



# PJM8205DNSG

## Dual N Enhancement Field Effect Transistor

### DESCRIPTIONS

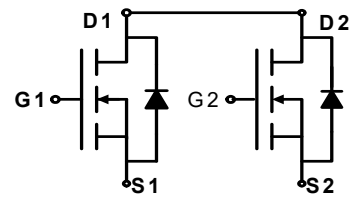
The ATM8205DNSG uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

### FEATURES

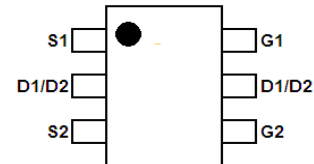
- $V_{DS} = 20V, I_D = 6A$   
 Typ.  $R_{DS(ON)} = 16m\Omega @ V_{GS}=4.5V$   
 Typ.  $R_{DS(ON)} = 19m\Omega @ V_{GS}=2.5V$
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

### APPLICATIONS

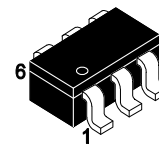
- Battery protection
- Load switch
- Power management



Schematic diagram



pin assignment



SOT-26(TSOP-6)

Top view

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	6	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	25	A
Maximum Power Dissipation	$P_D$	1.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	83	$^\circ C/W$
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### Electrical Characteristics ( $T_A=25^\circ C$ 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	$\mu A$



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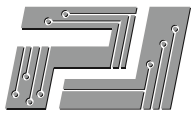
## Dual N Enhancement Field Effect Transistor

### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
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Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.7	1.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=4.5A$	-	16	22	m $\Omega$
		$V_{GS}=2.5V, I_D=3.5A$	-	19	27	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=4.5A$	-	10	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0MHz$	-	900	-	PF
Output Capacitance	$C_{oss}$		-	220	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	100	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=1A$ $V_{GS}=4.5V, R_{GEN}=6\Omega$	-	10	20	nS
Turn-on Rise Time	$t_r$		-	11	25	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35	70	nS
Turn-Off Fall Time	$t_f$		-	30	60	nS
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=6A,$ $V_{GS}=4.5V$	-	12	15	nC
Gate-Source Charge	$Q_{gs}$		-	2.3	-	nC
Gate-Drain Charge	$Q_{gd}$		-	1	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1.7A$	-	0.75	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	1.7	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



