

MSQ120.12

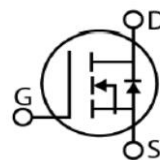
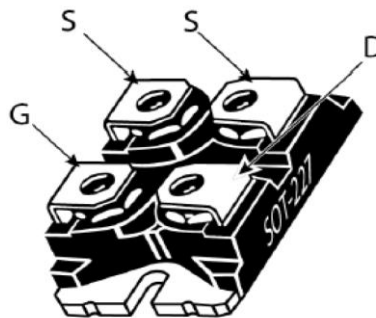
SIC MOSFET

Features:

- High speed switching low capacitances
- High blocking voltage with low RDS (on)
- Fast and reliable body diode
- Easy to parallel and simple to drive
- Superior avalanche ruggedness
- ROHS compliant, Halogen free
- isolated voltage to 2500V

Typical applications:

- PV inverter, converter and industrial motor drives
- Smart grid transmission and distribution
- induction heating and welding
- Power supply and distribution
- H/EV powertrain and EV charge



G—Gate
D—Drain
S—Source

Symbol	Characteristics	Test Conditions		Value			Unit
				Min	Typ	Max	
● Absolute Maximum Ratings (Tc = 25°C)							
V _{DS}	Drain-Source voltage					1200	V
I _D	Drain current (continuous)		Tc = 25°C			120	A
			Tc = 100°C			90	A
I _{DM}	Drain current (pulsed)					270	A
V _{GS}	Gate-Source voltage			-10		+22	V
P _D	power dissipation					600	W
T _j	Junction temperature			-55		+175	°C
T _{stg}	Storage temperature			-55		+175	°C
● Typical Performance - Static (Tj = 25°C unless otherwise specified)							
BV _{DS}	Drain-Source breakdown voltage	I _D = 250μA, V _{GS} = 0V		1200			V
I _{DSS}	Zero gate voltage drain current	V _{DS} = 1200V, V _{GS} = 0V, Tj = 25°C			5	100	μA
I _{GSS}	Gate-body leakage current	V _{DS} = 0V, V _{GS} = -10 to 20V			10	250	nA
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = 22mA		2	3	4	V
V _{GSon}	Recommended turn-on voltage	Static			18		V
V _{GSoff}	Recommended turn-off voltage				-5		V
R _{DS(on)}	Static Drain-source on resistance	V _{GS} = 18V, I _D = 50A	Tj = 25°C		16	22	mΩ
			Tj = 175°C		28		mΩ

Symbol	Characteristics	Test Conditions	Value			Unit	
			Min	Typ	Max		
● Typical Performance - Dynamic (Tj = 25°C unless otherwise specified)							
C _{ISS}	Input capacitance	V _{DS} = 1000V, f = 1MHz, V _{AC} = 25mV		6878		pF	
C _{OSS}	Output capacitance			288		pF	
C _{RSS}	Reverse transfer capacitance			13		pF	
g _{fs}	Transconductance	V _{DS} = 20V, I _D = 50A		51		S	
E _{OSS}	Coss stored energy	V _{DS} = 1000V, f = 1MHz		141		μJ	
E _{ON}	Turn-on energy (body diode)	V _{DS} = 800V, V _{GS} = -5/20V, I _D = 50A, L = 68μH, Tj = 175°C		2.35		mJ	
E _{OFF}	Turn-off energy (body diode)			0.67		mJ	
Q _g	Total gate charge	V _{DS} = 800V, V _{GS} = -5/20V, I _D = 50A		238		nC	
Q _{gs}	Gate-source charge			76.7		nC	
Q _{gd}	Gate-drain charge			78.3		nC	
R _{G (int)}	Internal gate resistor	f = 1MHz, V _{AC} = 25mV		2.2		Ω	
t _{d(on)}	Turn-on delay time	V _{DS} = 800V, V _{GS} = -5/20V, I _D = 50A, L = 68μH, R _{ext} = 2.5Ω		48		ns	
t _r	Rise time			35		ns	
t _{d(off)}	Turn-off delay time			75		ns	
t _f	Fall time			16		ns	
● Typical Performance - Reverse Diode (Tj = 25°C unless otherwise specified)							
V _{FSD}	Forward voltage	V _{GS} = 0V, I _F = 37.5A	Tj = 25°C		3.5	6	V
			Tj = 175°C		3	6	V
I _S	Continuous diode forward current	V _{GS} = 0V, Tc = 25°C			110		A
t _{rr}	Reverse recovery time	V _{GS} = -5V, I _F = 50A, V _R = 800V, di/dt = 900A/μs, Tj = 175°C		98			ns
Q _{rr}	Reverse recovery charge			613			nC
I _{rrm}	Peak reverse recovery current			18			A
● Thermal characteristics							
R _{th(j-c)}	Thermal resistance, junction to case				0.25		°C/W
R _{th(j-A)}	Thermal resistance, junction to Ambient				40		°C/W

