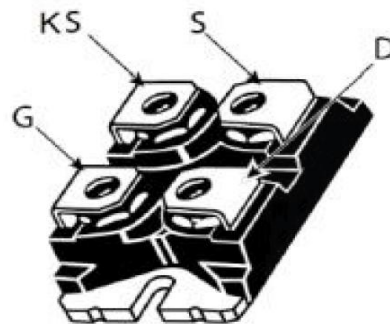


MSK250.12

SIC MOSFET

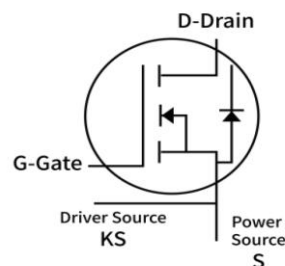
Features:

- 3rd Generation SiC MOSFET Technology
- High speed switching low capacitances
- High blocking voltage with low $R_{DS(on)}$
- Optimized package with separate driver source pin
- Easy to parallel and simple to drive
- ROHS compliant, Halogen free



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



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				250	A
		Tc = 100°C				180	A
I _{DM}	Drain current (pulsed)					400	A
V _{GS}	Gate-Source voltage			-10		+22	V
P _D	power dissipation					833	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			10	100	μA
I _{GSS}	Gate-body leakage current	V _{DS} = 0V, V _{GS} = -5 to 20V			155	250	nA
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = 40mA		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 = 100A			7.5	9	mΩ
					12		mΩ

Symbol	Characteristics	Test Conditions	Value			Unit	
			Min	Typ	Max		
● Typical Performance - Dynamic (T _j = 25°C unless otherwise specified)							
C _{ISS}	Input capacitance	V _{DS} = 1000V, f = 1MHz, V _{AC} = 25mV		13.8		pF	
C _{OSS}	Output capacitance			568		pF	
C _{RSS}	Reverse transfer capacitance			28		pF	
g _{fs}	Transconductance	V _{DS} = 20V, I _D = 100A		65		S	
E _{OSS}	Coss stored energy	V _{DS} = 1000V, f = 1MHz		285		μJ	
E _{ON}	Turn-on energy (body diode)	V _{DS} = 800V, V _{GS} = -5/18V, I _D = 100A, L = 68μH, R _{G(ext)} = 2.5Ω, T _j = 175°C		6.5		mJ	
E _{OFF}	Turn-off energy (body diode)			3.5		mJ	
Q _g	Total gate charge	V _{DS} = 800V, V _{GS} = -5/18V, I _D = 100A		412		nC	
Q _{gs}	Gate-source charge			145		nC	
Q _{gd}	Gate-drain charge			128		nC	
R _{G (int)}	Internal gate resistor	f = 1MHz, V _{AC} = 25mV		1.1		Ω	
t _{d(on)}	Turn-on delay time	V _{DS} = 800V, V _{GS} = -5/18V, I _D = 100A, L = 68μH, R _{G(ext)} = 2.5Ω		58		ns	
t _r	Rise time			56		ns	
t _{d(off)}	Turn-off delay time			105		ns	
t _f	Fall time			36		ns	
● Typical Performance - Reverse Diode (T _j = 25°C unless otherwise specified)							
V _{FSD}	Forward voltage	V _{GS} = 0V, I _F = 70A	T _j = 25°C		3.6	6	V
			T _j = 175°C		3.2	6	V
I _S	Continuous diode forward current	V _{GS} = 0V, T _c = 25°C		180		A	
t _{rr}	Reverse recovery time	V _{GS} = -5V, I _F = 100A, V _R = 800V, di/dt = 900A/μs, T _j = 175°C		115		ns	
Q _{rr}	Reverse recovery charge			735		nC	
I _{rrm}	Peak reverse recovery current			28		A	
● Thermal characteristics							
R _{th(j-c)}	Thermal resistance, junction to case			0.18		°C/W	
R _{th(j-A)}	Thermal resistance, junction to Ambient			40		°C/W	

Figure 1

Output Characteristics (T_j = 25 °C)

