



# SPN8878

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN8878 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology. The SPN8878 has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low  $R_{DS(ON)}$  and fast switching speed.

### FEATURES

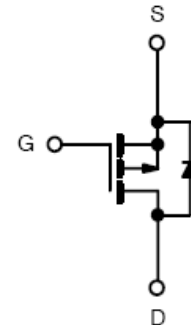
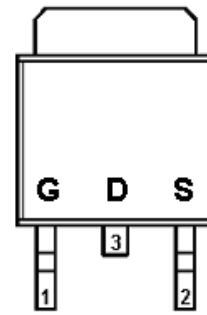
- ◆ 30V/20A,  $R_{DS(ON)} = 12m\Omega @ V_{GS} = 10V$
- ◆ 30V/15A,  $R_{DS(ON)} = 17m\Omega @ V_{GS} = 4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-252 package design

### APPLICATIONS

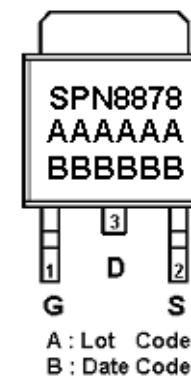
- Power Management in Note book
- Powered System
- DC/DC Converter
- Load Switch

### PIN CONFIGURATION

TO-252



### PART MARKING





# SPN8878

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### PIN DESCRIPTION

Pin	Symbol	Description
1	G	Gate
2	S	Source
3	D	Drain

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN8878T252RGB	TO-252	SPN8878

※ SPN8878T252RGB : Tape Reel ; Pb – Free ; Halogen - Free

### ABSOLUTE MAXIMUM RATINGS

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

Parameter	Symbol	Typical	Unit	
Drain-Source Voltage	$V_{DSS}$	30	V	
Gate –Source Voltage	$V_{GSS}$	$\pm 20$	V	
Continuous Drain Current	$I_D$	$T_A=25^{\circ}\text{C}$	18	A
		$T_A=100^{\circ}\text{C}$	13	
Pulsed Drain Current	$I_{DM}$	40	A	
Continuous Drain Current	$I_S$	5	A	
Power Dissipation	$P_D$	$T_A=25^{\circ}\text{C}$ TO-252-2L	40	W
		TO-251	55	
Operating Junction Temperature	$T_J$	150	$^{\circ}\text{C}$	
Storage Temperature Range	$T_{STG}$	-55/150	$^{\circ}\text{C}$	
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	100	$^{\circ}\text{C}/\text{W}$	

