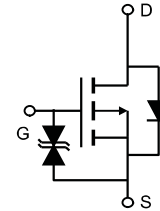


## P-Channel Trench MOSFET

### Description

The RMA7P20ED1 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch



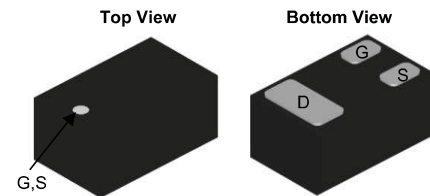
Schematic diagram

### General Features

- $V_{DS} = -20V, I_D = -0.7A$
- $R_{DS(ON)} < 0.60\Omega @ V_{GS} = -2.5V$
- $R_{DS(ON)} < 0.42\Omega @ V_{GS} = -4.5V$
- Lead free product is acquired
- Surface mount package
- Halogen-free

### Application

- Load switch



DFN1006-3

## Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
1605	RMA7P20ED1	DFN1006-3	Ø180mm	8 mm	

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )	$I_D$	$T_c = 25^\circ\text{C}$	-0.7
		$T_c = 70^\circ\text{C}$	-0.55
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	-2	A
Maximum Power Dissipation	$P_D$	0.9	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-50 To 150	$^\circ\text{C}$

## Thermal Characteristic

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	100	$^\circ\text{C/W}$
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## Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	-0.6	-1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-0.5A$		360	420	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.3A$		400	500	
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-0.3A$				
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-4V, V_{GS}=0V,$ $F=1.0MHz$	-	52	-	PF
Output Capacitance	$C_{oss}$		-	12	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	8.2	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-4V, I_D=-0.3A,$ $R_L=-1.2\Omega, V_{GEN}=-4.5V, R_g=1\Omega$	-	6	-	nS
Turn-on Rise Time	$t_r$		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	23	-	nS
Turn-Off Fall Time	$t_f$		-	8	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-4V, I_D=-0.5A, V_{GS}=-4.5V$	-	0.8	-	nC
Gate-Source Charge	$Q_{gs}$		-	0.16	-	nC
Gate-Drain Charge	$Q_{gd}$		-	0.2	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-0.5A$	-	-	-1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	0.7	A

### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

# RATING AND CHARACTERISTICS CURVES (RMA7P20ED1)

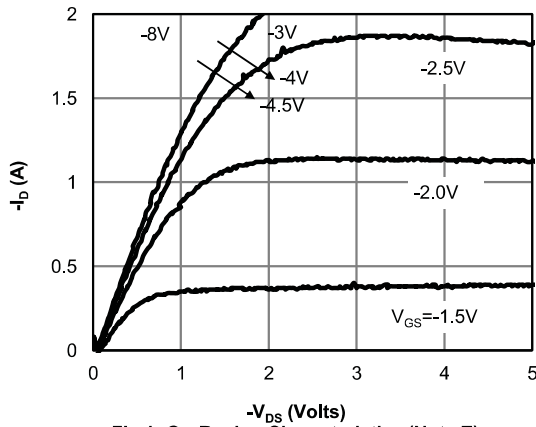


Fig 1: On-Region Characteristics (Note E)

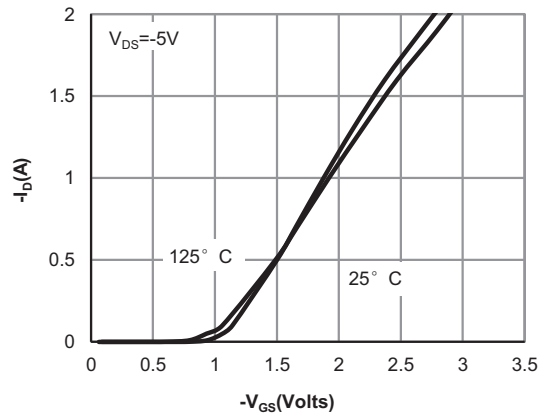


Figure 2: Transfer Characteristics (Note E)

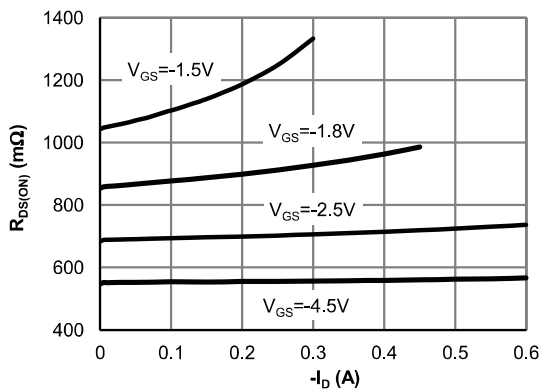


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

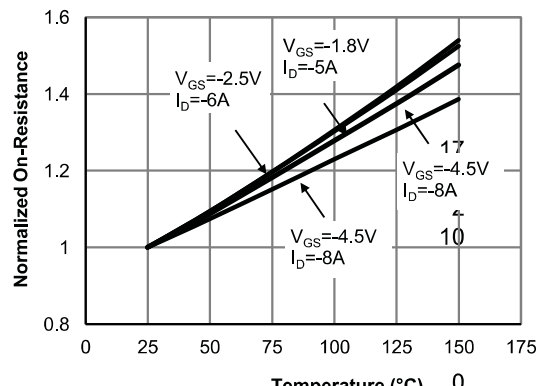


Figure 4: On-Resistance vs. Junction Temperature (Note E)

