

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## MS80N03

Product specification


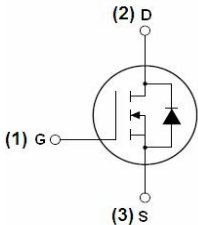

## Features

- $V_{DS} = 30V, I_D = 80A$
- $R_{DS(ON)}, 3.5m\Omega$  (Typ) @  $V_{GS} = 10V$
- $R_{DS(ON)}, 7m\Omega$  (Typ) @  $V_{GS} = 4.5V$
- Low on resistance
- Low gate charge
- Fast switching
- Low reverse transfer capacitances

## Application

- DC-DC converters
- Synchronous Rectifier

## Reference News

PACKAGE OUTLINE	N-Channel MOSFET	Marking
 TO-252		

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	30	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current-Continuous <sup>Note3</sup>	$TC = 25^\circ C$	$I_D$	80	A
	$TC = 100^\circ C$		63	A
Drain Current-Pulsed <sup>Note1</sup>		$I_{DM}$	200	A
Avalanche Energy <sup>Note4</sup>		$E_{AS}$	280	mJ
Avalanche Current		$I_{AS}$	33	A
Maximum Power Dissipation	$TC = 25^\circ C$	$P_D$	105	W
Storage Temperature Range		$T_{STG}$	-55 to +150	$^\circ C$
Operating Junction Temperature Range		$T_J$	-55 to +150	$^\circ C$

## Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	3.3	-	$^\circ C/W$

**Electrical Characteristics(TJ=25℃ unless otherwise noted)**

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BVDSS	VGS=0V, IDS=250uA	30	-	-	V
Zero Gate Voltage Drain Current	IDSS	VDS=30V, VGS=0V	-	-	1	uA
Gate-Body Leakage	IGSS	VGS=±20V, VDS=0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	VGS(TH)	VDS=VGS, IDS=250uA	1.0	1.7	2.5	V
Drain-Source On-State Resistance	RDS(ON)	VGS= 10V, IDS=30A	-	3.5	5.5	mΩ
		VGS=4.5V, IDS=20A	-	7	8.9	

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	Ciss	VDS = 15V, VGS = 0V, f= 1MHz	-	1963	-	pF
Output Capacitance	Coss		-	248	-	
Reverse Transfer Capacitance	Crss		-	221	-	
Gate Resisitance	Rg	VDD=0V, VGS= 1V, F= 1MHz	-	1.43	-	Ω

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	Td(on)	VGS=10V, VDS=15V, RGEN=3Ω Id=20A	-	55	-	ns
Rise Time	tr		-	36.4	-	
Turn-Off Delay Time	Td(off)		-	37.5	-	
Fall Time	tf		-	14	-	
Total Gate Charge at 10V	Qg	VDS=15V, IDS=45A , VGS=10V	-	41	-	nC
Gate to Source Gate Charge	Qgs		-	6.4	-	
Gate to Drain“Miller”Charge	Qgd		-	11	-	

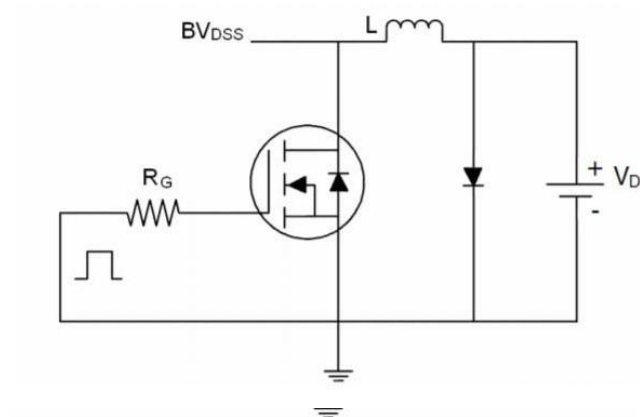
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	VSD	VGS=0V, IDS=20A	-	-	1.2	V
Reverse Recovery Time	trr	TJ=25℃ ,IF=20A	-	21.7	-	nS
Reverse Recovery Charge	Qrr	di/dt= 100A/us	-	7.2	-	nC

**Notes:**

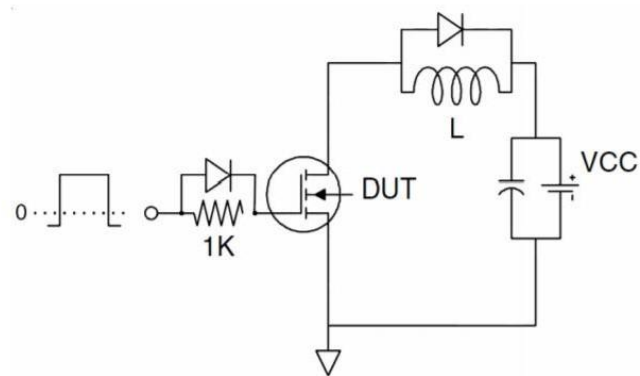
- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: EAS condition: L=0.5mH, VDD= 15V, VG= 10V, VGATE=30V, Start TJ=25℃.

