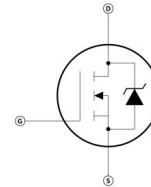
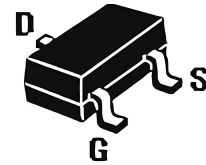


Features

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



Applications

- Battery switch
- DC/DC converter

Absolute maximum ratings

Parameter	Symbol	Value	Unit
Drain-source voltage ($V_{GS} = 0$)	V_{DSS}	60	V
Transient Gate- source voltage	V_{GSM}	± 30	
Continuous Gate- source voltage	V_{GSS}	± 20	
Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	I_D	3	A
Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	I_D	1.7	A
Drain current (pulsed)(note 1)	I_{DM}	10	A
Repetitive Avalanche current(note 1)	I_{AR}	1.6	A
Avalanche energy(note 2)	E_{AS}	12.8	mJ
Total dissipation at $T_C = 25\text{ }^\circ\text{C}$	P_{TOT}	8.3	W
Total dissipation at $T_C = 100\text{ }^\circ\text{C}$	P_{TOT}	3.3	W
Operating junction temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage temperature	T_{stg}		
Maximum lead temperature for soldering purpose	T_J	300	$^\circ\text{C}$

Electrical Characteristics ($T_{vj} = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
On /off states						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 1\text{ mA}, V_{GS} = 0$	60			V
Zero gate voltage drain current ($V_{GS} = 0$)	I_{DSS}	$V_{DS} = \text{Max rating}$ $V_{DS} = \text{Max rating}, T_C = 125\text{ }^\circ\text{C}$			1	μA
Gate-body leakage current ($V_{DS} = 0$)	I_{GSS}	$V_{GS} = \pm 20\text{ V}$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	1.3	2.5	V

MS3N06FF

Static drain-source on resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 3A		78	105	mΩ
Dynamic						
Forward transconductance	g _{fs}	V _{DS} = 15 V, I _D = 3A		3		S
Input capacitance	C _{iss}	V _{DS} =25V,f=1MHz,V _{GS} =0V		247		pF
Output capacitance	C _{oss}			34		
Reverse transfer capacitance	C _{rss}			19		
Turn on delay time	t _{d(on)}	V _{DD} =30V,I _D =3A V _{GS} =10V,R _g =10Ω Inductance load	-	32	-	ns
Turn on rise time	t _r		-	47	-	ns
Turn off delay time	t _{d(off)}		-	26	-	ns
Turn off fall time	t _f		-	18	-	ns
Total gate charge	Q _g	V _{DD} =30V,I _D =3A V _{GS} =10V	-	6	-	nC
Gate-source charge	Q _{gs}		-	1	-	
Gate-drain charge	Q _{gd}		-	1	-	
Source drain diode						
Source-drain current	I _{SD}		-	3	-	A
Source-drain current (pulsed)	I _{SDM}		-	8	-	
Forward on voltage	V _{SD}	I _{SD} = 3A, V _{GS} = 0V	-	1.2	-	V
Reverse recovery time	t _{rr}	V _{ge} =0V,I _S =3A,V _R =30V,	-	120	-	ns
Reverse recovery charge	Q _{rr}	-di _F /dt=100A/μs	-	26	-	nC

Thermal data

Parameter	Symbol	Value	Unit
Thermal resistance junction-case max	$R_{thj-case}$	15	°C/W
Thermal resistance junction-Ambient max	$R_{thj-Ambient}$	60	

Ordering information

Code number	Silkscreen	Package
MS3N06FF	SOT-232-3L	SOT-23-3L

Notes:

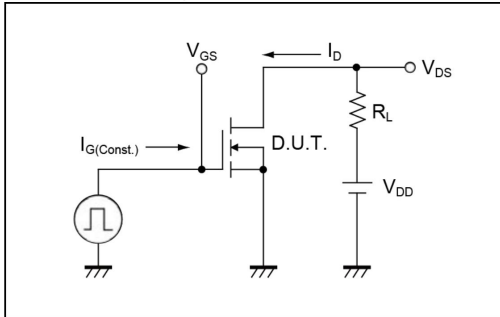
1:Pulse width limited by maximum junction temperature

