

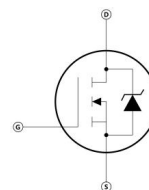
## Features

- $V_{DS} = 60V, I = 3A$   
 $R_{DS(ON)} < 105m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 125m\Omega @ V_{GS} = 4.5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package



## Applications

- Battery switch
- DC/DC converter



## Electrical ratings

Absolute maximum ratings			
Parameter	Symbol	Value	Unit
Drain-source voltage ( $V_{GS} = 0$ )	$V_{DS}$	60	V
Gate- source voltage	$V_{GS}$	$\pm 20$	
Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	$I_D$	3	A
Drain current (pulsed)	$I_{DM}$	10	
Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	$P_{TOT}$	1.7	W
Operating junction temperature	$T_J$	-55 to 150	$^\circ\text{C}$
Storage temperature	$T_{stg}$		

Thermal data			
Parameter	Symbol	Value	Unit
Thermal resistance junction-case max	$R_{thj-case}$	0.015	W/ $^\circ\text{C}$
Maximum lead temperature for soldering purpose	$T_J$	300	

**Electrical Characteristics (T<sub>vj</sub> = 25°C unless otherwise specified)**

<b>On /off states</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Test conditions</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> = 1 mA, V <sub>GS</sub> = 0	60			V
Zero gate voltage drain current (V <sub>GS</sub> = 0)	I <sub>DSS</sub>	V <sub>DS</sub> = Max rating V <sub>DS</sub> =Max rating, T <sub>C</sub> =125 °C			1	μA
Gate-body leakage current (V <sub>DS</sub> = 0)	I <sub>GSS</sub>	V <sub>GS</sub> = ± 20 V			± 100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1.0	1.3	2.5	V
Static drain-source on resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3A		78	105	mΩ

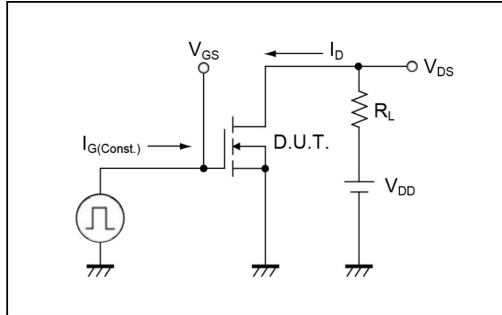
<b>Dynamic</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Test conditions</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 3		3		S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, f=1MHz, V <sub>GS</sub> =0		247		pF
Output capacitance	C <sub>oss</sub>			34		
Reverse transfer capacitance	C <sub>rss</sub>			19		
Total gate charge	Q <sub>g</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =3A V <sub>GS</sub> =4.5V		6		nC
Gate-source charge	Q <sub>gs</sub>			1		
Gate-drain charge	Q <sub>gd</sub>			1		

<b>Source drain diode</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Test conditions</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>
Source-drain current	I <sub>SD</sub>			3		A
Source-drain current (pulsed)	I <sub>SDM</sub>			8		
Forward on voltage	V <sub>SD</sub>	I <sub>SD</sub> = 3A, V <sub>GS</sub> = 0		1.2		V

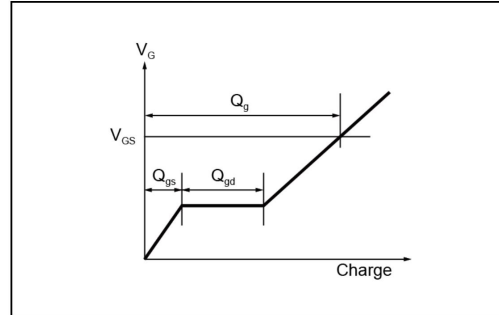
<b>MS3N06FF</b>	SOT-23-3L		
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## Electrical characteristics