### TYPICAL CHARACTERISTICS CURVES

#### Typical Electrical and Thermal Characteristics

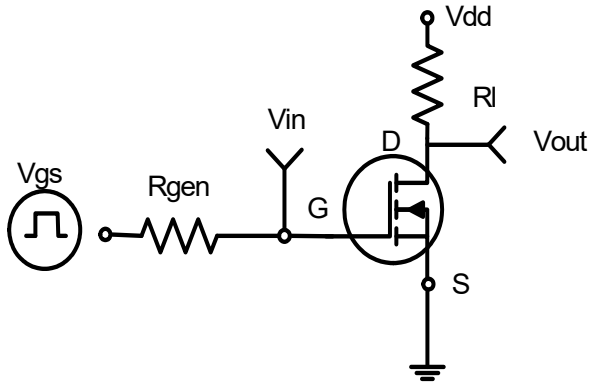


Figure 1: Switching Test Circuit

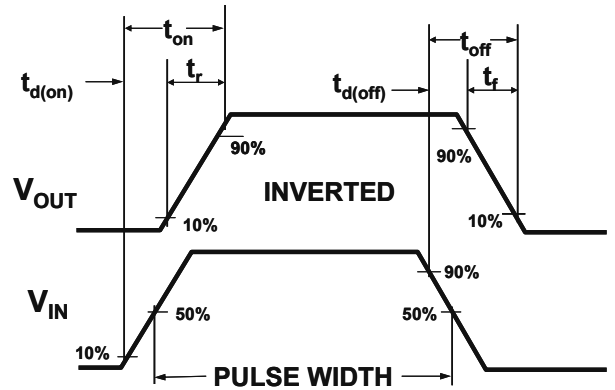


Figure 2: Switching Waveforms

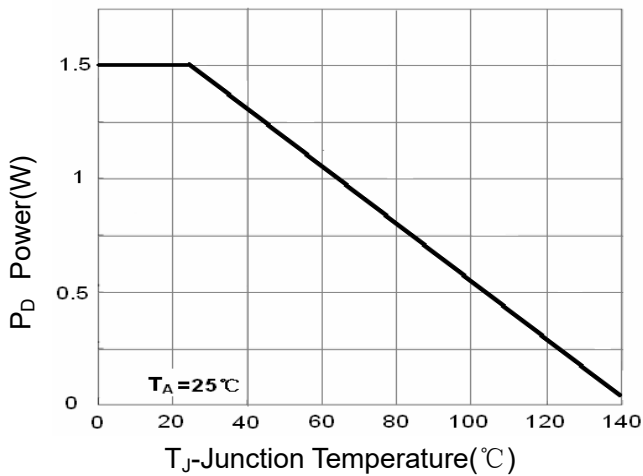