2:L=10mH, $I_{AS}=I_{AR}$, $V_{DD}=30V, R_G=25\Omega$, Starting $T_J=25^\circ C$ 3: $I_{SD}\leq 3.0A$, $di/dt\leq 200A/\mu s$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ C$ 4:Pulse Test:Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1.5\%$

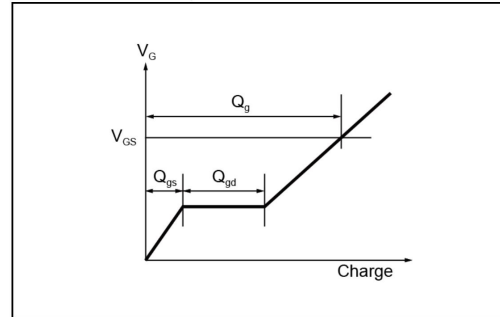
5:Essentially independent of operating temperature

Electrical characteristics

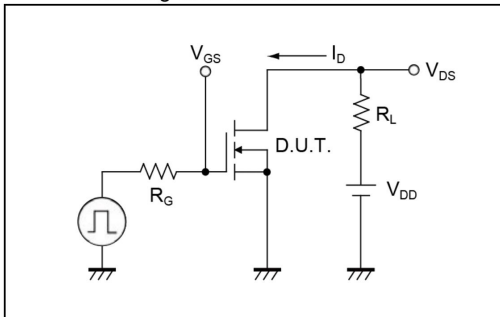
Gate Charge Measurement Circuit



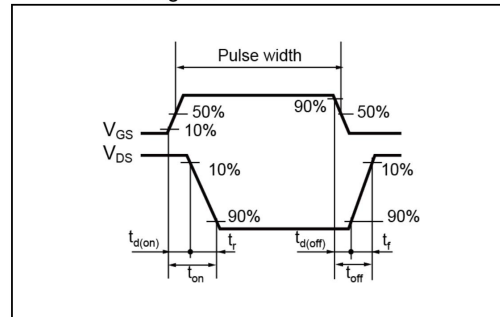
Gate Charge Waveform



