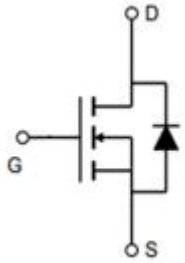
V1-207A1

Datasheet

General Description

V1-207A1 N-Channel MOSFET is based on unique device design to achieve low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics. This product is designed to minimize the die size in many handheld and mobile applications.

Symbol

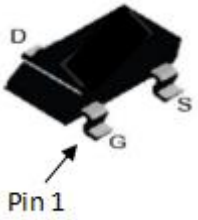


Symbol of V1-207A1

Features

- Low RDS(ON) & FOM
- $R_{DS(ON)\_max}$ = 28mΩ@V_{GS} = 4.5V
- Extremely low switching loss
- Excellent stability and uniformity
- RoHS and Halogen-Free Compliant

Package Type



Package Type of V1-207A1

Application

- Charging Circuit
- Battery Applications
- Synchronous Rectification
- High Frequency Switching

Ordering Information

Product Name	Package	Marking
V1-207A1	SOT23-3	V1-207A1

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	±8	V
Continuous Drain Current Note 1, T_C=25ºC	I_D	6	A
Pulsed Drain Current Note 2, T_C=25ºC	I_{DM}	24	A
Max Power Dissipation, T_C=25ºC	P_D	1.25	W
Avalanche Current, Single Pulse Note 5	I_{AS}	7.77	A
Avalanche Energy, Single Pulse Note3	E_{AS}	9.06	mJ
Continuous Diode Forward Current, T_C=25ºC	I_S	1.7	A
Operation and storage temperature	T_J,T_{STG}	-55 to 150	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		-		ºC/W
Thermal Resistance, Junction-to-Ambient Note4	$R_{\theta JA}$		100		

Notes:

Note1: Calculated continuous current based on maximum allowable junction temperature.

Note2: Pulse width limited by safe operating area.

Note3: V_{DS}=15V, V_{GS}=4.5V, L=0.3mH, Rg=25Ω, starting T_J=25 °C.

Note4: When mounted on 1 inch square copper board, t≤10sec. The value in any given application depends on the user's specific board design.

Electrical Characteristics (T_J= 25 ºC, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250uA	20			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	uA
Gate-Body Leakage Current	Forward	I_{GSSF}	V_{GS}=8V, V_{DS}=0V			100	nA
	Reverse	I_{GSSR}	V_{GS}= -8V, V_{DS}=0V			-100	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	0.5	0.67	1.0	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=2.5V, I_D=5A		26.5	35	mΩ
			V_{GS}=4.5V, I_D=6A		22.1	28	
Gate Resistance		R_G	F=1MHz, Open Drain		5.4		Ω
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS}=10V, V_{GS}=0V, f=1MHz		245.3		pF
Output Capacitance		C_{oss}			177		pF
Reverse Transfer Capacitance		C_{rss}			18.4		pF
Turn-on Delay Time		$t_{d(on)}$	V_{DS}=10V, I_D=6A, R_G=6.0Ω, V_{GS}=4.5V		2.7		ns
Rise Time		t_r			26.3		
Turn-off Delay Time		$t_{d(off)}$			21.8		
Fall Time		t_f			26.9		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DS}=16V, I_D=6A, V_{GS}=4.5V		0.12		nC
Gate to Drain Charge		Q_{gd}			1.8		
Gate Charge Total		Q_g			4.0		
Gate Plateau Voltage		$V_{Plateau}$			1.3		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=1A		0.79	1	V
Reverse Recovery Time		t_{rr}	V_R=10V, I_F=1A, dI_F/dt=100A/us		17.94		ns
Reverse Recovery Charge		Q_{rr}			9.24		nC
Peak Reverse Recovery Current		I_{rrm}			1.04		A

Typical Performance Characteristics

T_A = 25°C (unless otherwise stated)