Figure 3 Power Dissipation

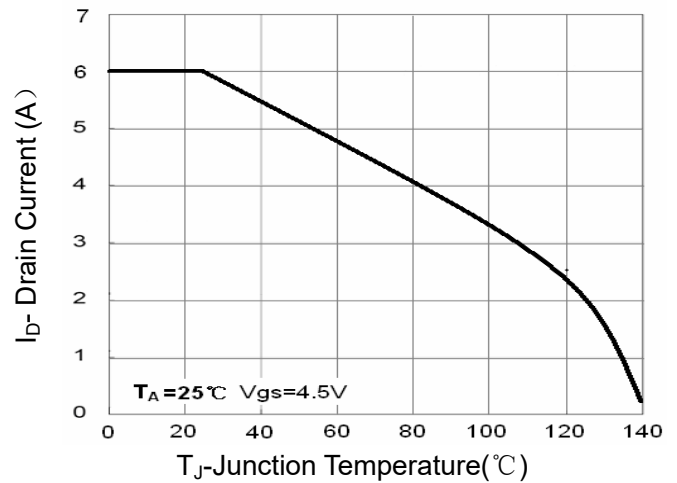


Figure 4 Drain Current

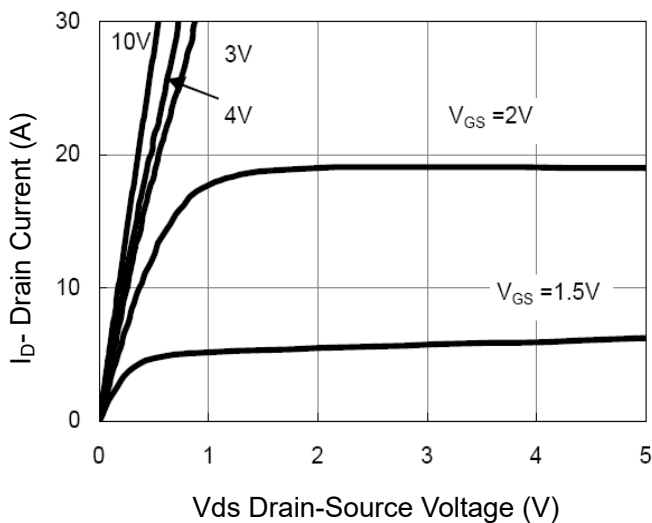


Figure 5 Output Characteristics

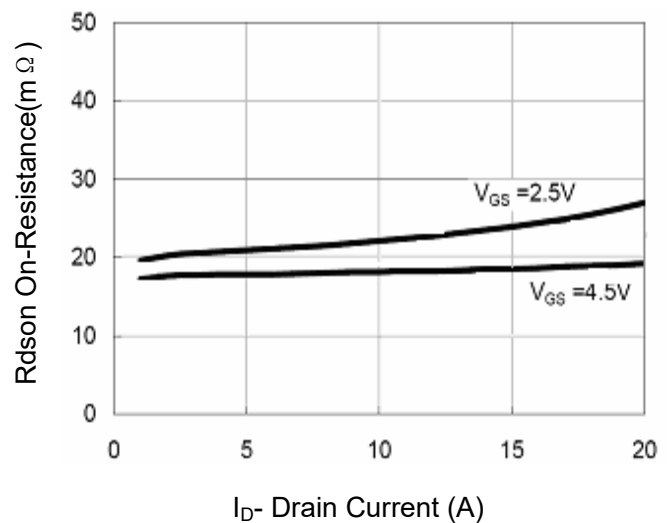
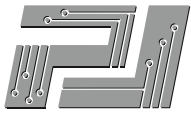
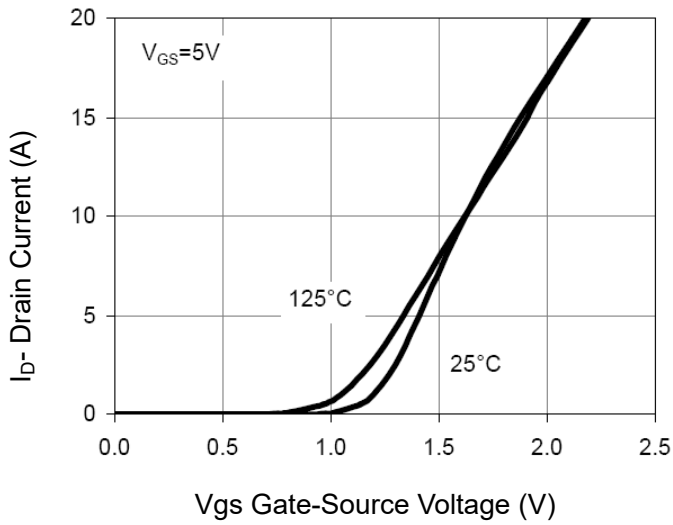