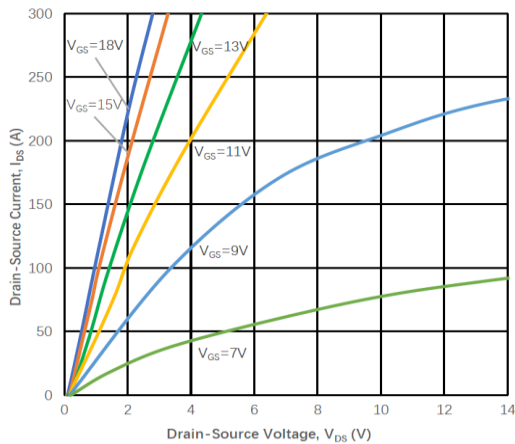


Figure 2

Output Characteristics (T_j = 175°C)

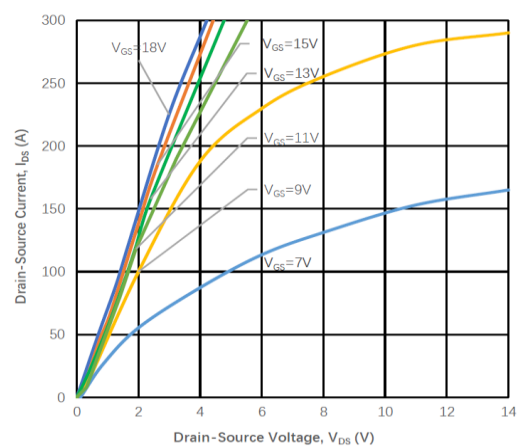


Figure 3

Normalized On-Resistance vs. Temperature

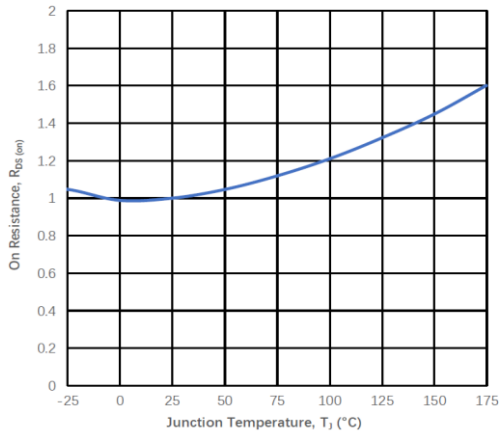


Figure 4

On-Resistance vs. Temperature

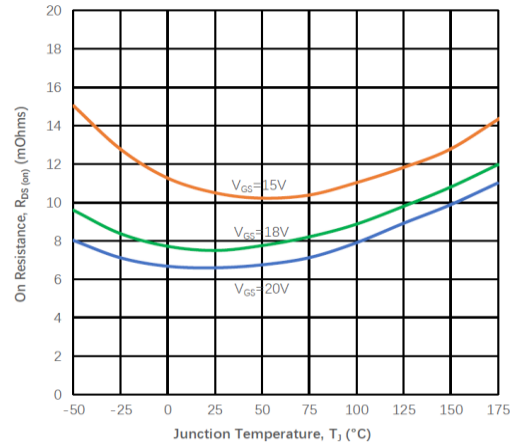


Figure 5

Transfer Characteristic

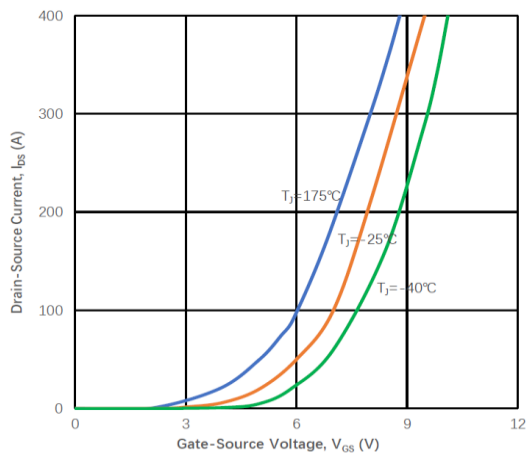


Figure 6

Body Diode Characteristic at 25°C

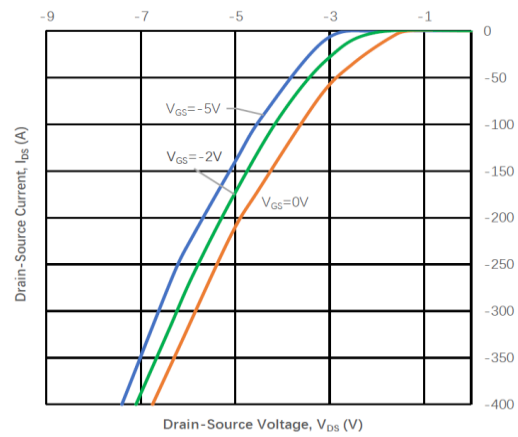


Figure 7

