

PRODUCT FEATURES

- ☐ 1200V new semiconductor material-silicon carbide
- ☐ Optimized for low RDS(on) and high short-circuit ruggedness
- ☐ Low internal gate resistance for fast switching



APPLICATIONS

- ☐ High Frequency Switching Application
- ☐ Motor Drives
- ☐ Welding Machine
- ☐ UPS

MODULE CHARACTERISTICS($T_{vj}=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{isol}	Isolation test voltage	RMS, $f = 50\text{ Hz}$, $t = 5\text{ s}$	3500	V
CTI	Comparative tracking index		>200	
T_{stg}	Storage Temperature		-40~125	$^{\circ}\text{C}$
Torque	to heatsink	Recommended (M6)	3~5	Nm
	to terminal	Recommended (M5)	2.5~5	Nm
Weight			160	g
P_{tot}	Power Dissipation Per Mosfet	$T_C=25^{\circ}\text{C}$, $T_{vjmax}=175^{\circ}\text{C}$	321	W

MOSFET

ABSOLUTE MAXIMUM RATINGS($T_{vj}=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{DSS}	Drain - source voltage		1200	V
I_{DDC}	Continuous DC Drain Current	$V_{GS}=18\text{V}$, $T_C=100^{\circ}\text{C}$, $T_{vj}=175^{\circ}\text{C}$	80	A
I_{DRM}	Repetitive Peak Drain Current	tp limited by T_{vjmax}	160	A
V_{GSS}	Gate-source Voltage (Dynamic)	AC ($f > 1\text{ Hz}$)	-10/+23	V
V_{GSS}	Gate-source Voltage (Static)		-4/+18	V

MacMic Science & Technology Co., Ltd.

Add: #18, Hua Shan Zhong Lu, New District, Changzhou City, Jiangsu Province, P. R .of China

Tel.: +86-519-85163708 Fax: +86-519-85162291 Post Code: 213022 Website: www.macmicst.com

MMN14S120BC6NA

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=10\text{mA}, T_{vj}=25^{\circ}\text{C}$		2.5		V
$R_{DS(on)}$	Static drain-source on-state resistance	$I_D=66\text{A}, V_{GS}=18\text{V}, T_{vj}=25^{\circ}\text{C}$		13.8		m Ω
		$I_D=66\text{A}, V_{GS}=18\text{V}, T_{vj}=150^{\circ}\text{C}$		21.5		
		$I_D=66\text{A}, V_{GS}=18\text{V}, T_{vj}=175^{\circ}\text{C}$		25.3		
I_{DSS}	Reverse Bias Drain Current	$V_{DS}=1200\text{V}, V_{GS}=0\text{V}$			10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{DS}=0\text{V}, V_{GS}=23\text{V}$			200	nA
Q_G	Gate Charge	$V_{DS}=800\text{V}, V_{GS}=-4/18\text{V}$		0.24		μC
$R_{G(int)}$	Internal Gate Resistance	$f=100\text{kHz}$		0.4		Ω
C_{iss}	Input Capacitance	$V_{DS}=800\text{V}, V_{GS}=0\text{V}, f=100\text{kHz}$		5.98		nF
C_{oss}	Output Capacitance			0.32		
C_{rss}	Reverse Transfer Capacitance			0.015		
$t_{d(on)}$	Turn on Delay Time	$V_{DS}=800\text{V}, I_D=66\text{A}$ $R_{Gon}=10\Omega$ $R_{Goff}=4\Omega$ $V_{GS}=-4/18\text{V}$ $di/dt_{on}=5000\text{A}/\mu\text{s}$ $dv/dt_{off}=43000\text{V}/\mu\text{s}$ $(T_{vj}=175^{\circ}\text{C})$	$T_{vj}=25^{\circ}\text{C}$	27		ns
			$T_{vj}=175^{\circ}\text{C}$	28		
t_r	Rise Time		$T_{vj}=25^{\circ}\text{C}$	41		
			$T_{vj}=175^{\circ}\text{C}$	41		
$t_{d(off)}$	Turn off Delay Time		$T_{vj}=25^{\circ}\text{C}$	70		
			$T_{vj}=175^{\circ}\text{C}$	80		
t_f	Fall Time		$T_{vj}=25^{\circ}\text{C}$	15		
			$T_{vj}=175^{\circ}\text{C}$	16		
E_{on}	Turn on Energy		$T_{vj}=25^{\circ}\text{C}$	1.22		mJ
			$T_{vj}=175^{\circ}\text{C}$	1.28		
E_{off}	Turn off Energy		$T_{vj}=25^{\circ}\text{C}$	0.29		
			$T_{vj}=175^{\circ}\text{C}$	0.30		
$R_{th,jc}$	Junction to Case Thermal Resistance				0.467	K /W
T_{vjop}	Operating Temperature		-40		175	$^{\circ}\text{C}$