Figure 6 Drain-Source On-Resistance

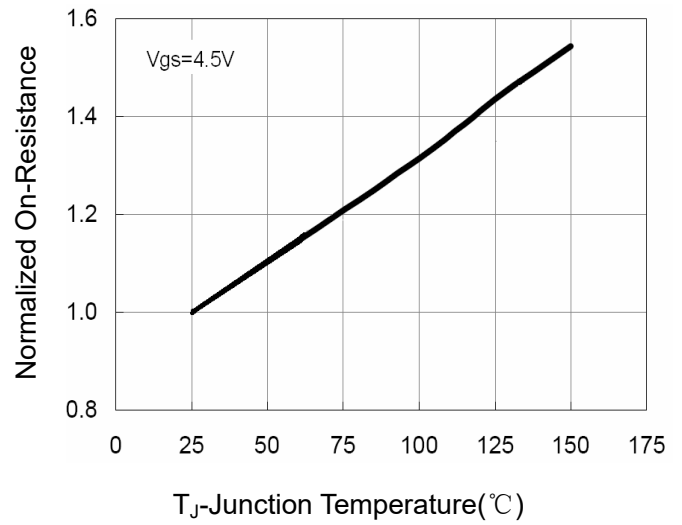


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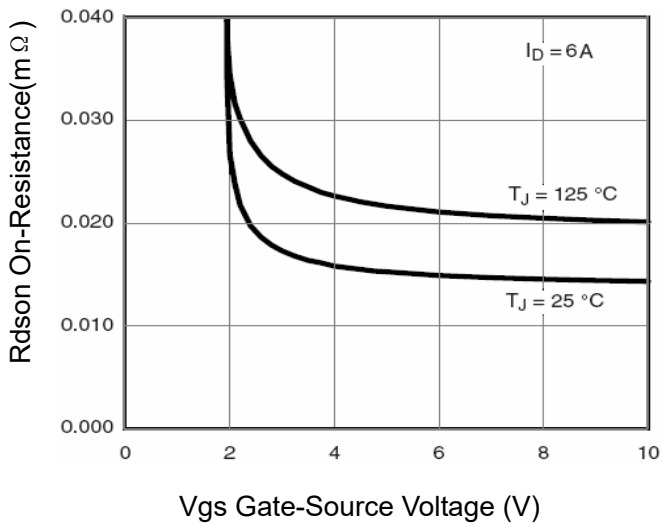
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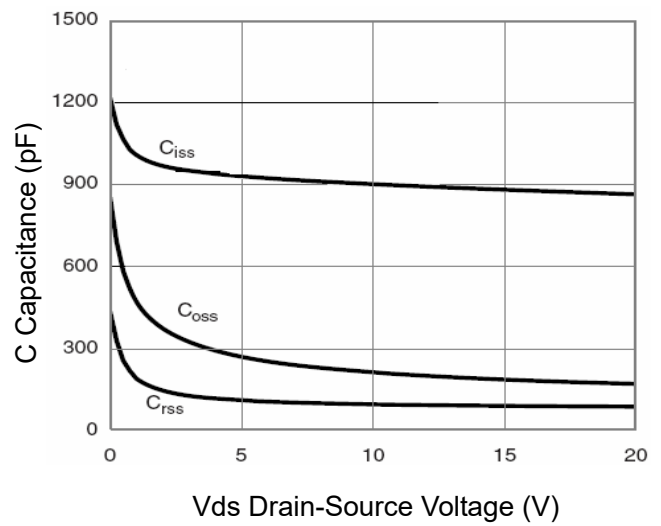
**Figure 7 Transfer Characteristics**