Threshold Voltage vs. Temperature

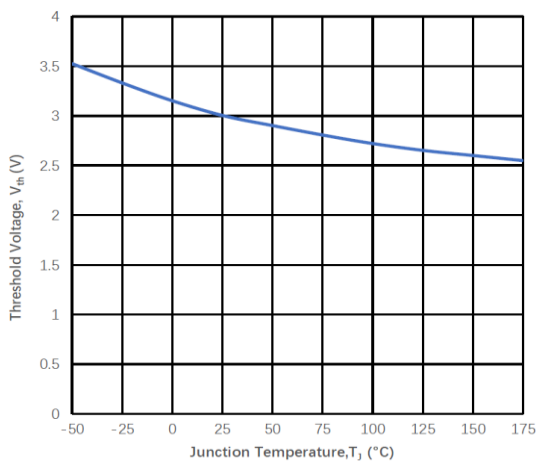


Figure 8

Gate Charge Characteristics

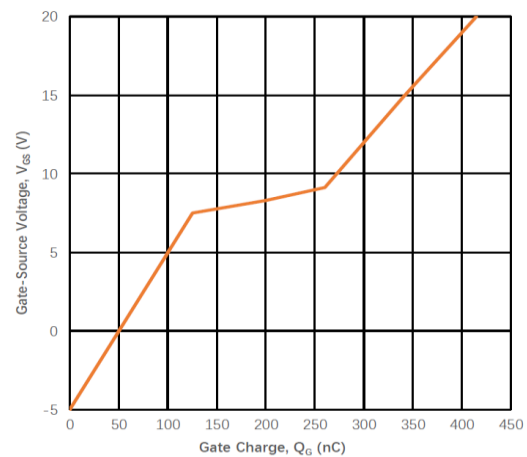


Figure 9

3rd Quadrant Characteristic at 25°C

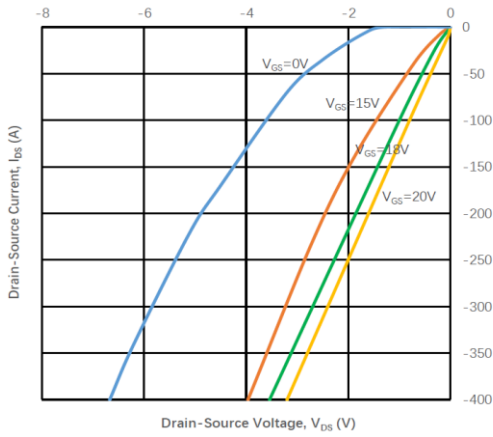


Figure 10

Output Capacitor Stored Energy

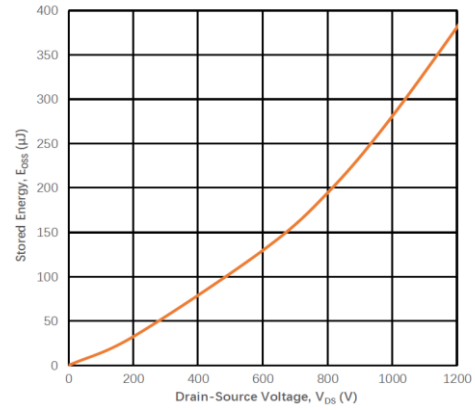


Figure 11

Capacitances vs. Drain-Source

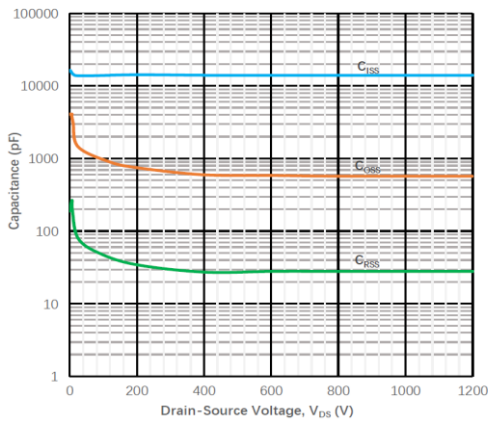


Figure 12

Max Power Dissipation Derating vs T_c