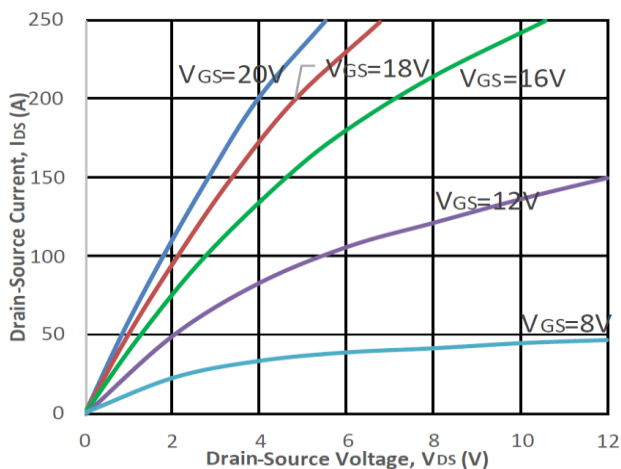
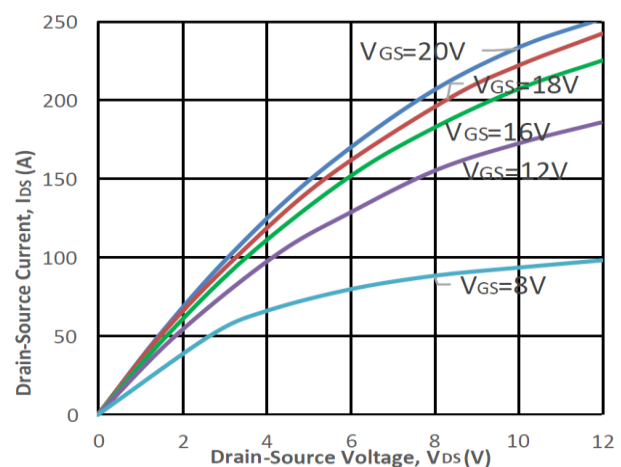
Fig1. Output characteristics ($T_j = 25^\circ\text{C}$)

Fig2. Output characteristics ($T_j = 175^\circ\text{C}$)