Figure 1: Output Characteristics

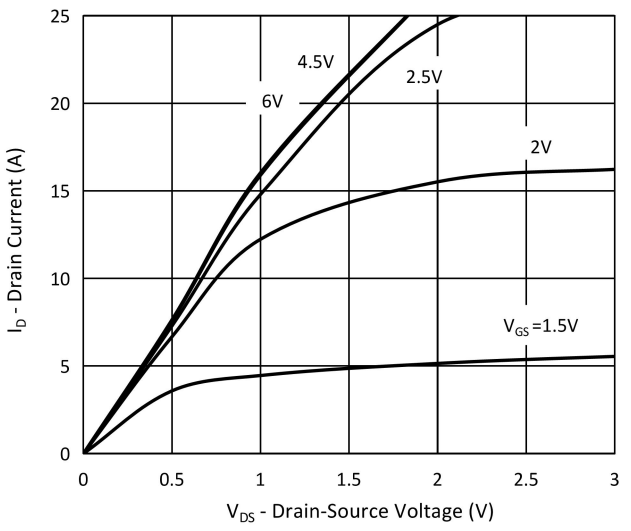


Figure 2: Transfer Characteristics

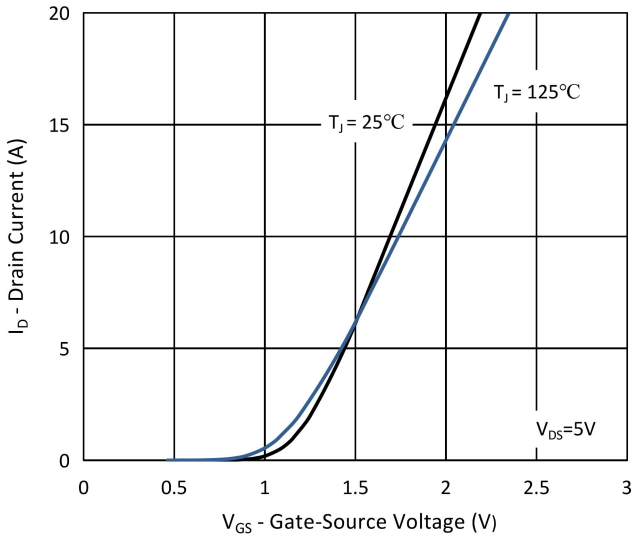


Figure 3: Capacitance Characteristics

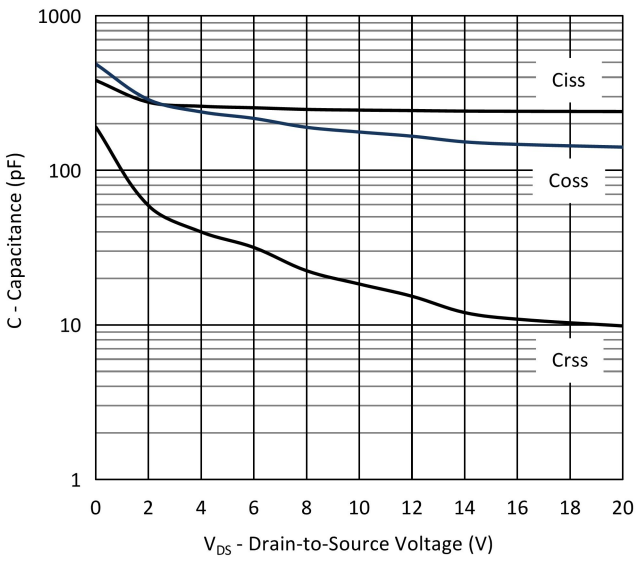


Figure 4: Gate Charge