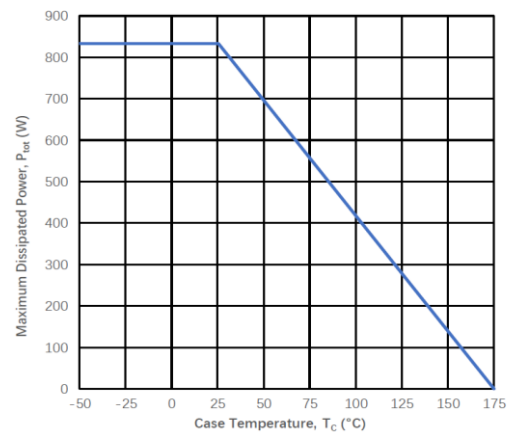


Figure 13

Switching Energy vs. Drain Current
 $V_{GS} = -5/+18V$ $V_{DS} = 800V$ $L = 68\mu H$ $R_{G(ext)} = 2.5\Omega$

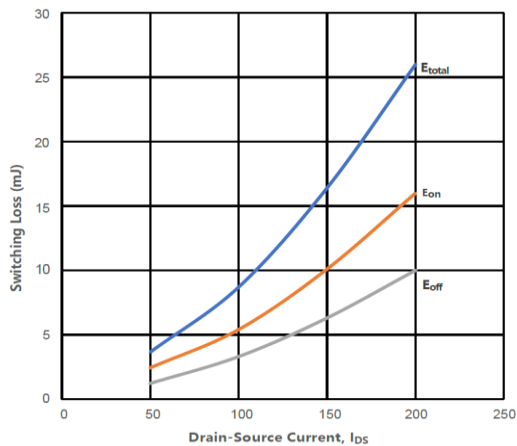


Figure 14

Switching Energy vs. $R_{G(ext)}$

$V_{GS} = -5/+18V$ $V_{DS} = 800V$
 $L = 68\mu H$ $I_D = 100A$

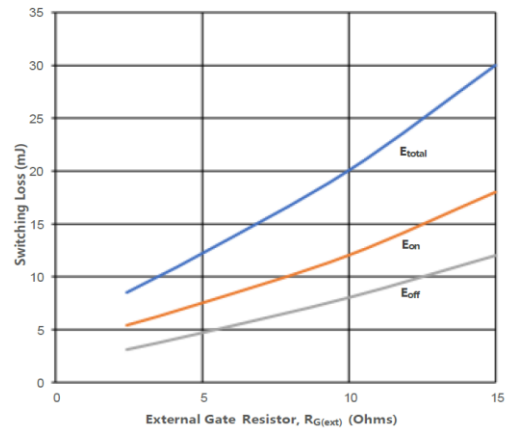


Figure 15

Switching Energy vs. Temperature

$V_{GS} = -5/+18V$; $V_{DS} = 800V$; $L = 68\mu H$; $I_D = 100A$; $R_{G(ext)} = 2.5\Omega$