MMN14S120BC6NA

Body DIODE

ABSOLUTE MAXIMUM RATINGS($T_{vj}=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
I_{SD}	DC Body Diode Forward Current	$V_{GS}=-4\text{V}, T_C=100^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$	37	A

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

Symbol	Parameter/Test Conditions			Min.	Typ.	Max.	Unit
V _{SD}	Diode Forward Voltage	I _{SD} =66A , V _{GS} =-4V, T _{vj} =25℃			4.7		V
		I _{SD} =66A , V _{GS} =-4V, T _{vj} =150℃			4.24		
		I _{SD} =66A , V _{GS} =-4V, T _{vj} =175℃			4.1		
I _{rrm}	Peak reverse recovery current	V _{DS} =800V, V _{GS} =-4V, I _{SD} =66A, -di/dt=5700kA/μs (T _{vj} =175℃)	T _{vj} =25℃		79		A
			T _{vj} =175℃		125		
Q _{rr}	Reverse recovery charge		T _{vj} =25℃		2.22		μC
			T _{vj} =175℃		4.26		
E _{rec}	Reverse recovery energy		T _{vj} =25℃		1.4		mJ
			T _{vj} =175℃		3		

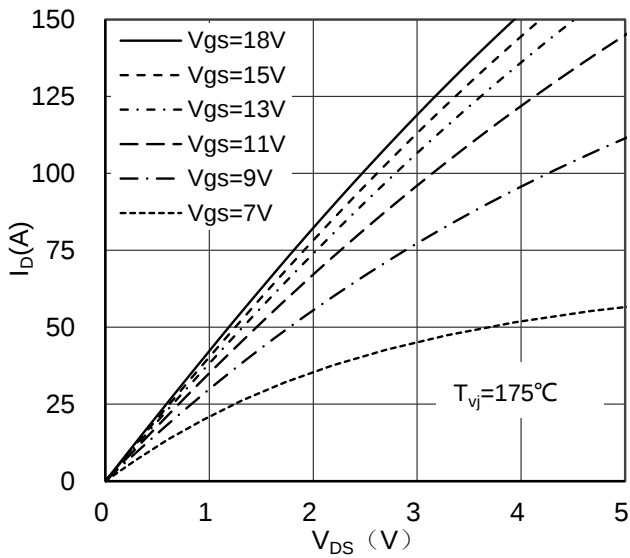


Figure 1. Typical Output Characteristics

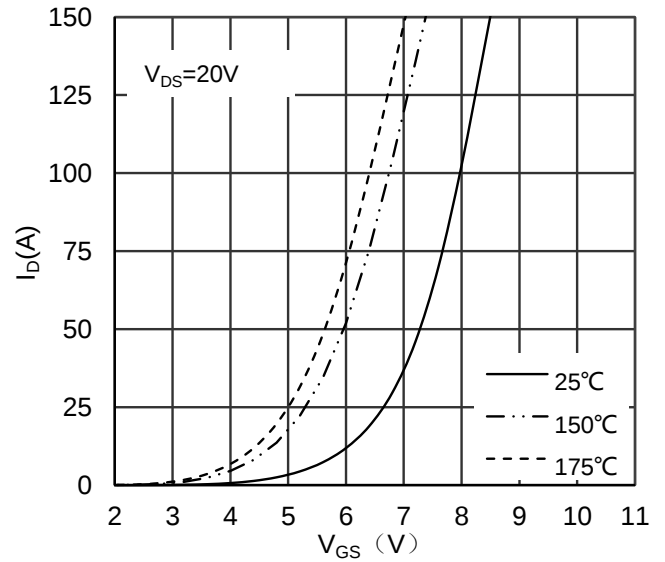


Figure 2. Typical Transfer characteristics