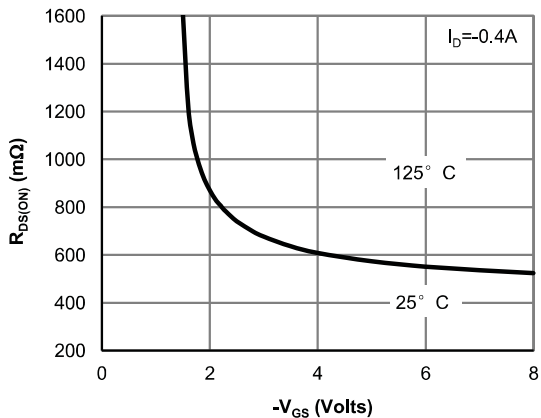


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

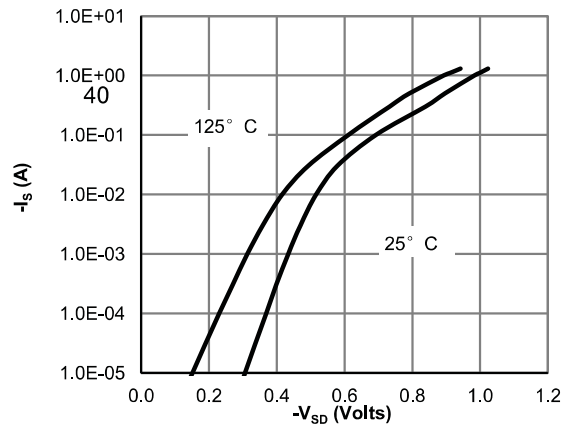


Figure 6: Body-Diode Characteristics (Note E)

# RATING AND CHARACTERISTICS CURVES (RMA7P20ED1)

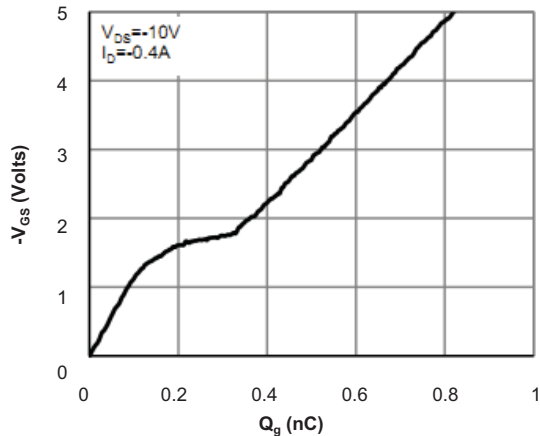


Figure 7: Gate-Charge Characteristics

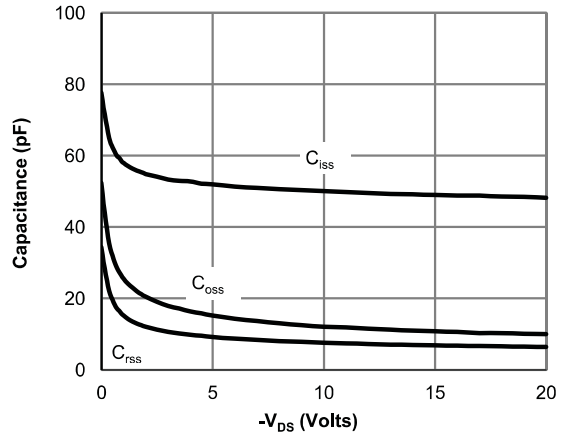


Figure 8: Capacitance Characteristics

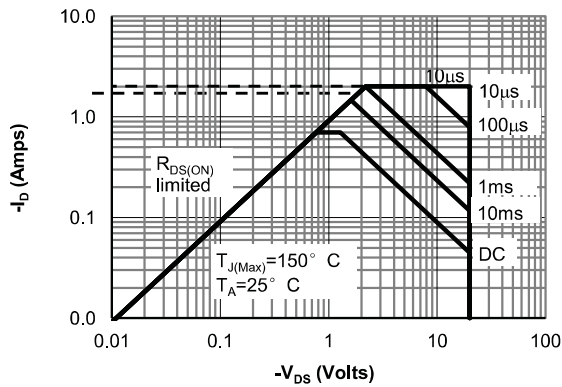


Figure 9: Maximum Forward Biased Safe Operating Area (Note B)