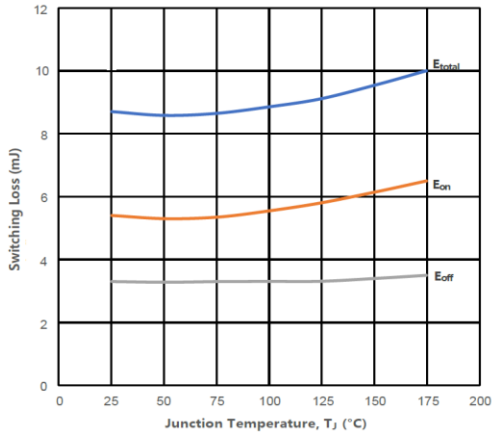


Figure 16

Switching Times vs. $R_{G(ext)}$

$V_{GS} = -5/+18V$; $V_{DS} = 800V$; $I_D = 100A$; $L = 68\mu H$

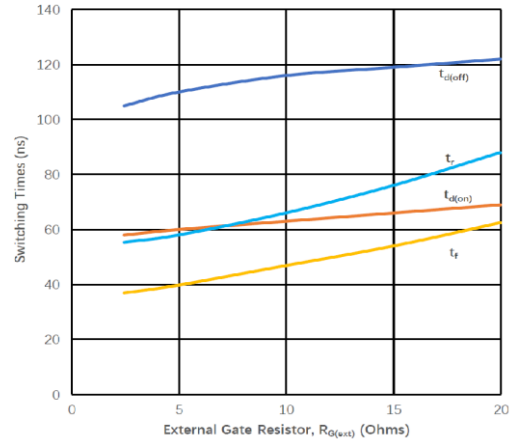


Figure 17

Transient Thermal Impedance

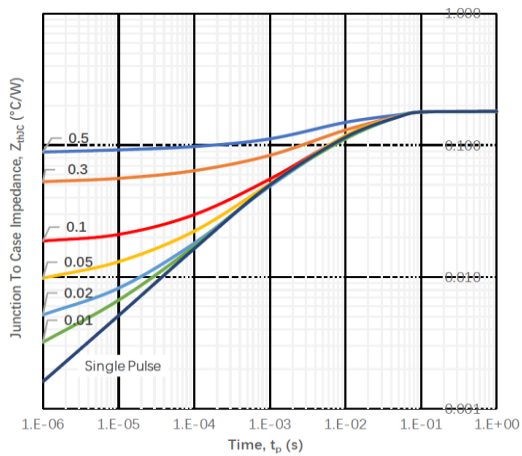
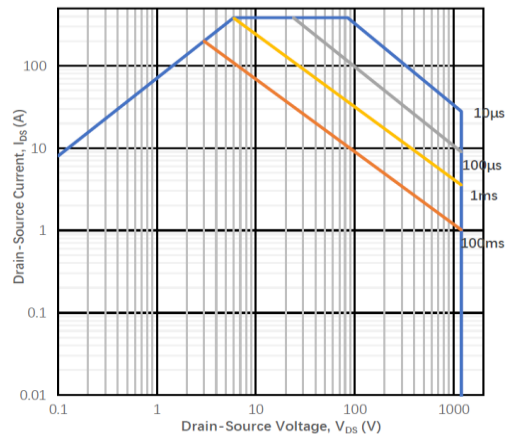
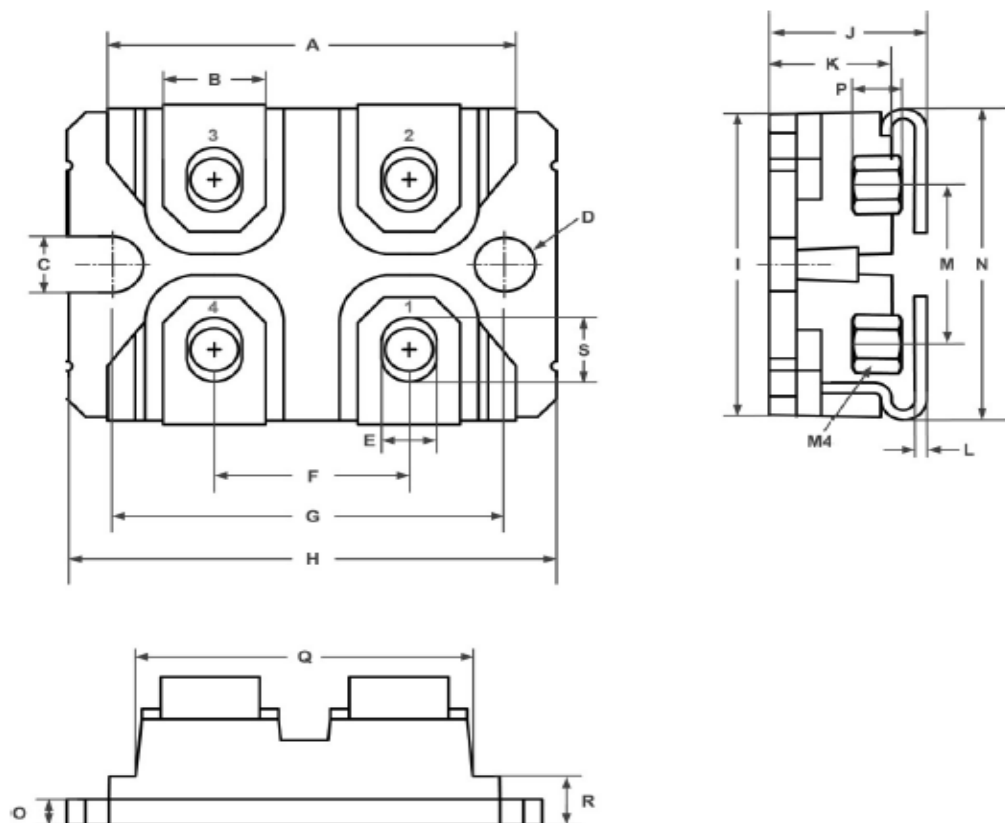


Figure 18

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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