### ELECTRICAL CHARACTERISTICS



# SPN8878

## N-Channel Enhancement Mode MOSFET

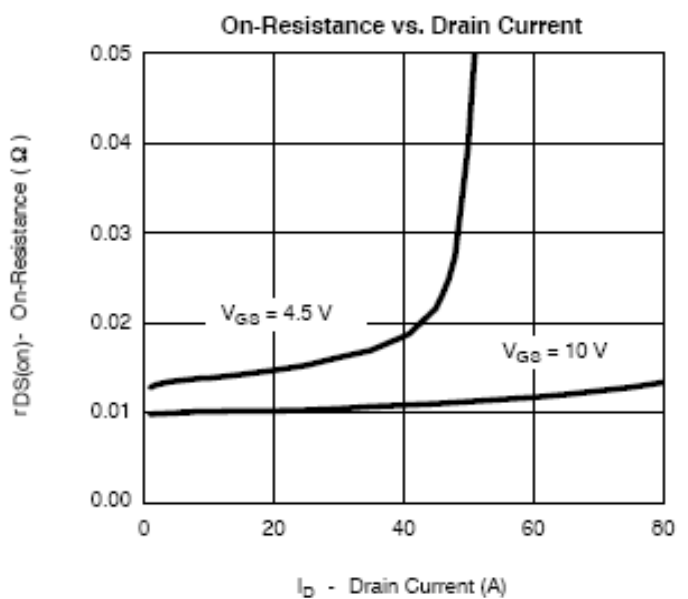
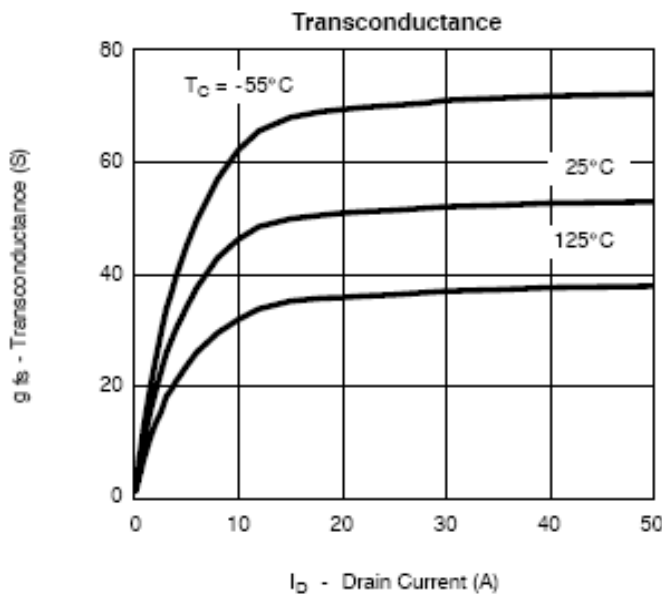
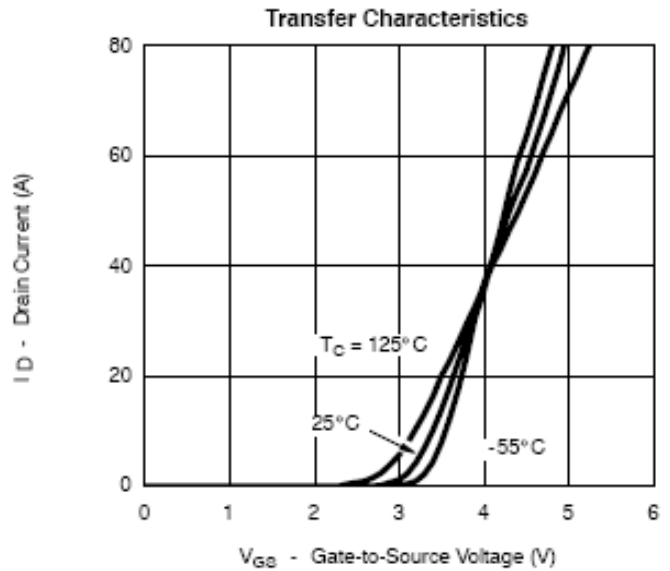
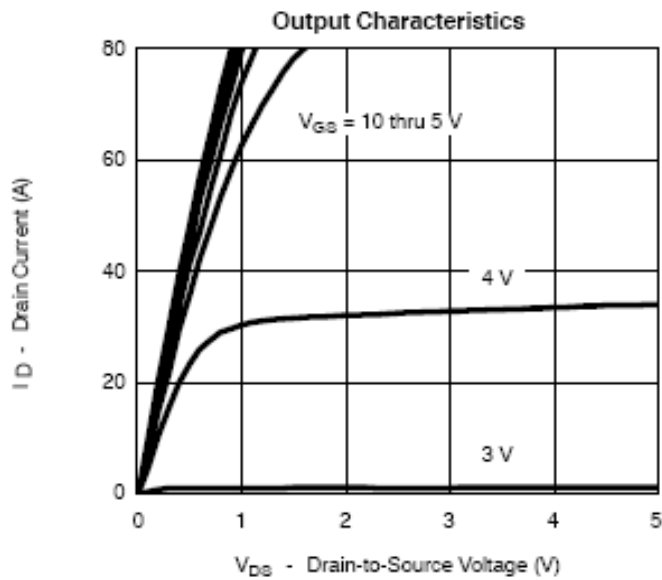
(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.0		3.0	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V			1	uA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V T <sub>J</sub> =85°C			5	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>DS</sub> ≥5V, V <sub>GS</sub> =10V	40			A
Drain-Source On-Resistance	R <sub>Ds(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A		0.010	0.012	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A		0.013	0.017	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =20A	15			S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =40A, V <sub>GS</sub> =0V		0.8	1.5	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V I <sub>D</sub> =50A		28	42	nC
Gate-Source Charge	Q <sub>gs</sub>			6		
Gate-Drain Charge	Q <sub>gd</sub>			5		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1MHz		1600		pF
Output Capacitance	C <sub>oss</sub>			285		
Reverse Transfer Capacitance	C <sub>rss</sub>			140		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, R <sub>L</sub> =0.3Ω I <sub>D</sub> =50A, V <sub>GEN</sub> =10V R <sub>G</sub> =1Ω		9	15	nS
	t <sub>r</sub>			15	25	
Turn-Off Time	t <sub>d(off)</sub>			20	30	
	t <sub>f</sub>			12	20	