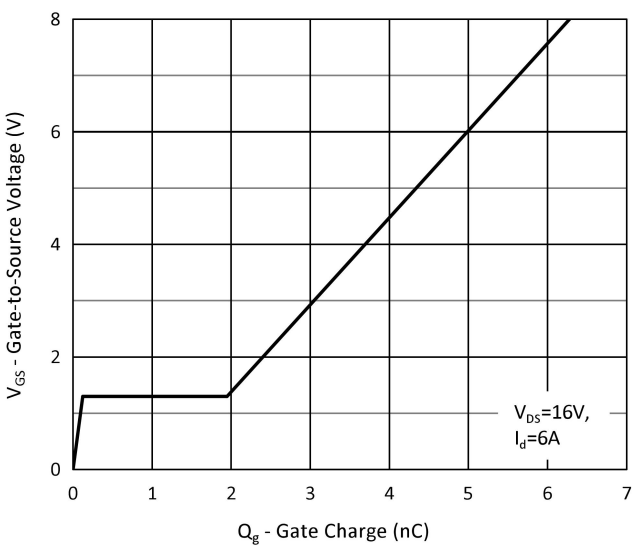


Figure 5: Normalized On Resistance vs Drain Current

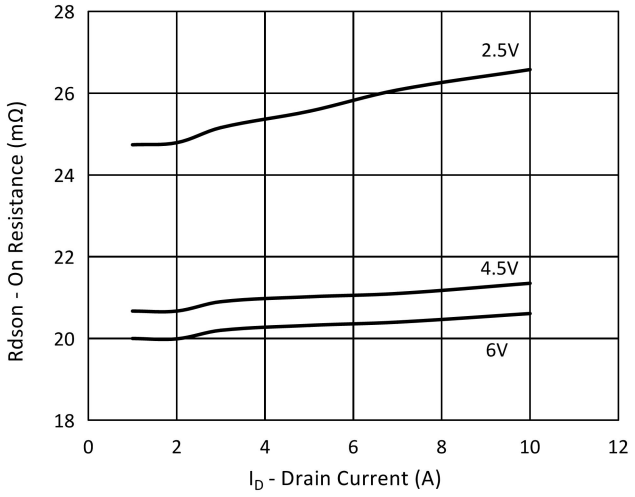


Figure 6: Normalized On Resistance vs Junction Temperature

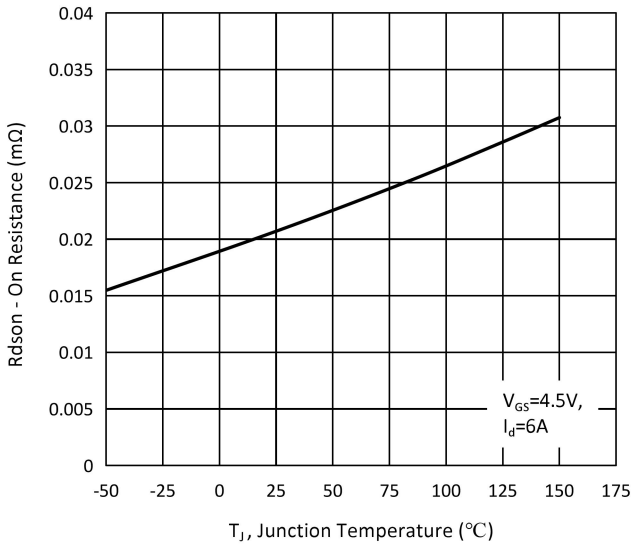