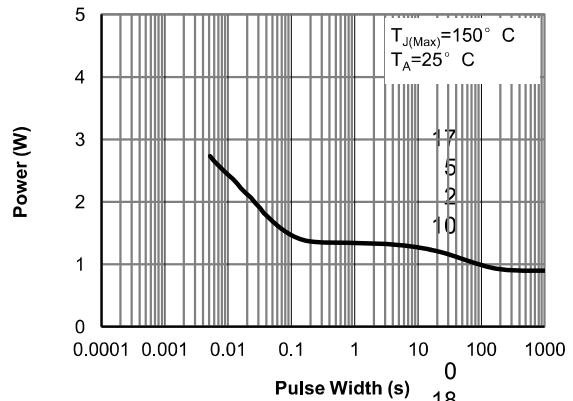


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note B)

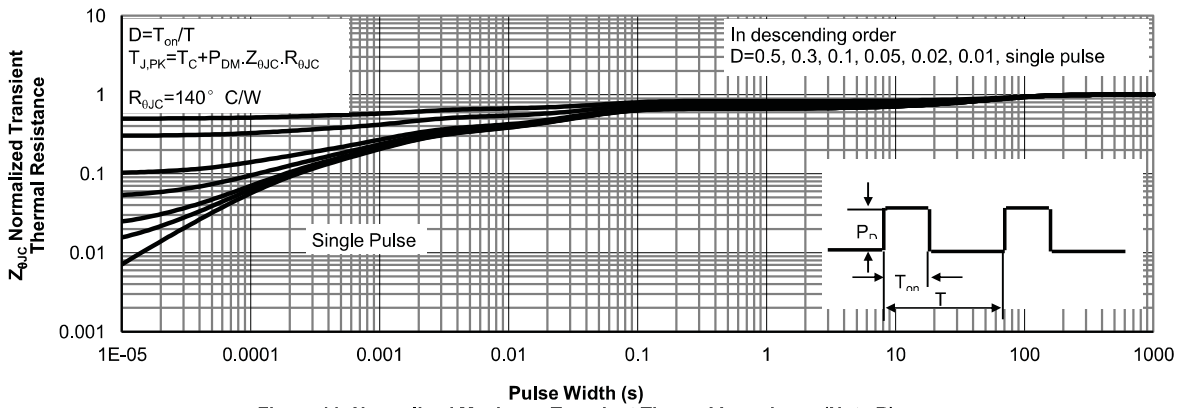
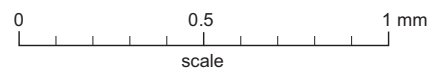
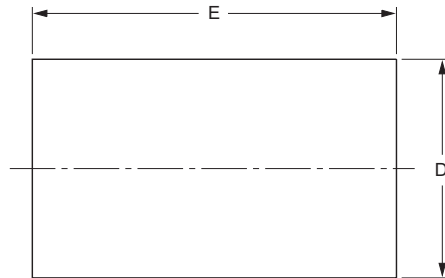
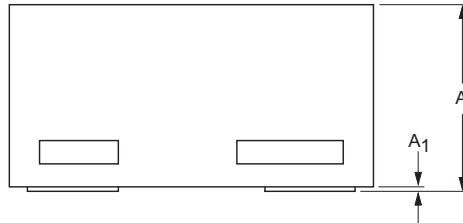
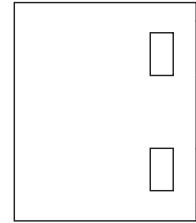
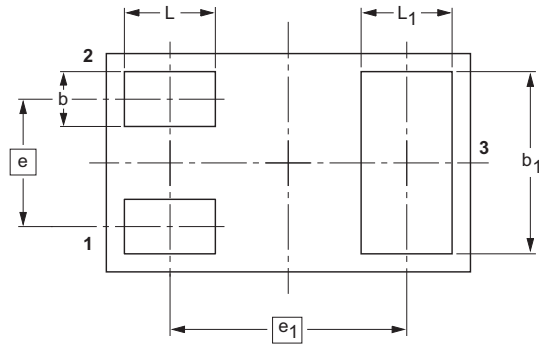


Figure 11: Normalized Maximum Transient Thermal Impedance (Note B)

## DFN1006-3 Package Information



**DIMENSIONS (mm are the original dimensions)**

UNIT	A <sup>(1)</sup>	A <sub>1</sub> max.	b	b <sub>1</sub>	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
mm	0.50 0.46	0.03	0.20 0.12	0.55 0.47	0.62 0.55	1.02 0.95	0.35	0.65	0.30 0.22	0.30 0.22

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