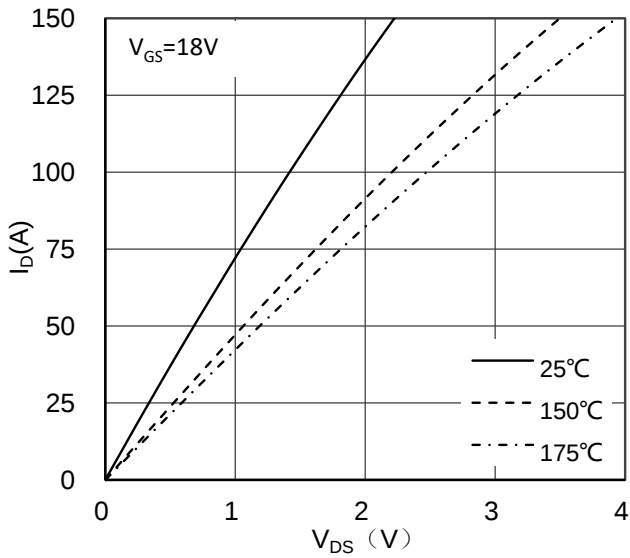


Figure 3. Typical Output Characteristics

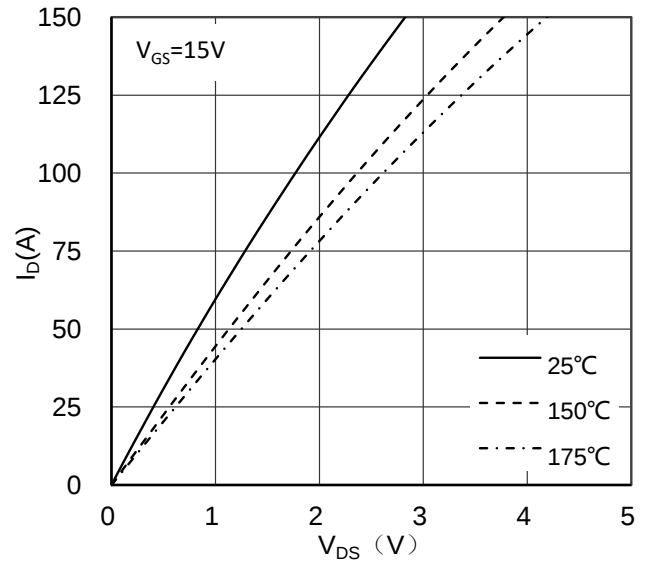


Figure 4. Typical Output Characteristics

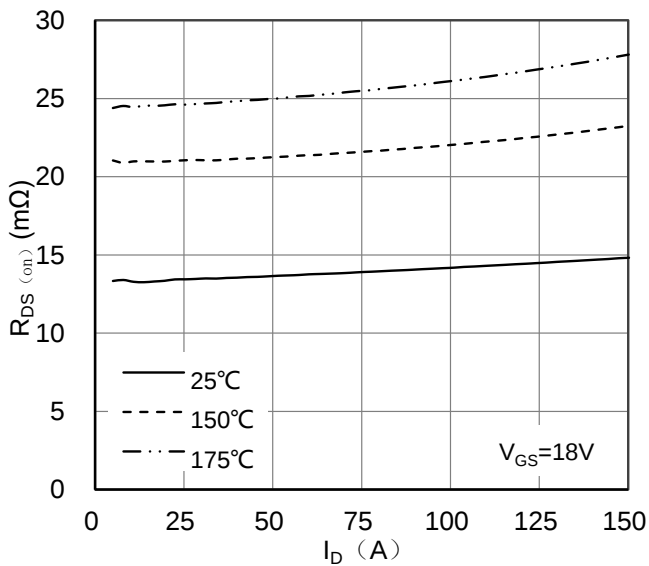


Figure 5. Typical Drain source on-resistance

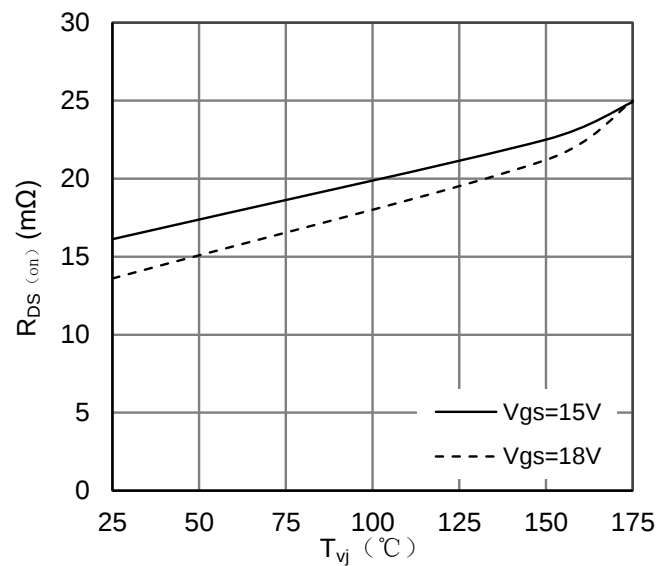


Figure 6. Typical Drain source on-resistance