Figure 7: Typical Diode Forward Voltage

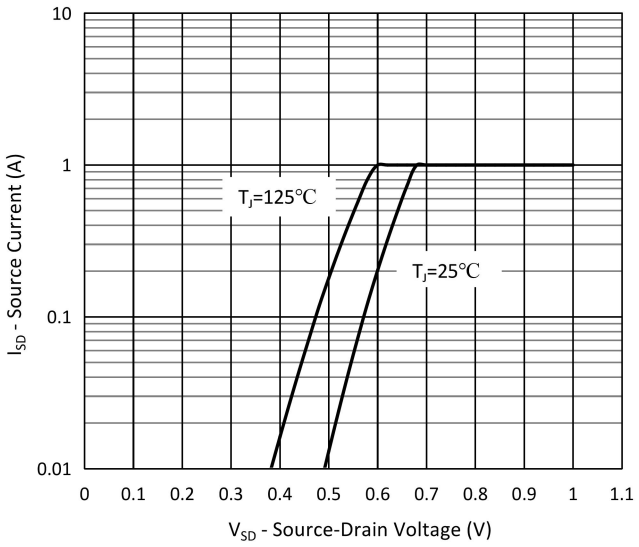


Figure 8: Maximum Safe Operating Area

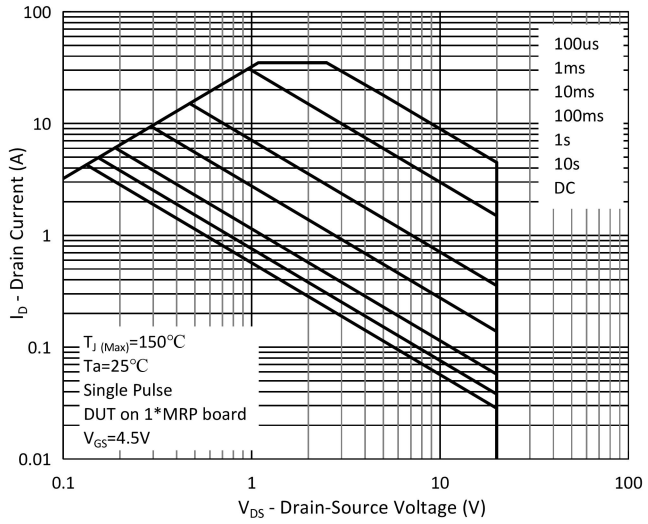
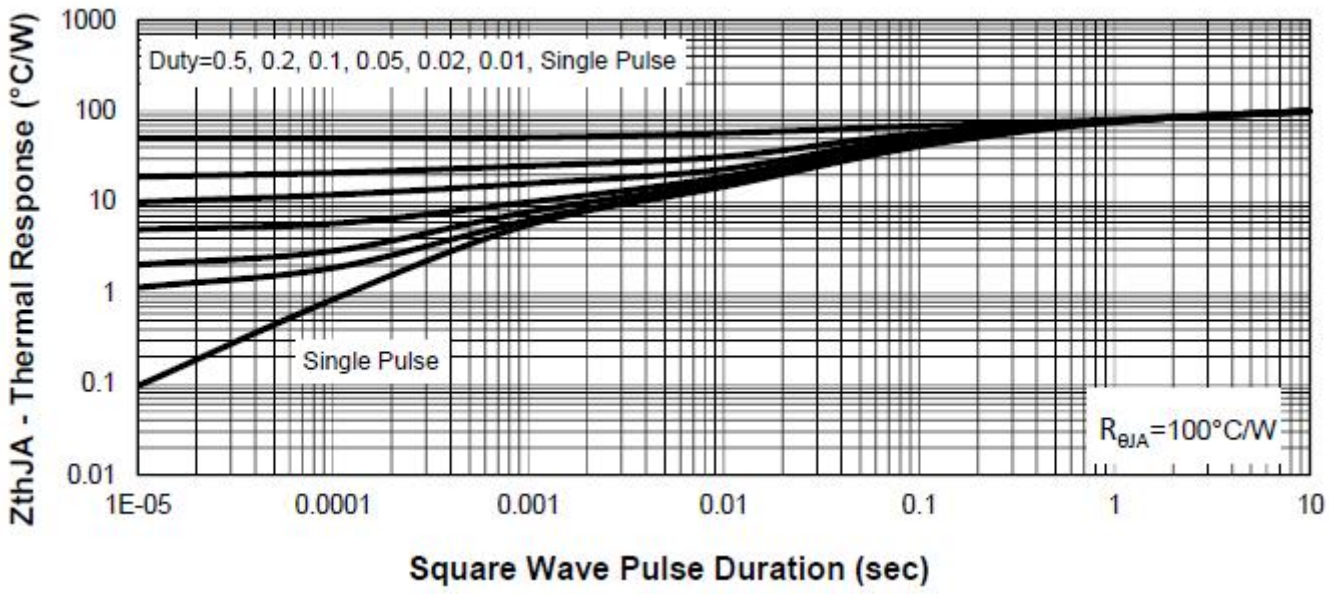
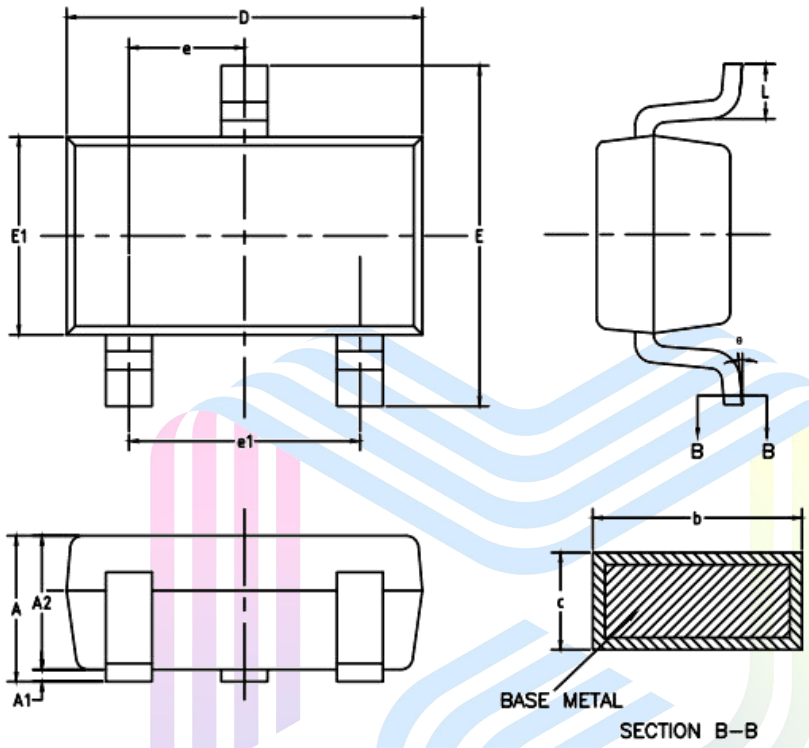


