onsemi

Silicon Carbide (SiC) MOSFET - EliteSiC, 23 mohm, 650 V, M3S, TO-247-4L

NTH4L023N065M3S

Features

- Typical $R_{DS(on)} = 23 \text{ m}\Omega @ V_{GS} = 18 \text{ V}$
- Ultra Low Gate Charge ($Q_{G(tot)} = 69 \text{ nC}$)
- High Speed Switching with Low Capacitance ($C_{oss} = 153 \text{ pF}$)
- 100% Avalanche Tested
- This Device is Halide Free and RoHS Compliant with Exemption 7a, Pb–Free 2LI (on second level interconnection)

Applications

• SMPS, Solar Inverters, UPS, Energy Storages, EV Charging Infrastructure

MAXIMUM RATINGS (T_J = 25° C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	650	V

THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case (Note 3)	$R_{ ext{ heta}JC}$	0.61	°C/W
Thermal Resistance, Junction-to-Ambient (Note 3)	R_{\thetaJA}	40	

3. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Operation Values of Gate-to-Source Voltage	V _{GSop}	-53 +18	V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

ELECTRICAL CHARACTERISTICS ($T_J = 25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit
OFF CHARACTERISTICS						

Drain-to-Source Breakdown Voltage $V_{(BR)DSS}$ $V_{GS} = 0 V$, $I_D = 1 mA$, $T_J = 25^{\circ}C$

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

Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	$V_{GS} = -3/18$ V, $V_{DD} = 400$ V,	-	9.6	_	ns
Turn-Off Delay Time	t _{d(OFF)}	$\Box_{\rm D}$ = 20 A, R _G = 4.7 Ω, I _J = 175°C (Notes 4 and 5)	_	41	-	
Rise Time	t _r		_	14	-	
Fall Time	t _f		-	12	-	
Turn-On Switching Loss	E _{ON}	7	_	51	-	μJ
Turn–Off Switching Loss	E _{OFF}	7	_	45	-	
Total Switching Loss	E _{TOT}		-	96	-	
SOURCE TO DRAIN DIODE CHARA	CTERISTICS					
Forward Diode Voltage	V _{SD}	$I_{SD} = 20 \text{ A}, V_{GS} = -3 \text{ V}, T_J = 25^{\circ}\text{C}$ – 4.5	4.5	6.0	V	
		I_{SD} = 20 A, V_{GS} = -3 V, T_{J} = 175°C (Note 5)	-	4.2	-	
Reverse Recovery Time	t _{RR}	$V_{GS} = -3 V, I_S = 20 A,$	-	19	-	ns
Charge Time	t _a	dl/dt = 1000 A/μs, V _{DS} = 400 V, T _{.1} = 25°C (Note 5)	-	11	-	
Discharge Time	t					
						-

TYPICAL CHARACTERISTICS



Figure 1. Output Characteristics

Figure 2. Output Characteristics

TYPICAL CHARACTERISTICS



Figure 7. Capacitance Characteristics

Figure 8. Stored Energy vs Drain to Source Voltage

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A	E	Α	B A2	E1	Øp1 D2		
		Q					
E/2		D	Ø		D1		
			L1				
b2			A1				
b1 (3X)		L					
1		4					
e1	,	b(4X)	С				
+ 0.254	` 4 (М) в А (Л						

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