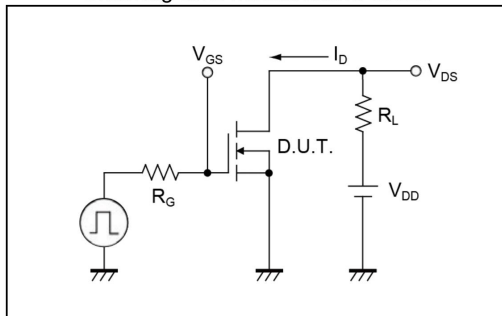
Gate Charge Measurement Circuit



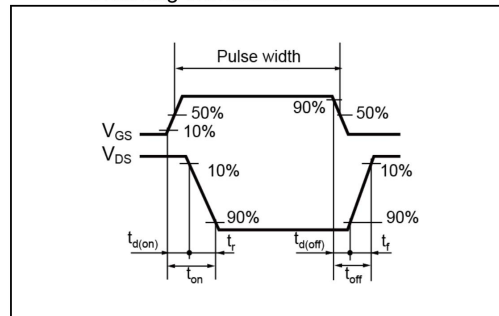
Gate Charge Waveform



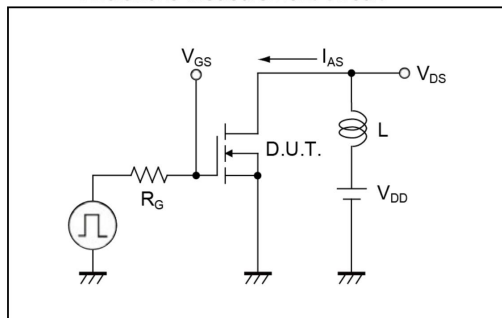
Switching Time Measurement Circuit



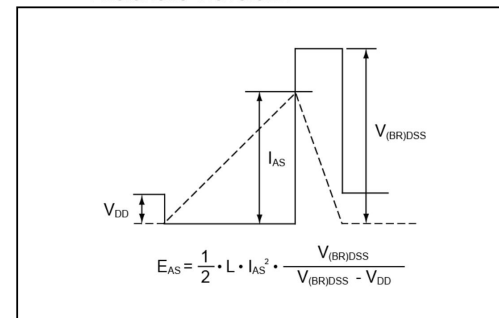
Switching Waveforms



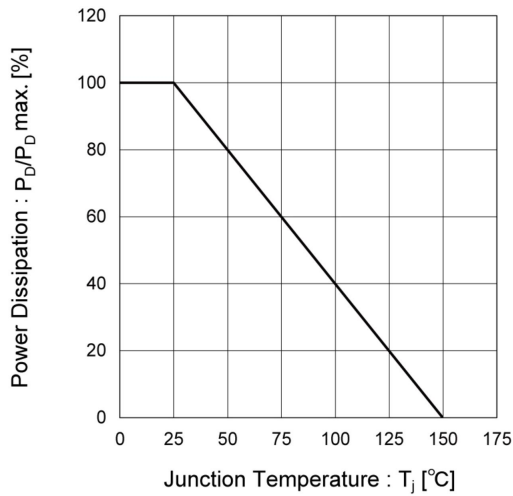