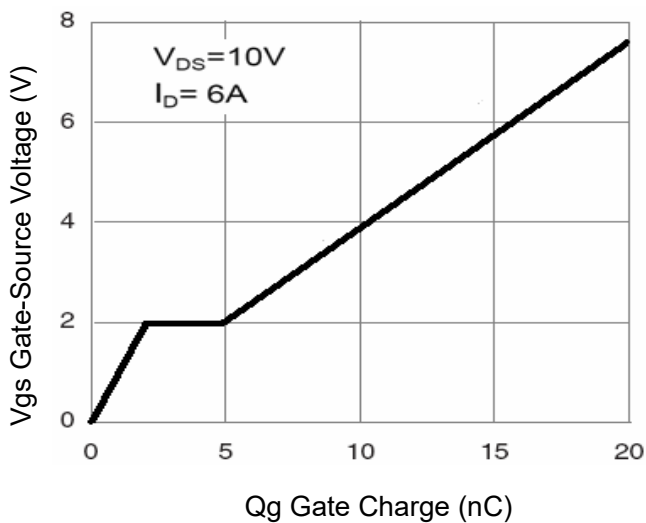
**Figure 8 Drain-Source On-Resistance**



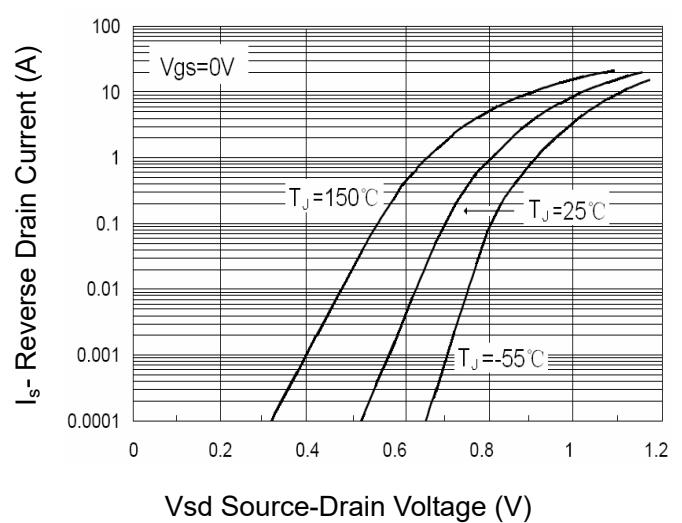
**Figure 9 Rdson vs Vgs**



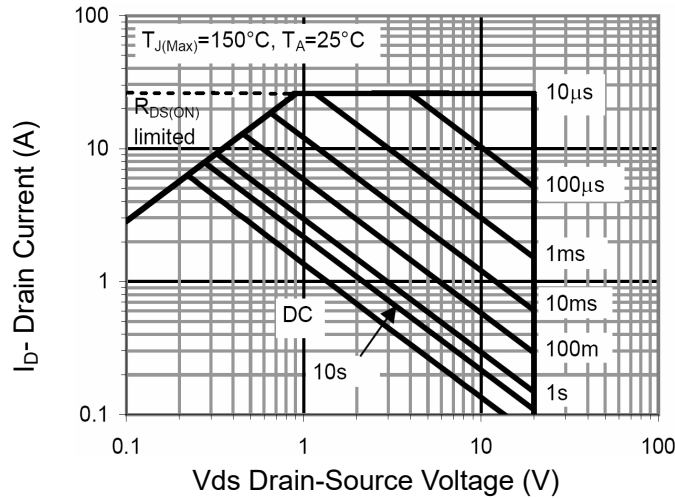
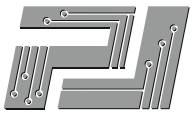
**Figure 10 Capacitance vs Vds**