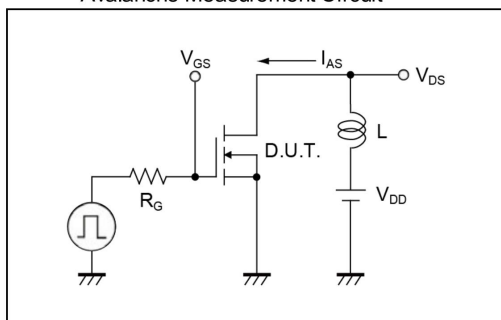
Switching Time Measurement Circuit



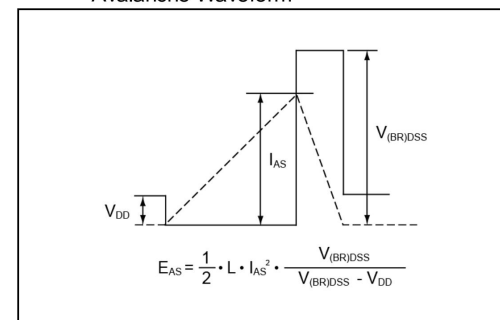
Switching Waveforms



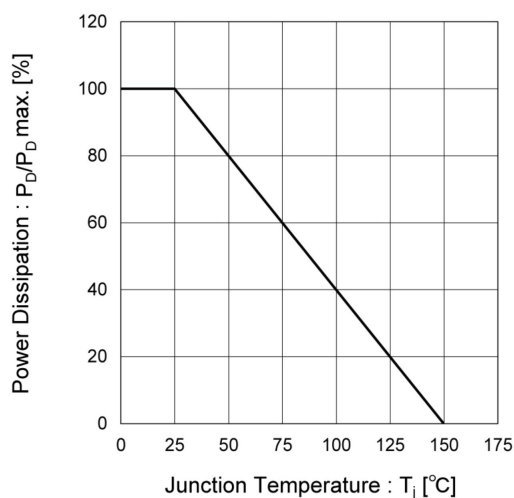
Avalanche Measurement Circuit



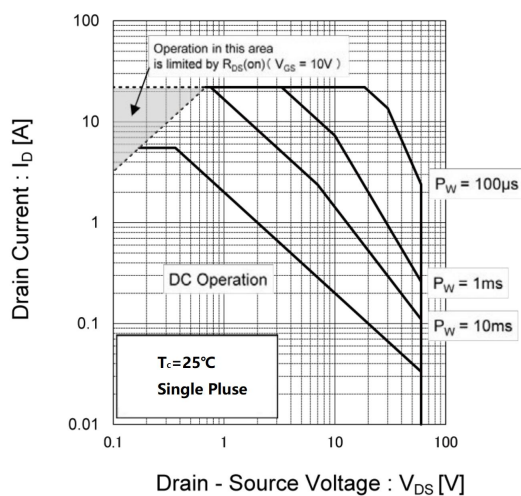
Avalanche Waveform



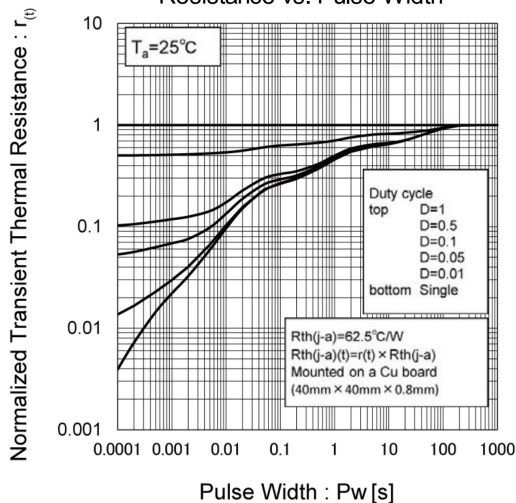
Power Dissipation Derating Curve



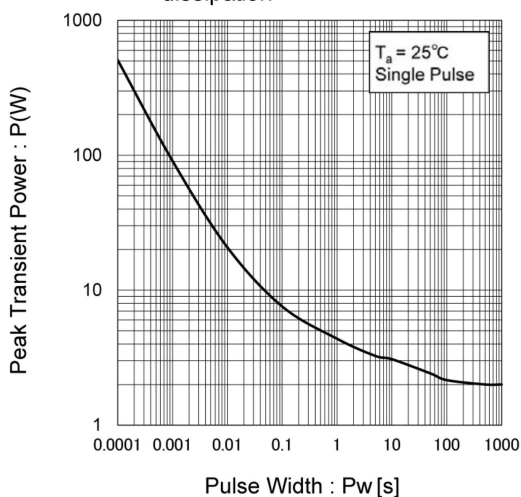
Maximum Safe Operating Area



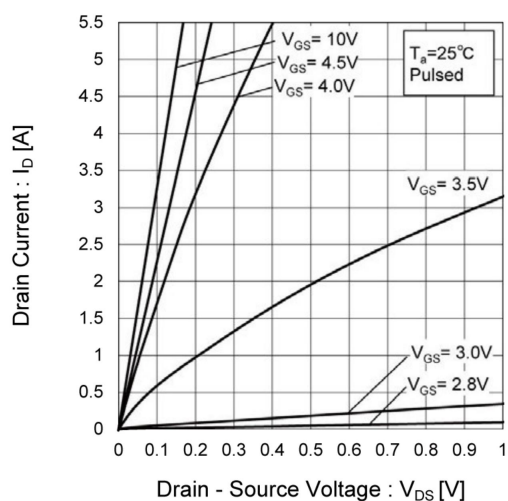
Normalized Transient Thermal Resistance vs. Pulse Width



