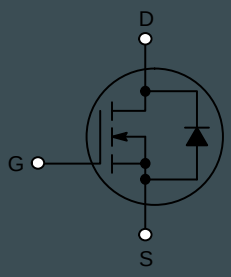
Silicon Carbide (SiC) MOSFET – EliteSiC, 13 mohm, 1200 V, M3S, Die

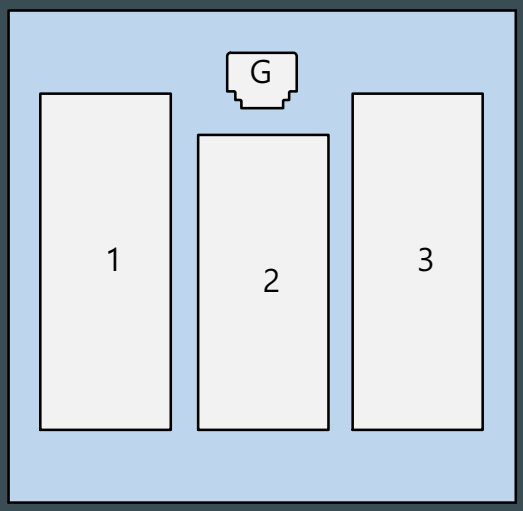
NTCR013N120M3S

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D MAX
1200 V	13 mΩ @ 18 V	151 A

N−CHANNEL MOSFET



DIE DIAGRAM



Description

Silicon Carbide (SiC) MOSFET uses a completely new technology that provides 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 operation frequency, increased power density, reduced EMI, and reduced system size.

Features

- Typ. $R_{DS(on)}$ = 13 mΩ @ V_{GS} = 18 V
- Low Switching Losses (Typ. E_{ON} 563 J at 75 A, 800 V)

Applications

- Solar Inverters
- Electric Vehicle Charging Stations
- Uninterruptible Power Supplies (UPS)
- Energy Storage Systems
- Switch Mode Power Supplies (SMPS)

Die Information

- Wafer Diameter 6 inch
- Die Size 4,380 x 6,380 μm
- Metallization
  - Top Al/Si/Cu 5 μm
  - Back Ti/NiV/Ag 0.5 μm
- Die Thickness Typ. 100 μm
- Gate Pad Size 1300 x 1068 μm

Die Layouc6.52 1 76.0002 Tc 551.622 c3906 Tm0 06.tre Di5SSoi2.6250 06.tre Di5S

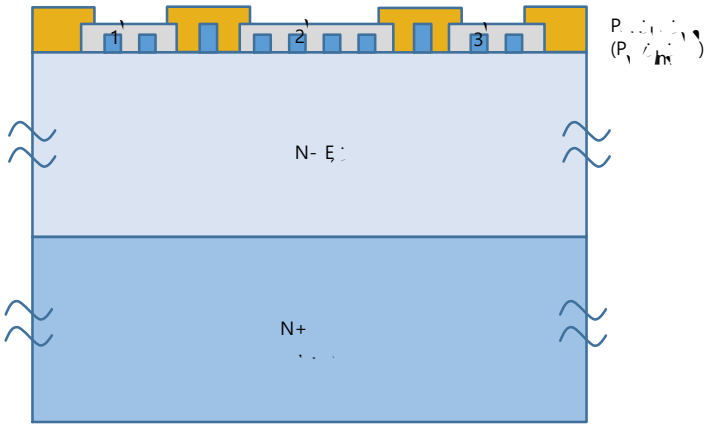


Figure 1. Bare Die Dimensions

THERMAL CHARACTERISTICS

Parameter	Symbol	Typ	Max	Unit
Junction−to−Case − Steady State (Note 4)	$R_{\theta JC}$	0.17	0.22	°C/W
Junction−to−Ambient − Steady State (Note 4)	$R_{\theta JA}$	−	40	

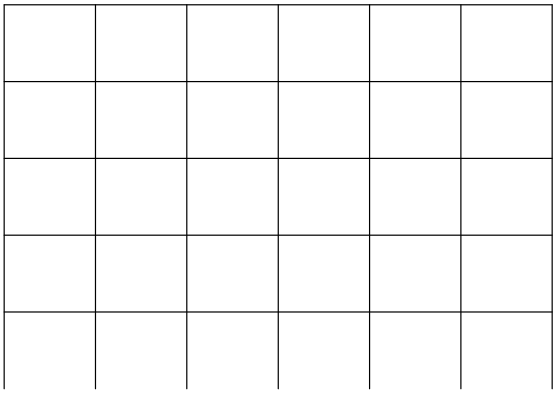
ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