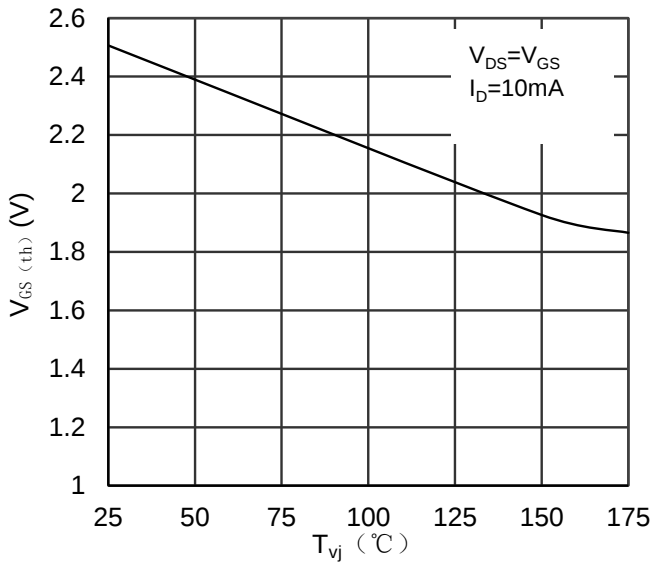


Figure 7. Typical Gate-source threshold voltage

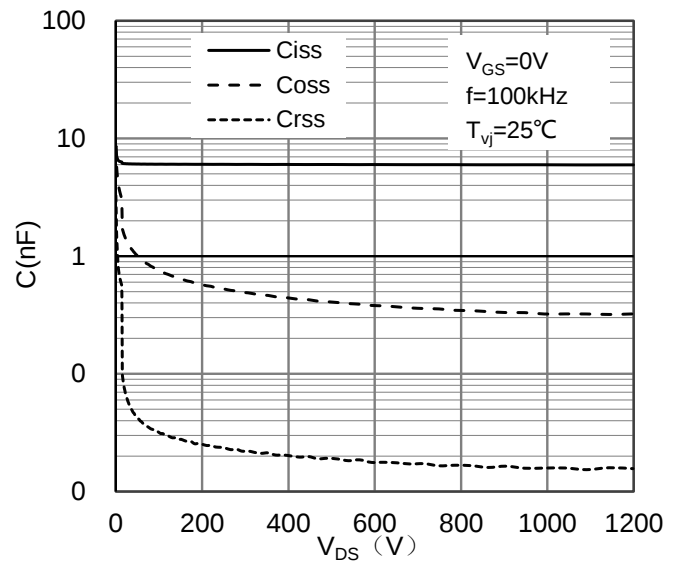


Figure 8. Typical capacitance

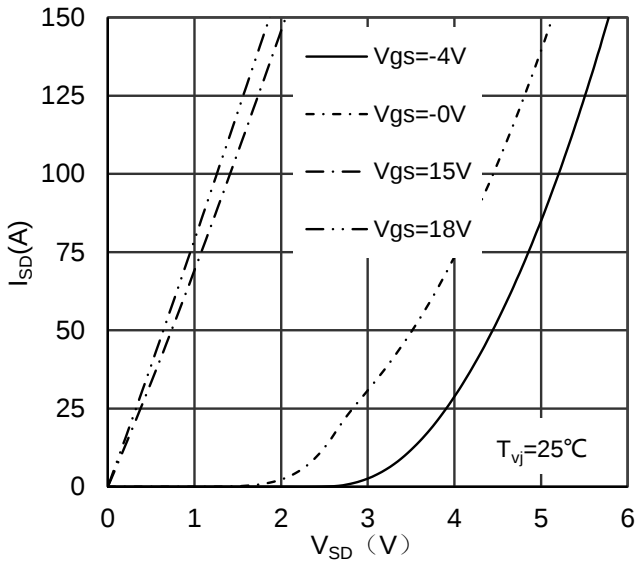


Figure 9. Typical Body Diode Forward

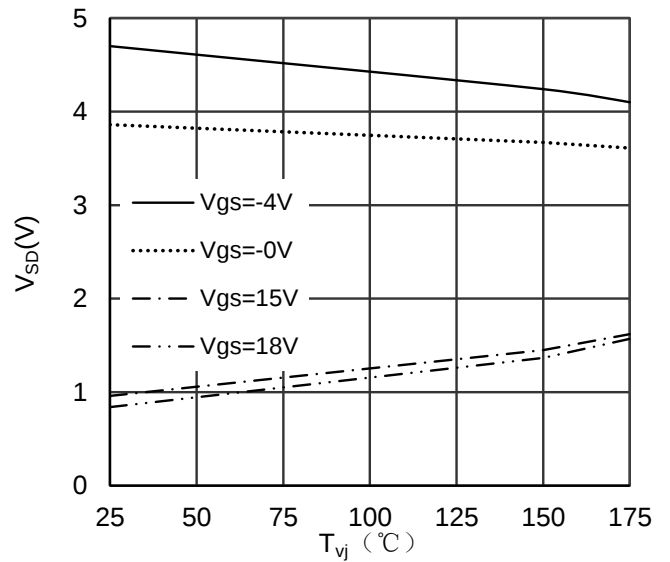


Figure 10. Typical Body Diode Forward Voltage