Figure 9: Transient Thermal Impedance



Mechanical Dimensions (SOT23-3 Unit:mm)



SYMBOL	MILLIMETER	
	MIN	MAX
A	0.9	1.45
A1	0	0.15
A2	0.9	1.3
b	0.28	0.5
c	0.1	0.23
D	2.82	3.05
E	2.6	3.0
E1	1.5	1.75
e	0.95BSC	
e1	1.8	2
L	0.3	0.6
θ	0°	8°

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Via-Media Semiconductor Limited Company

http://www.vmdsemi.com

Main Sites:

- **Headquarters**

Hangzhou Via-Media Semiconductor Co., LTD.
1305-1306, Building 71, No. 90, Wensan Road, Xihu District, Hangzhou, Zhejiang Province, P.R. China
Tel: +86-0571-8515 0563

- **Chengdu Office**

Chengdu Winhi Semiconductor Co., LTD.
Floor 15, Building 5, No. 171, Hele 2nd Street, Chengdu, Sichuan Province, P.R. China
Tel: +86-028-8505 0771

- **Shanghai**

Shanghai R&D Center.
1506~1508, Xinyin Building, 888 Yishan Road, Shanghai, P.R of China
Tel: +86-021-54201999

- **Shenzhen**

Shenzhen Sales Center.
17B, No.1 Phoenix Building, 2008 Shennan Road, Shenzhen, P.R of China
Tel: +86-0755-82570682

- **Xi'an**

Xi'an R&D Center
1703B, Building A, Greenland Center, Jinye Road, High-Tech Zone, Xi'an, Shaanxi, P.R of China