Avalanche Measurement Circuit



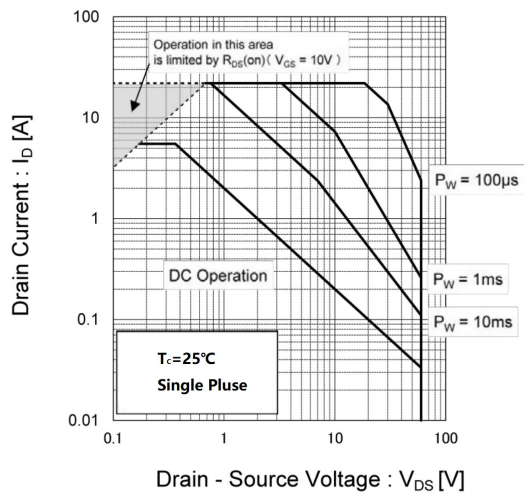
Avalanche Waveform



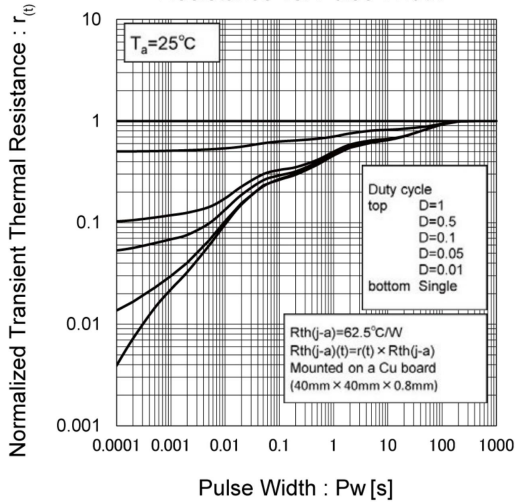
Power Dissipation Derating Curve



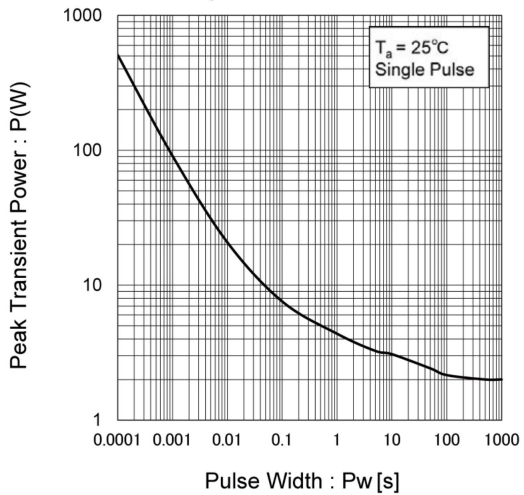
Maximum Safe Operating Area



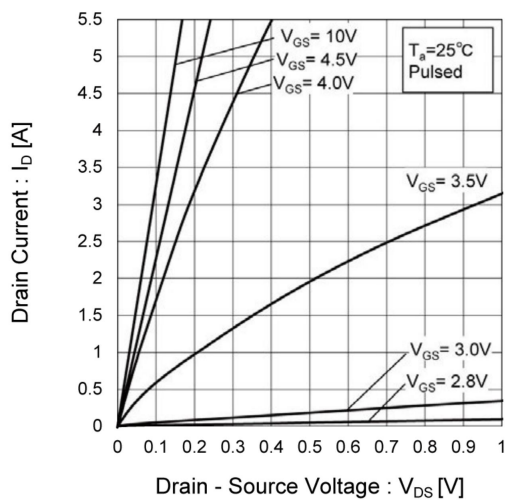
Normalized Transient Thermal Resistance vs. Pulse Width