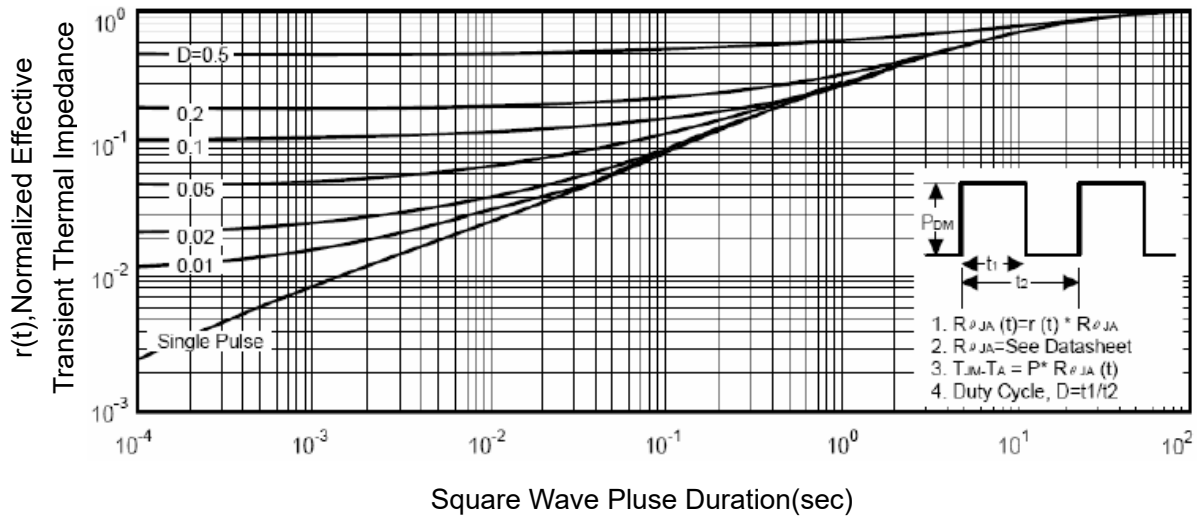
**Figure 11 Gate Charge**



**Figure 12 Source- Drain Diode Forward**



**Figure 13 Safe Operation Area**



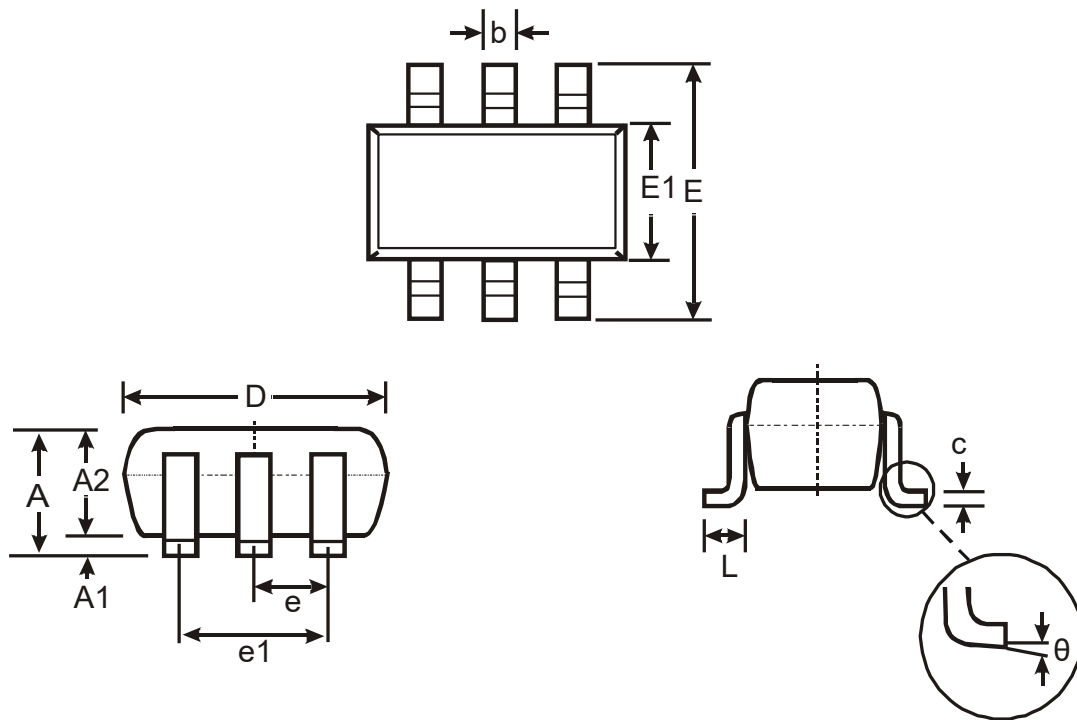
**Figure 14 Normalized Maximum Transient Thermal Impedance**



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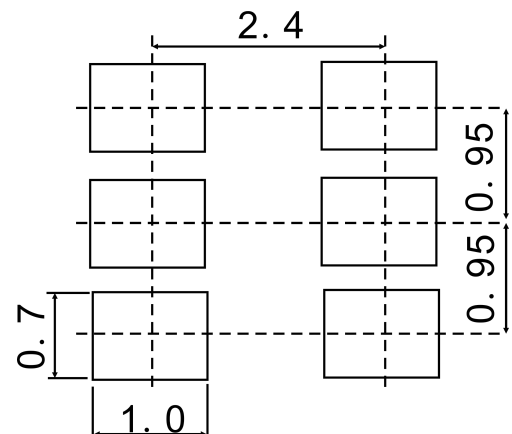
### PACKAGE OUTLINE



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.05	1.25	0.041	0.049
A1	0.00	0.10	0.000	0.004
A2	1.05	1.15	0.041	0.045
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.82	3.02	0.111	0.119
E	2.65	2.95	0.104	0.116
E1	1.50	1.70	0.059	0.067
e	0.95 (BSC)		0.037 (BSC)	
L	0.30	0.60	0.012	0.024
e1	1.80	2.00	0.071	0.079
θ	ε°	8°	0°	8°