Fig3. Normalized On-Resistance vs. Temperature

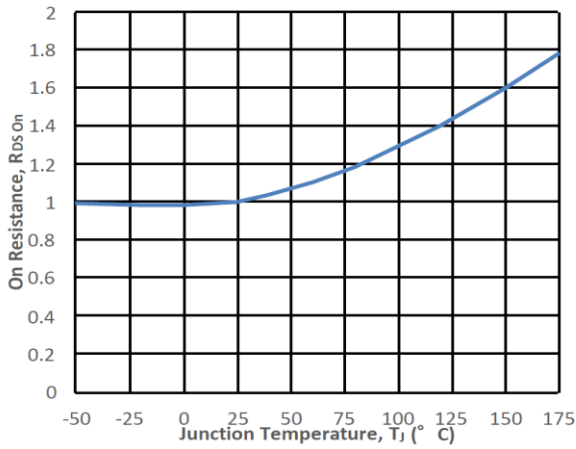


Fig4. On-Resistance vs. Temperature

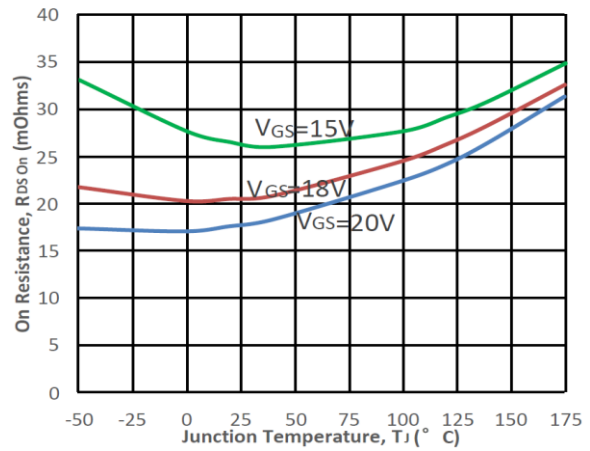


Fig5. Transfer Characteristic

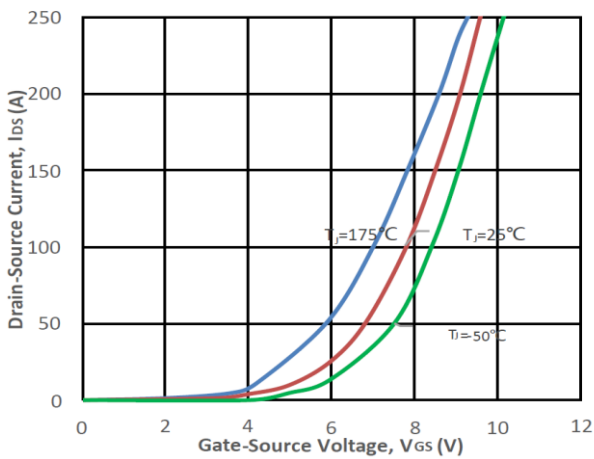


Fig6. Body Diode Characteristic at 25 °C

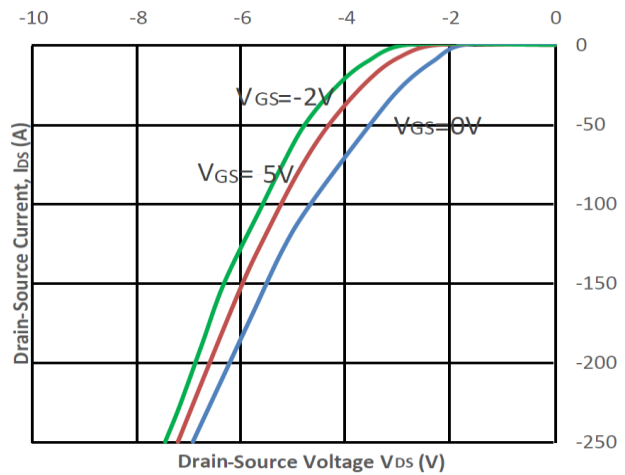


Fig7. Threshold Voltage vs. Temperature

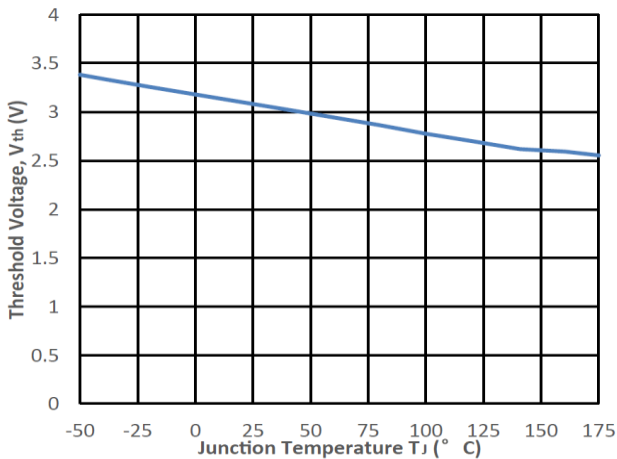


Fig8. Gate Charge Characteristics