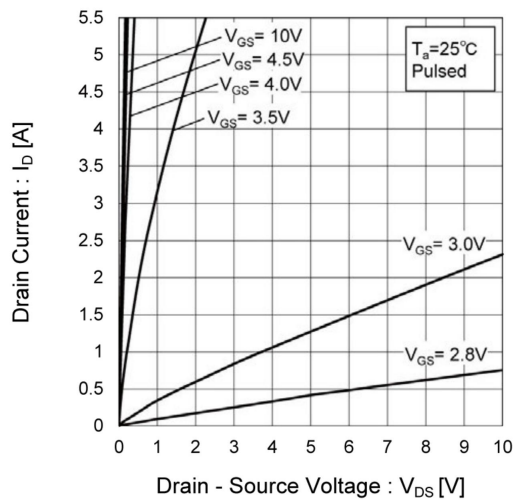
Single Pulse Maximum Power dissipation



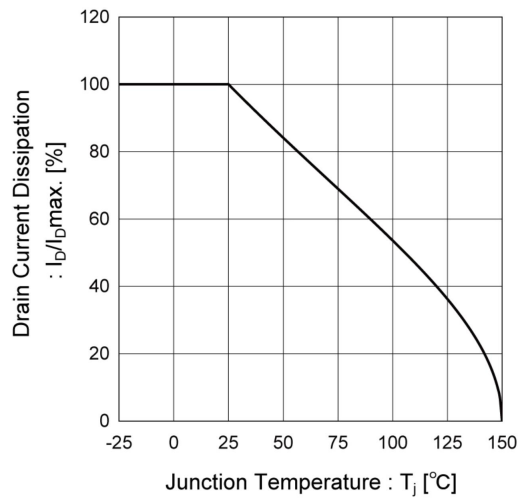
Typical Output Characteristics



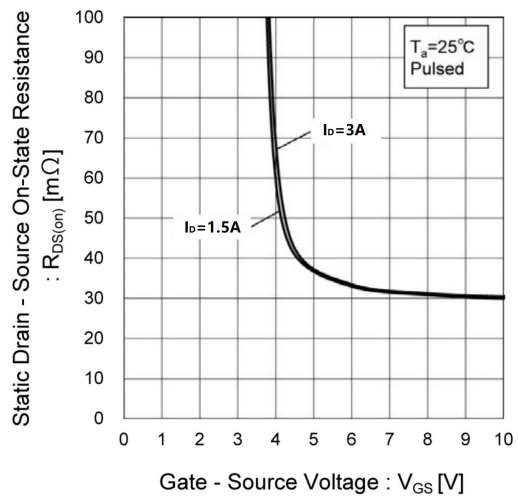
Typical Output Characteristics



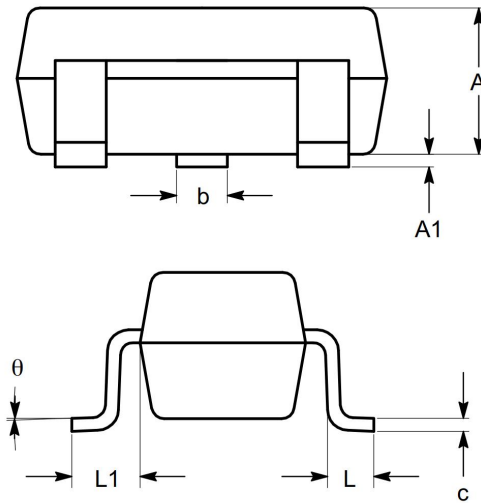
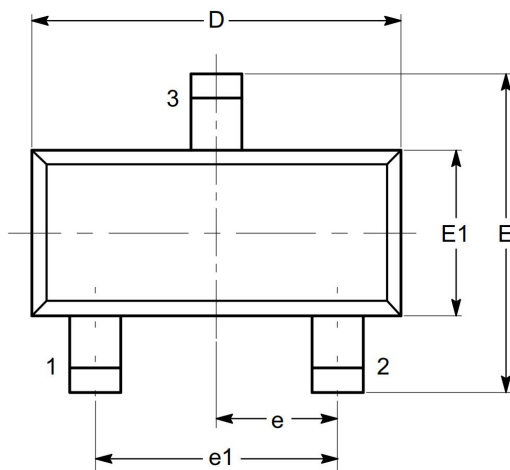
Drain Current Derating Curve



Static Drain - Source On - State Resistance vs. Gate Source Voltage



**Package outline dimension**



SYMBOL	MIN	NOM	MAX
A	0.89		1.12
A1	0.013		0.10
b	0.37		0.50
c	0.085		0.18
D	2.80		3.04
E	2.10		2.64

SYMBOL	MIN	NOM	MAX
E1	1.20		1.40
e		0.95 BSC	
e1		1.90 BSC	
L		0.40 REF	
L1		0.54 REF	
$\theta$	0°		8°