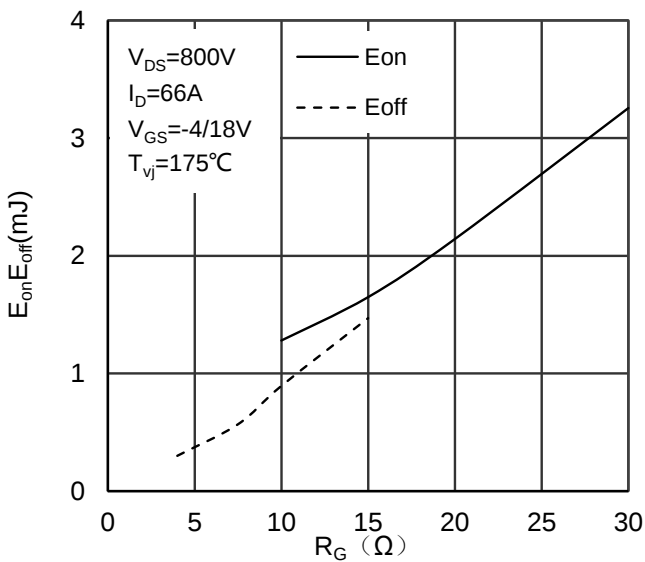


Figure 11. Typical Switching Energy

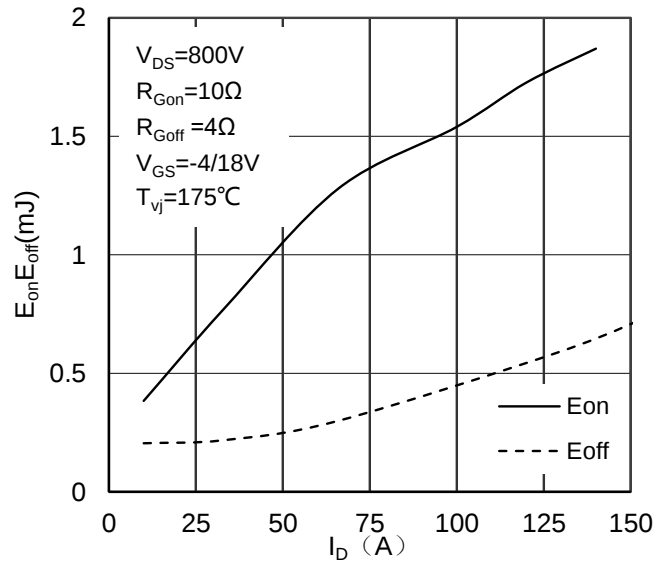


Figure 12. Typical Switching Energy

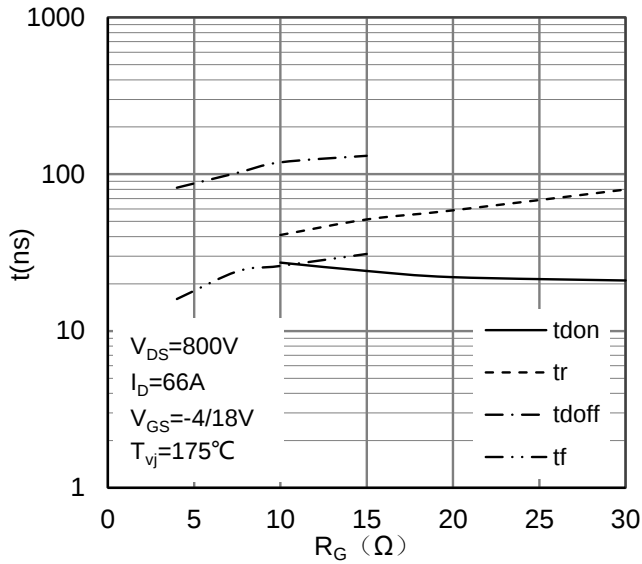


Figure 13. Typical Switching Times

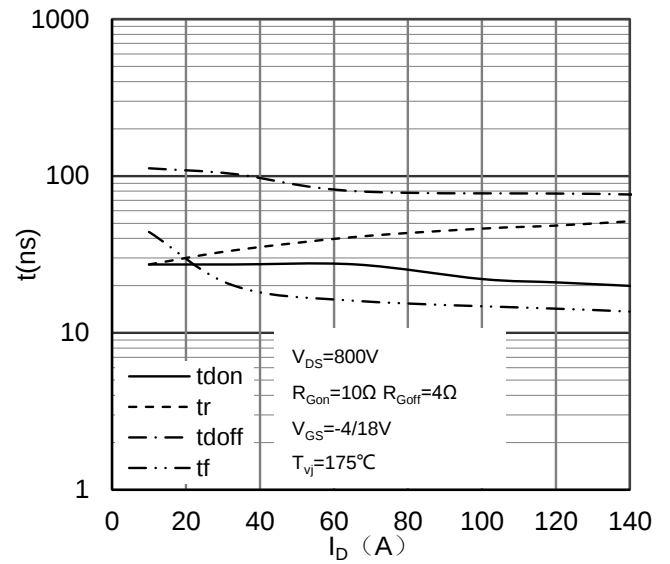


Figure 14. Typical Switching Times

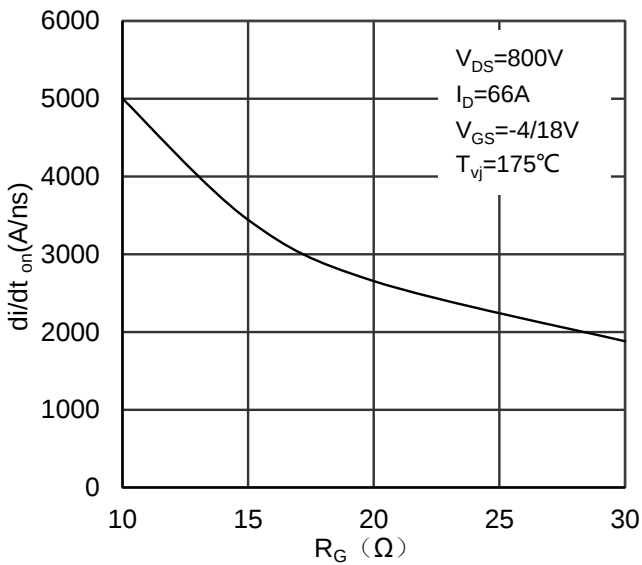