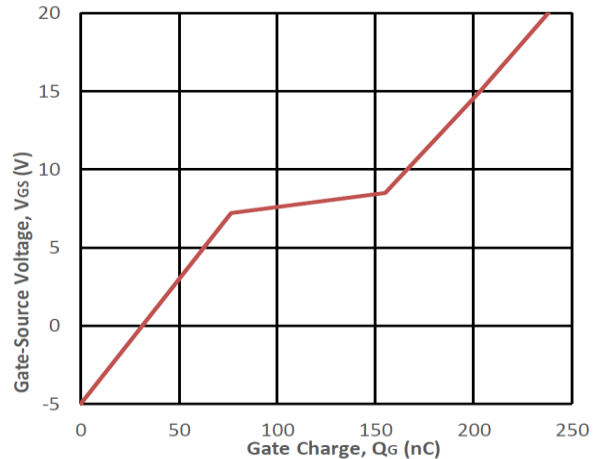


Fig9. 3rd Quadrant Characteristic at 25 °C

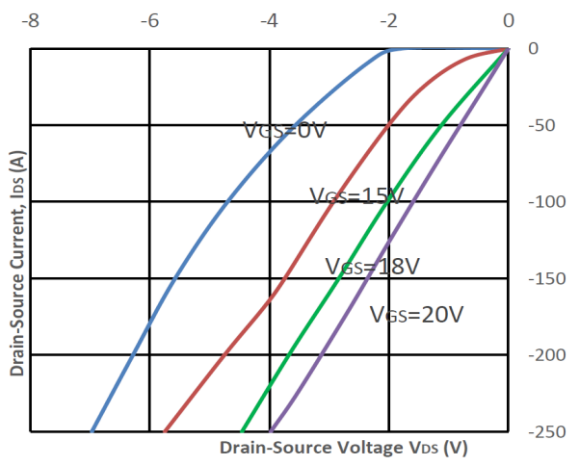


Fig10. Output Capacitor Stored Energy

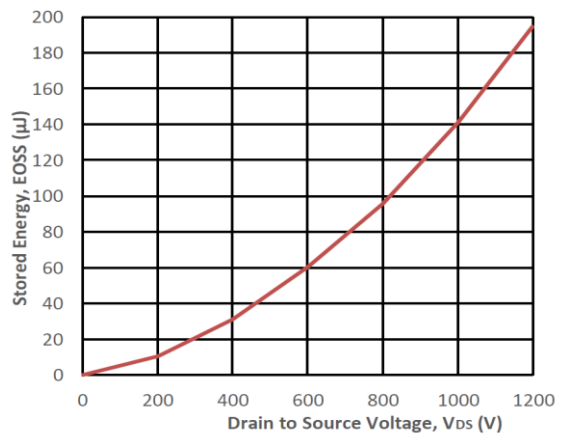


Fig11. Capacitances vs. Drain-Source

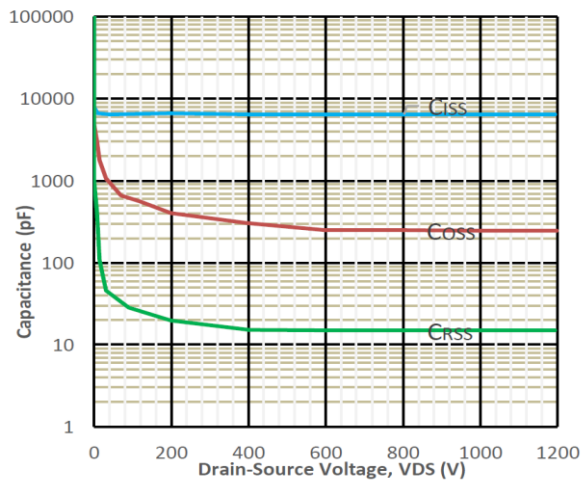


Fig12. Max Power Dissipation Derating Vs Tc

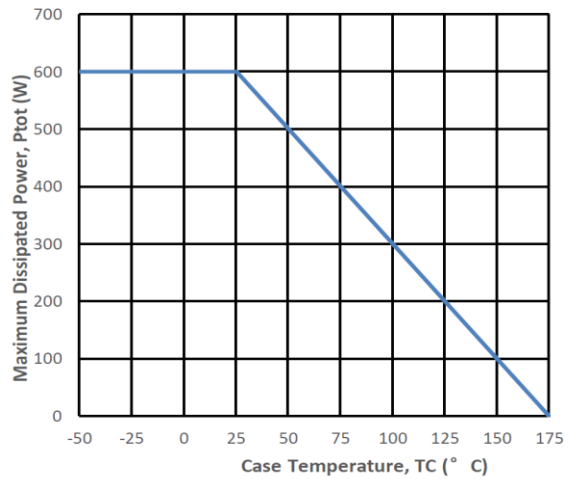


Fig13. Switching Energy vs. Drain Current
V_GS = -5/+20 V, V_DS = 800V, L = 68μH, R_G(ext) = 2.5Ω