### TYPICAL CHARACTERISTICS



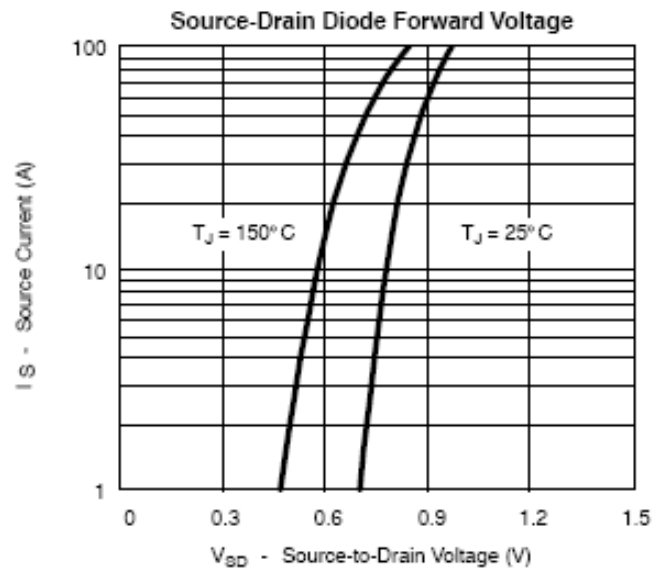
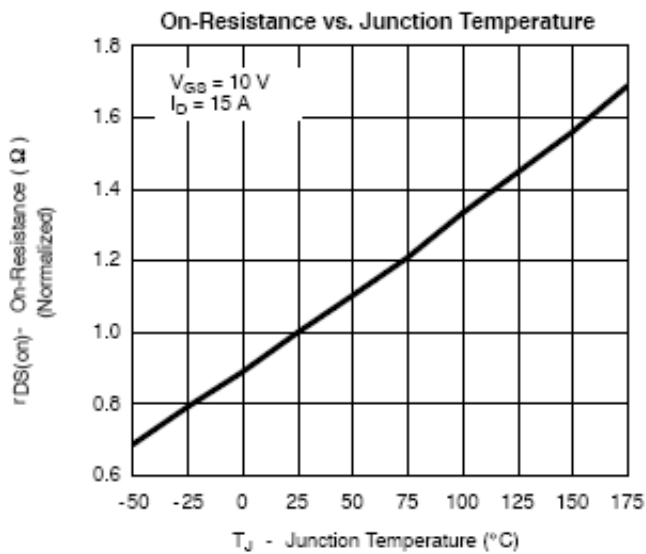
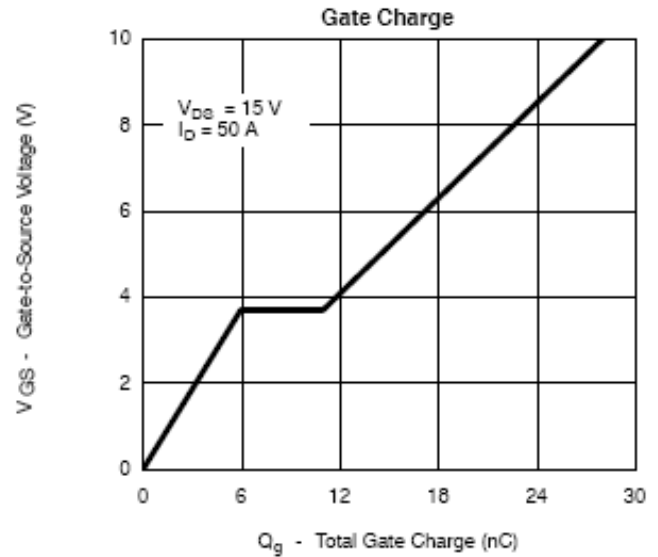
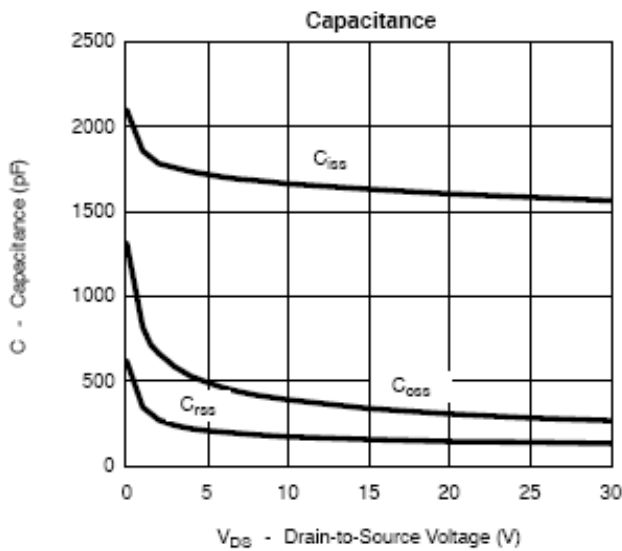
# SPN8878 N-Channel Enhancement Mode MOSFET