### RECOMMENDED SOLDERING PAD

Dimensions in Millimeters



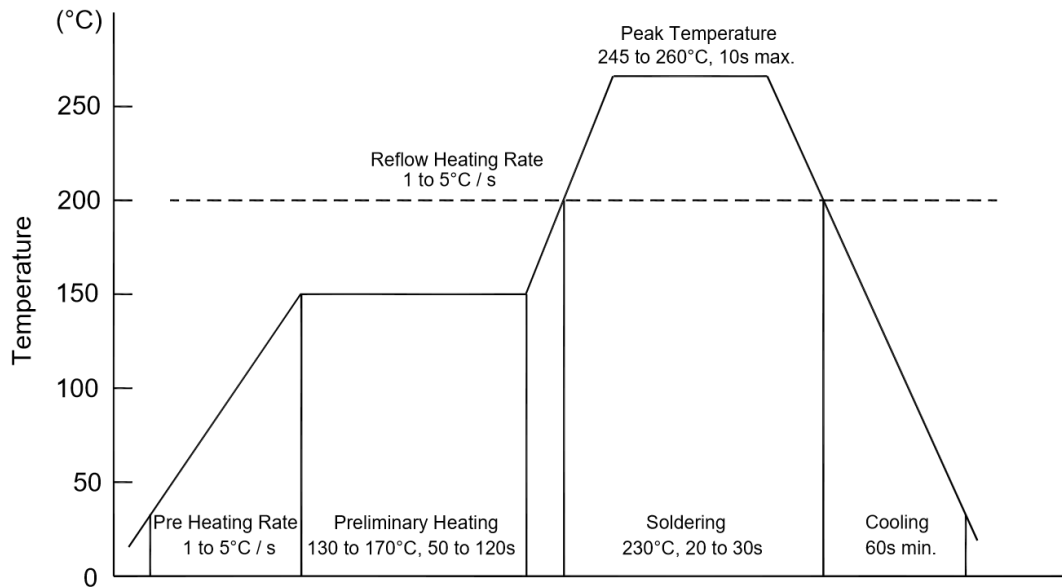
### ORDER INFORMATION

Device	Package	Shipping
PJM8205DNSG	SOT-26	3000/Reel&Tape(7inch)



### CONDITIONS OF SOLDERING AND STORAGE

#### ◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245 °C. If peak temperature is below 245 °C, you may adjust the following parameters:

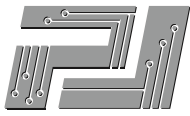
- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

#### ◆ Conditions of hand soldering

- Temperature: 370 °C
- Time: 3s max.
- Times: one time

#### ◆ Storage conditions

- **Temperature**  
5 to 40 °C
- **Humidity**  
30 to 80% RH
- **Recommended period**  
One year after manufacturing