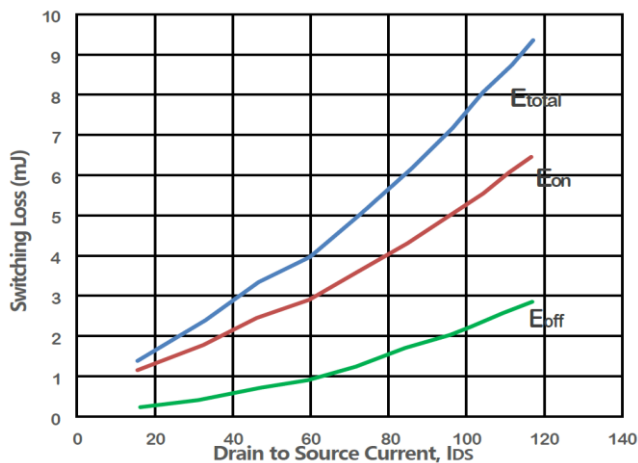


Fig14. Switching Energy vs. R_G(ext)
V_GS = -5/+20 V, V_DS = 800V, L = 68μH

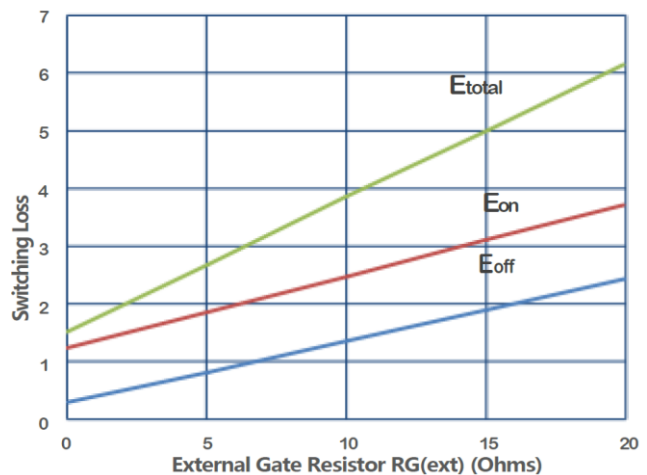


Fig15. Switching Energy vs. Temperature
 $V_{GS} = -5/+20V$, $V_{DS} = 800V$, $L = 68\mu H$, $R_{G(ext)} = 2.5\Omega$

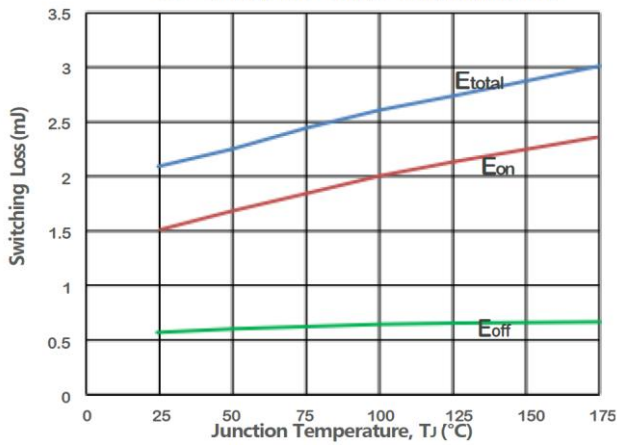


Fig16. Switching Times vs. R_{G(ext)}
 $V_{GS} = -5/+20V$, $V_{DS} = 800V$, $L = 68\mu H$