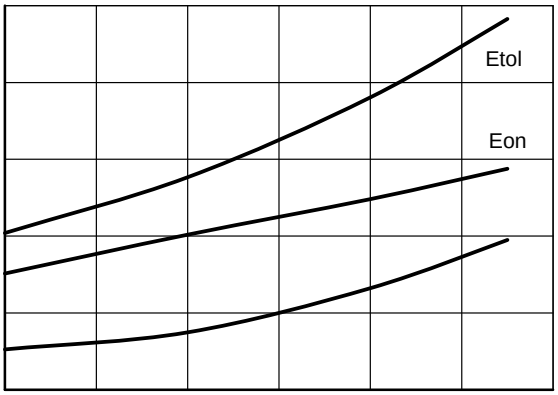
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF−STATE CHARACTERISTICS						
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA	1200	−	−	V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 1 mA, referenced to 25°C (Note 9)	−	0.3	−	V/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 1200 V, T_J = 25°C	−	−	100	μA
Gate−to−Source Leakage Current	I_{GSS}	V_{GS} = +22/−10 V, V_{DS} = 0 V	−	−		

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified) (continued)

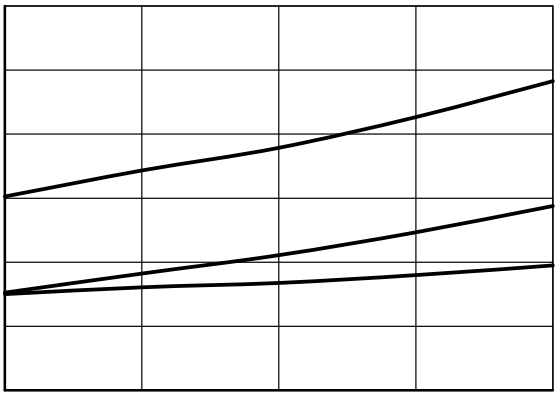
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
SOURCE−DRAIN DIODE CHARACTERISTICS						
Reverse Recovery Time	t_{RR}	V_{GS} = −3/18 V, I_{SD} = 75 A, dI_S				