Figure 15. Typical Current slope

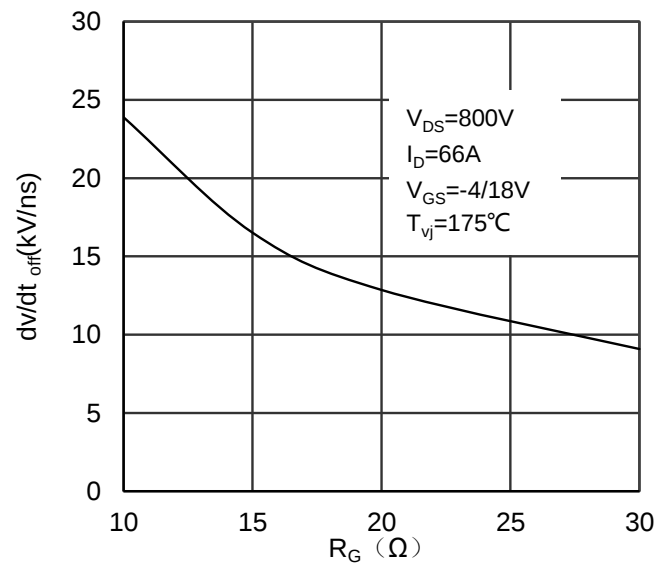


Figure 16. Typical Voltage slope

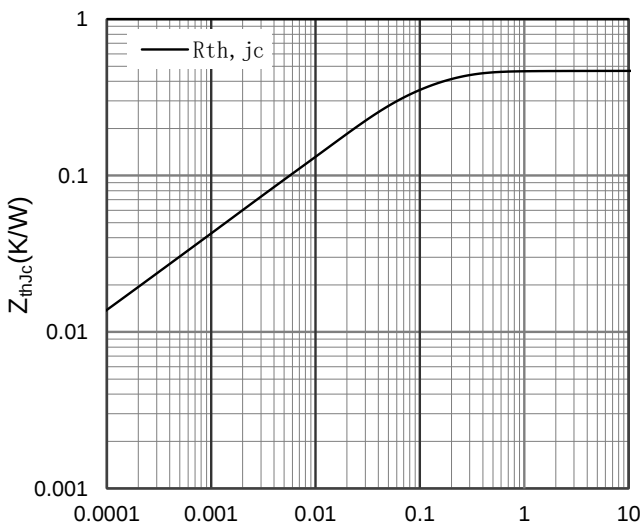


Figure 17. Transient Thermal Impedance

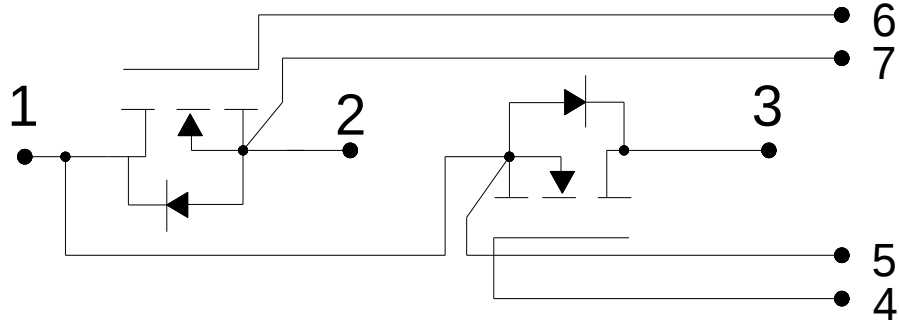
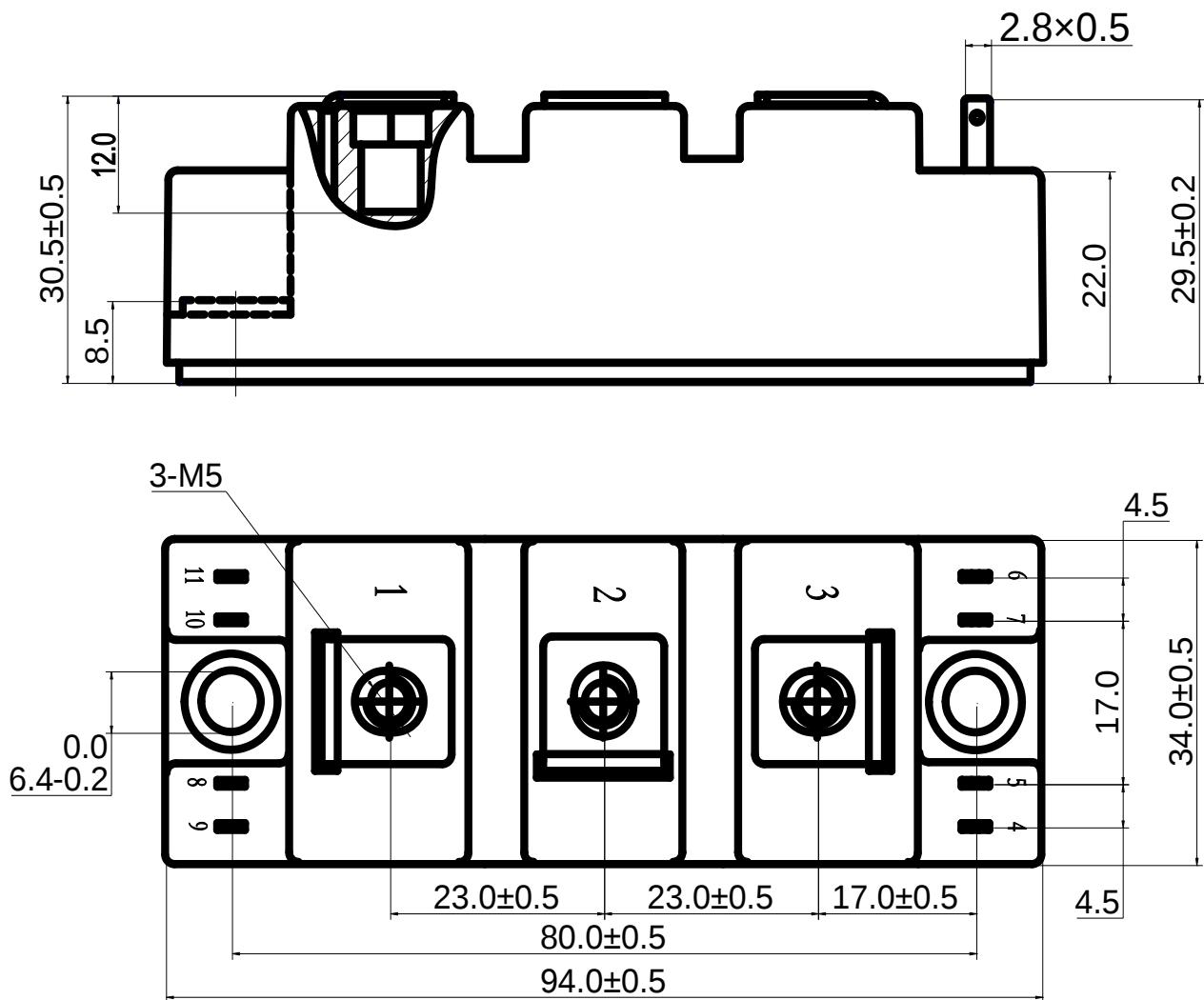


Figure 18. Circuit Diagram



Dimensions in (mm)

Figure 19. Package Outline