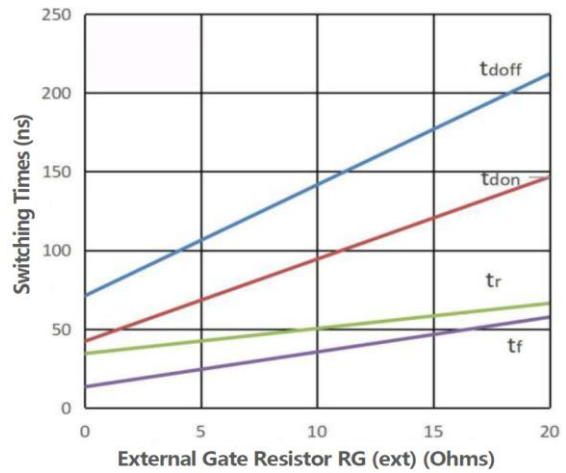


Fig17. Transient Thermal Impedance

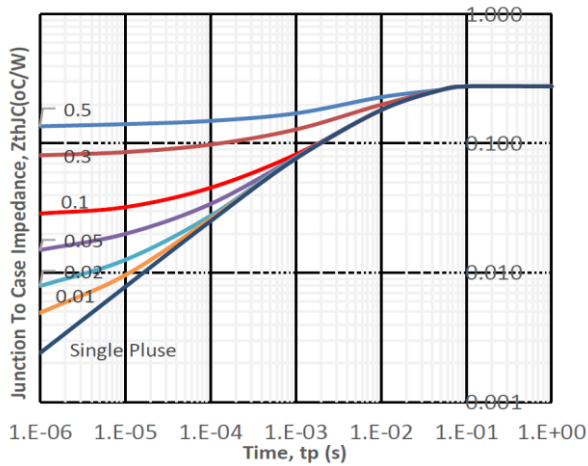
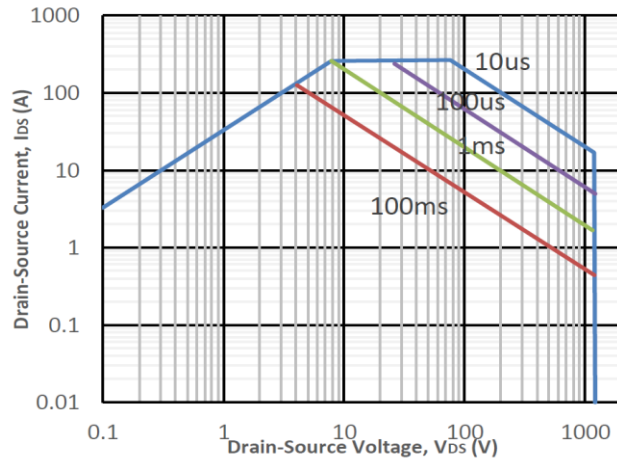
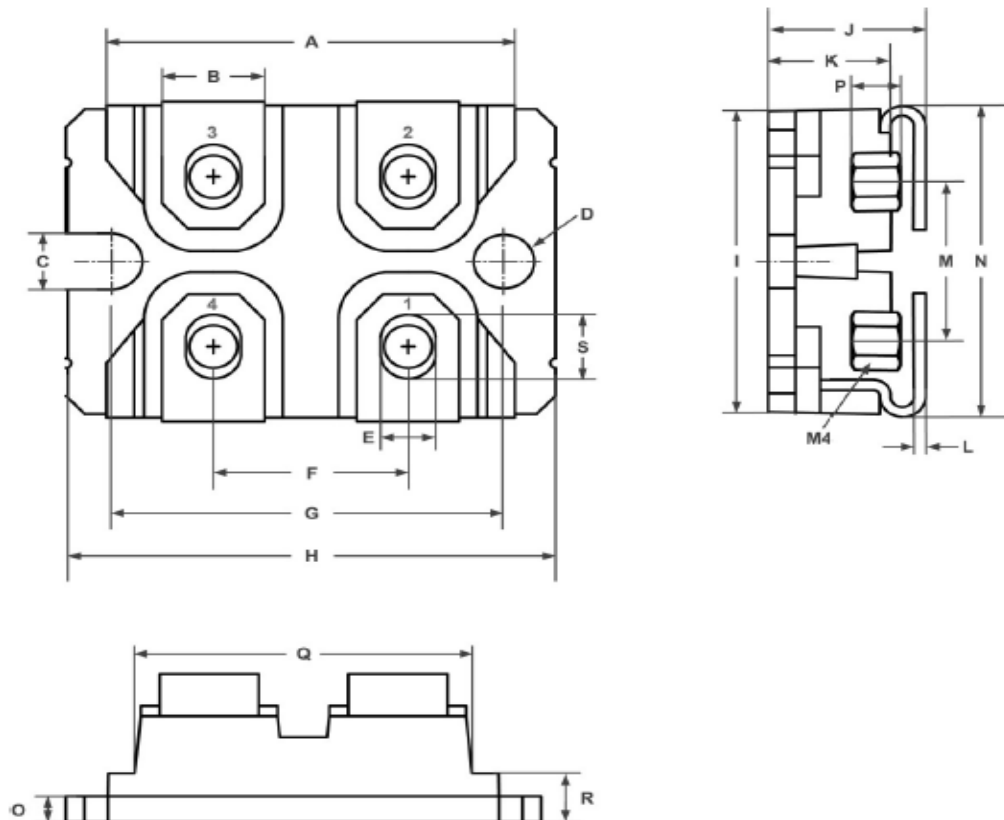


Fig18. Safe Operating Area



Outline:



Symbol	Millimeters			Symbol	Millimeters		
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	31,40	31,50	31,60	K	9,40	9,50	9,60
B	7,70	7,90	8,10	L	0,75	0,80	0,85
C	4,20	4,30	4,40	M	12,40	12,60	12,80
D	4,20	4,30	4,40	N	24,50	24,95	25,40
E	4,10	4,20	4,30	O	1,90	2,00	2,10
F	14,90	15,00	15,10	P	3,10	3,525	3,95
G	30,10	30,15	30,20	Q	26,60	26,80	27,00
H	38,00	38,20	38,40	R	3,80	4,00	4,20
I	23,80	24,00	24,20	S	5,10	5,25	5,40
J	11,80	12,00	12,20				

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Scomes Srl reserves the right to change any specification without notice