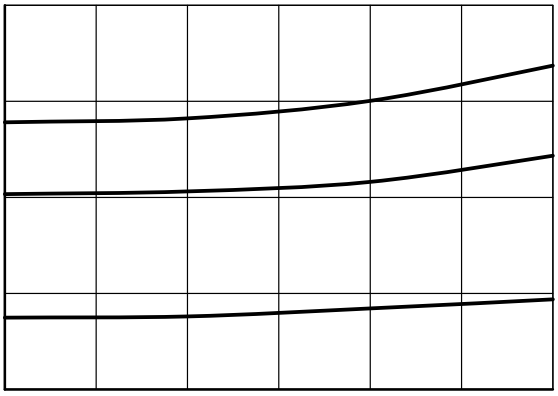
TYPICAL CHARACTERISTICS

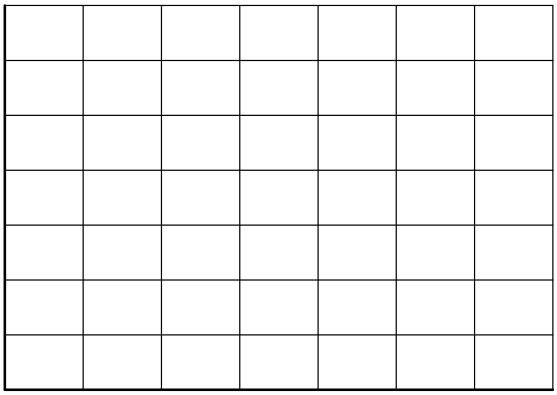




TYPICAL CHARACTERISTICS







TYPICAL CHARACTERISTICS

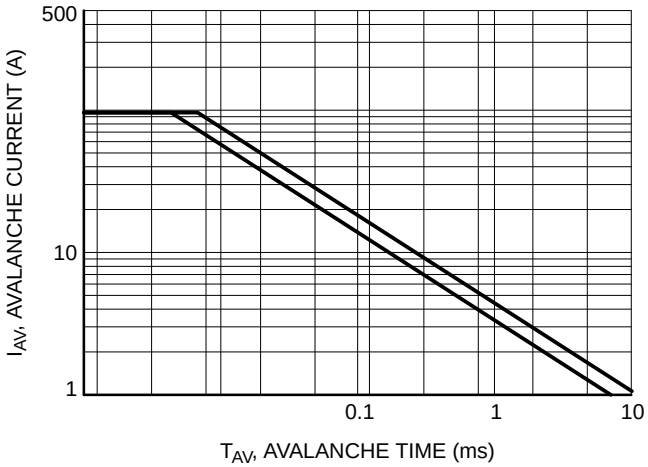


Figure 14. Unclamped Inductive Switching Capability

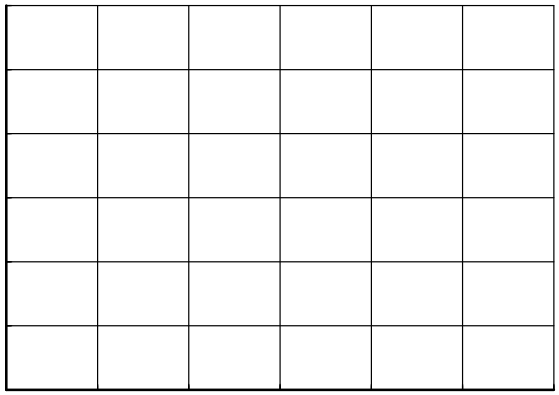


Figure 15. Maximum Continuous Drain Current vs. Case Temperature

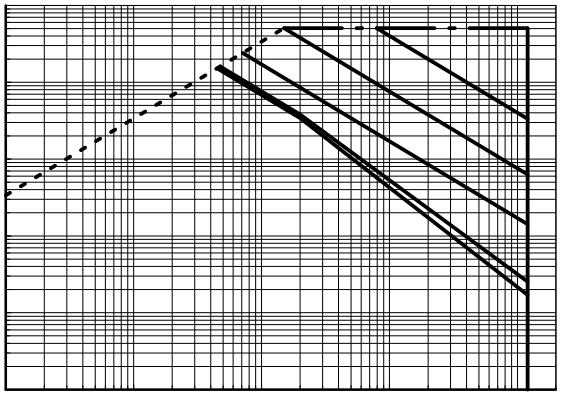


Figure 16. Safe Operating Area

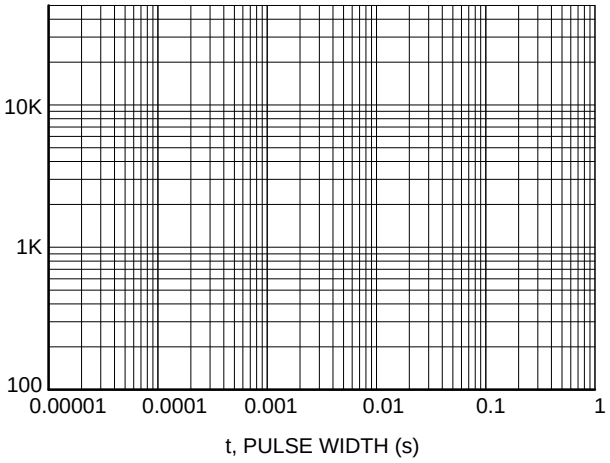


Figure 17. Single Pulse Maximum Power Dissipation

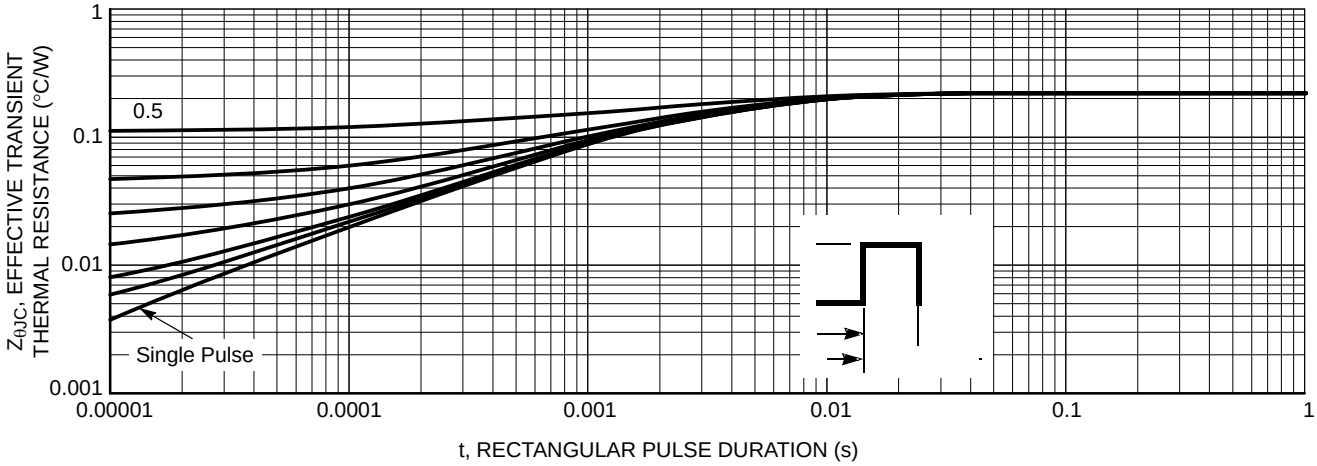


Figure 18. Junction−to−Case Transient Thermal Response