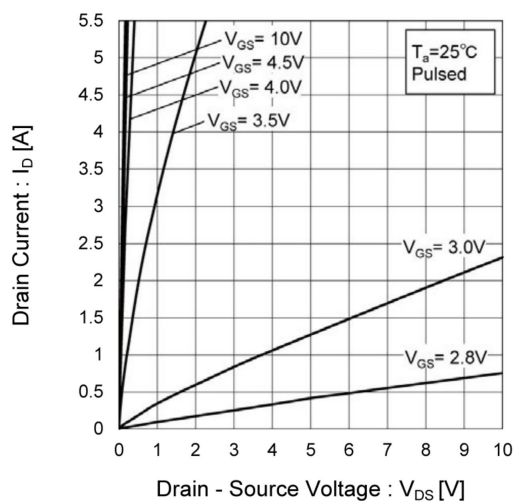
Single Pulse Maximum Power dissipation

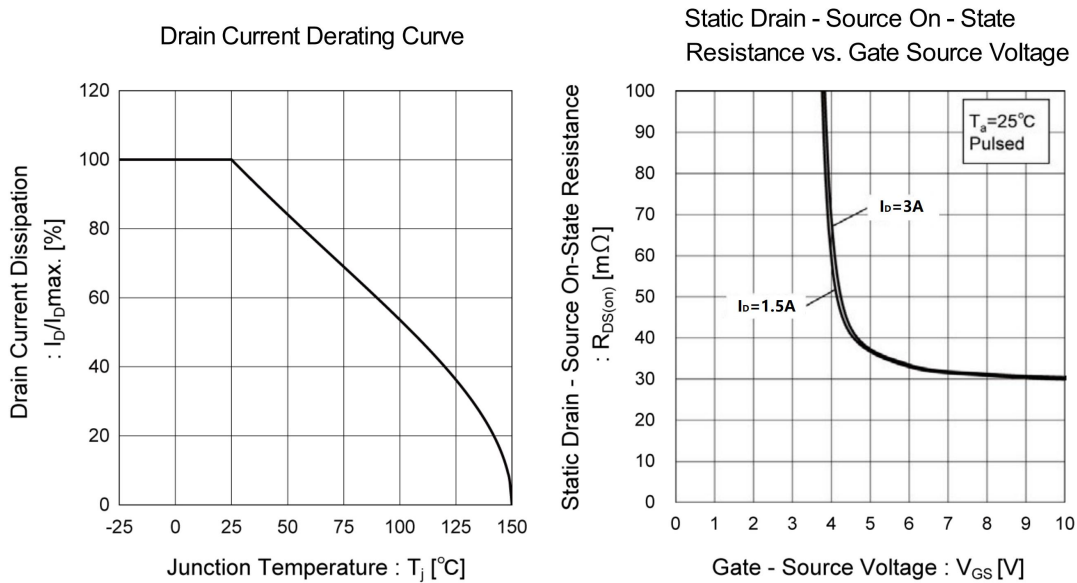


Typical Output Characteristics

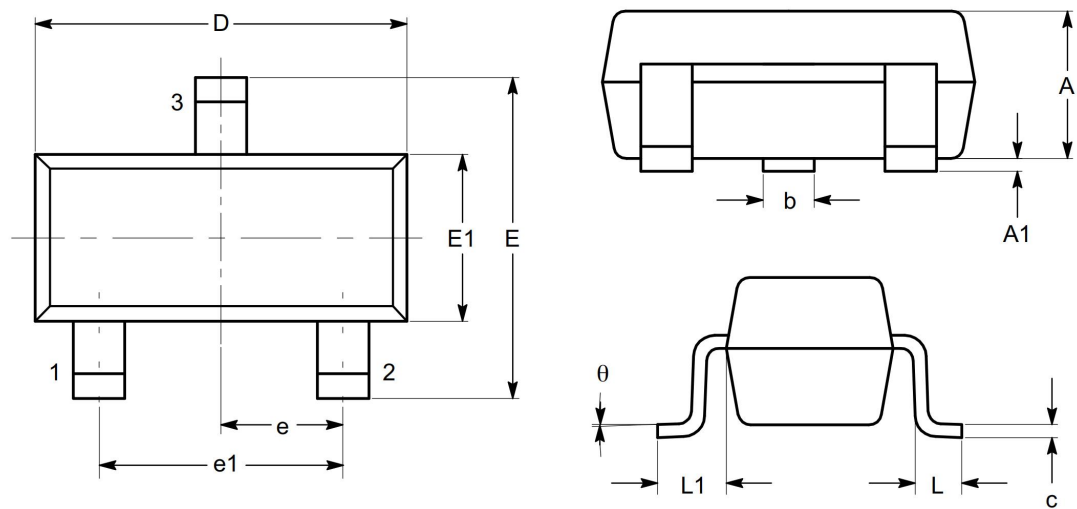


Typical Output Characteristics





Package outline dimension



SOT-232-3L

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		
θ	0°		8°