## TYPICAL CHARACTERISTICS



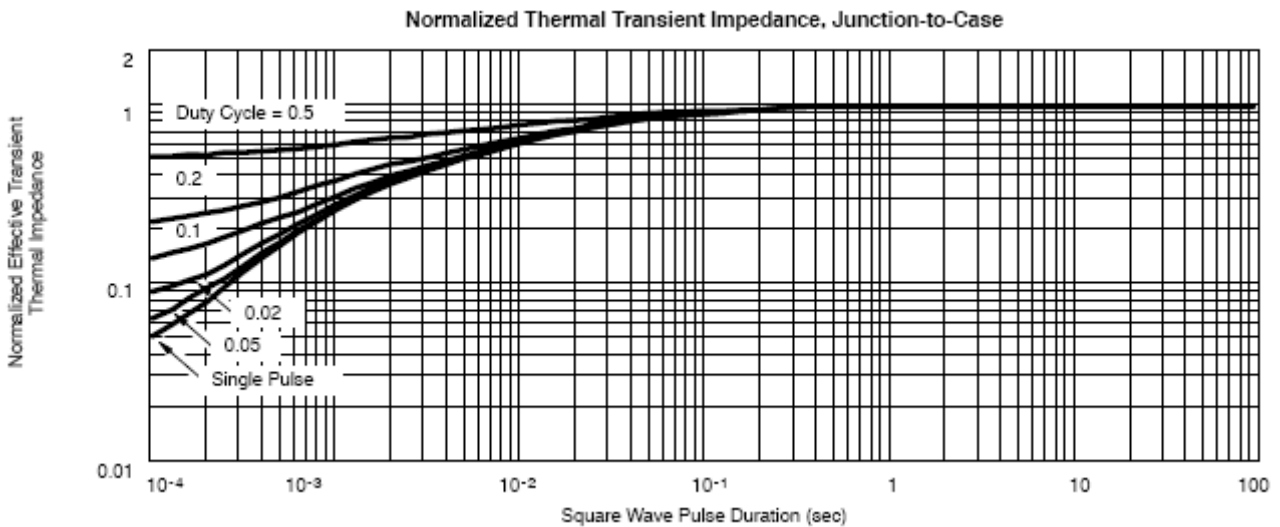
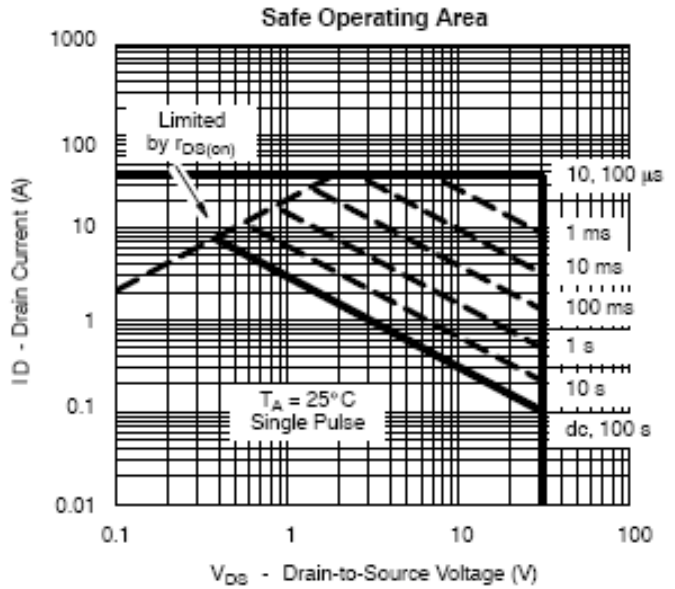
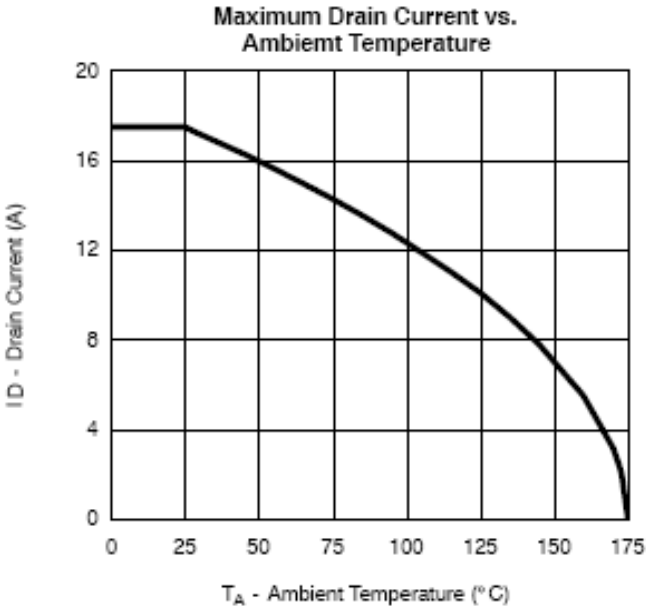
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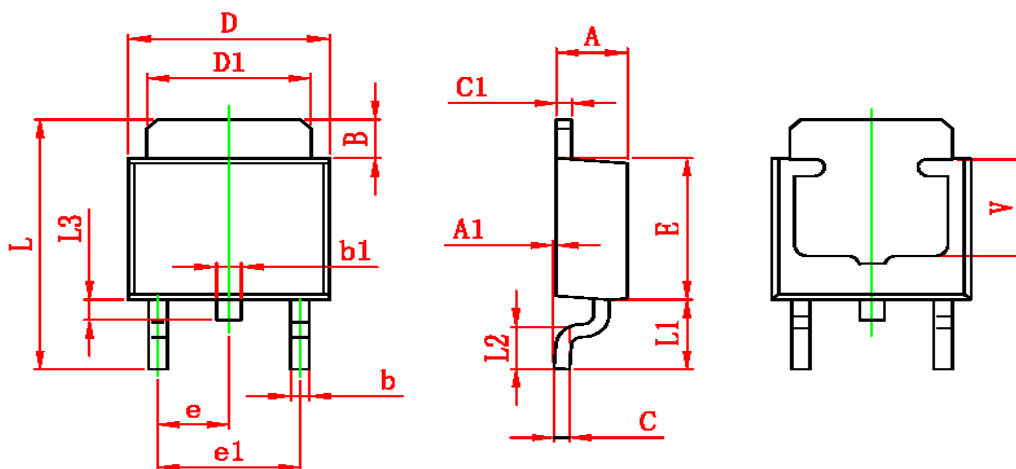


## TO-252 PACKAGE OUTLINE



# SPN8878

## N-Channel Enhancement Mode MOSFET



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.350	0.650	0.014	0.026
V	3.80 REF		0.150 REF	



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