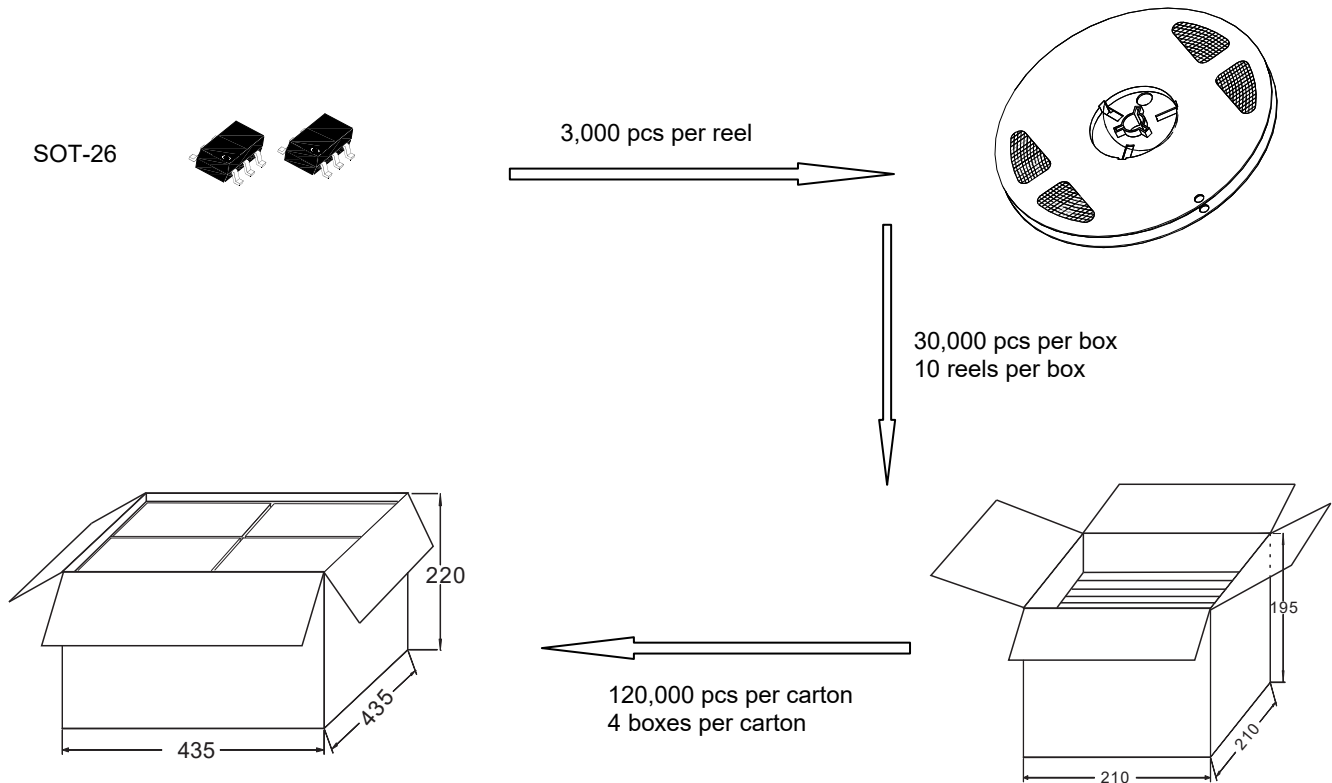


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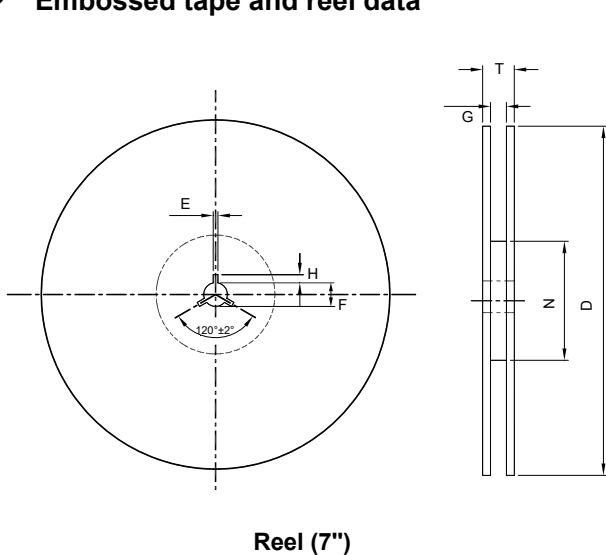
## Dual N Enhancement Field Effect Transistor

### PACKAGE SPECIFICATIONS

#### ◆ The method of packaging



#### ◆ Embossed tape and reel data



Symbol	Value (unit: mm)
A	$3.17 \pm 0.1$
B	$3.23 \pm 0.1$
C	$1.37 \pm 0.1$
E	$2 \pm 0.5$
F	$13 \pm 0.5$
D	$178 \pm 2.0$
G	$9.5 \pm 1.0$
H	$4 \pm 0.5$
N	60
T	$< 14.9$