## Test Circuit

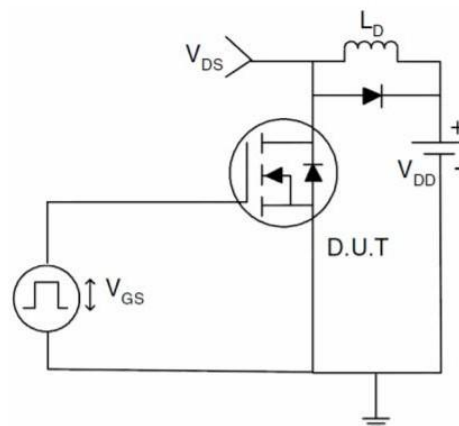
### 1) $E_{AS}$ Test Circuit



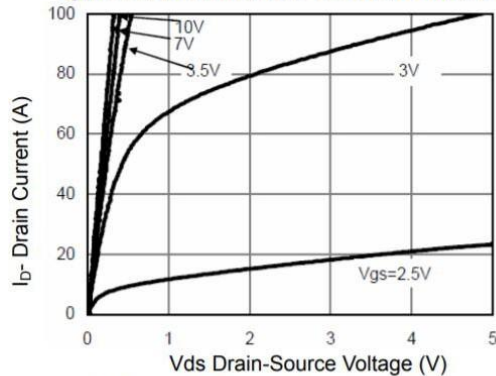
### 2) Gate Charge Test Circuit



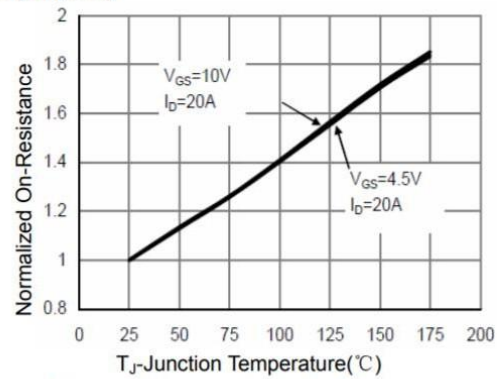
### 3) Switch Time Test Circuit



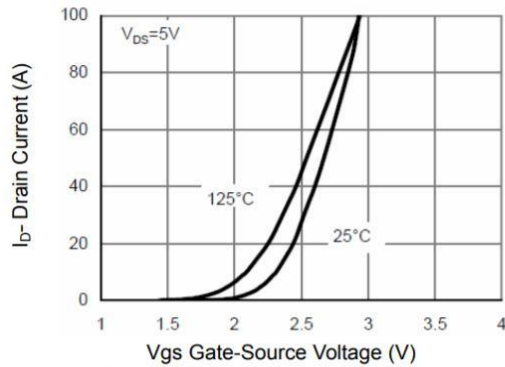
**Typical Electrical and Thermal Characteristics (Curves)**



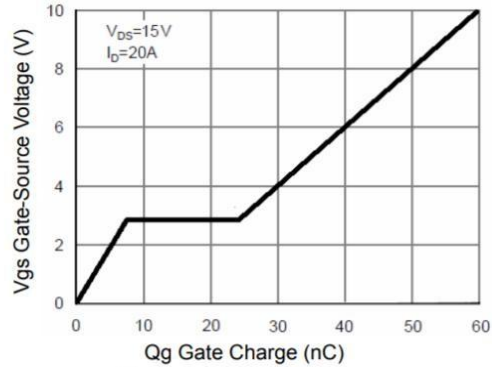
**Figure 1 Output Characteristics**



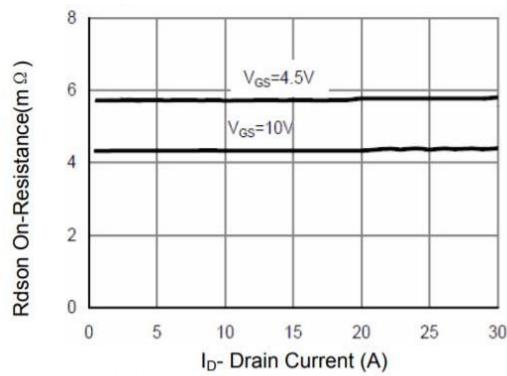
**Figure 4 Rdson-Junction Temperature**



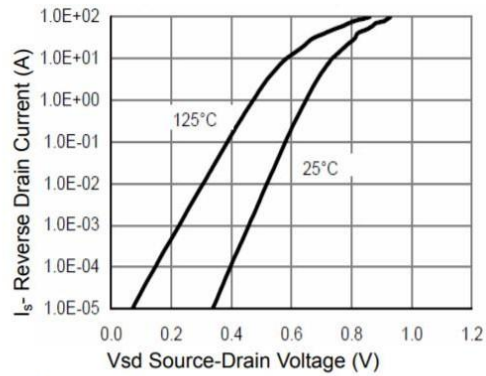
**Figure 2 Transfer Characteristics**



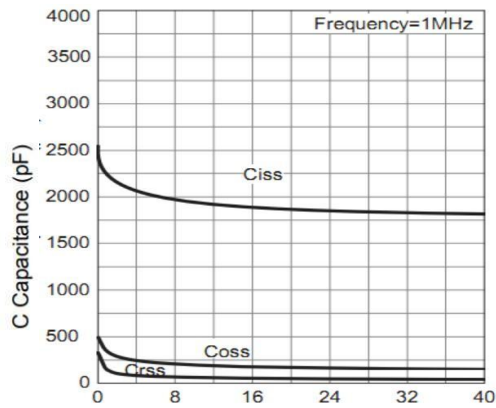
**Figure 5 Gate Charge**



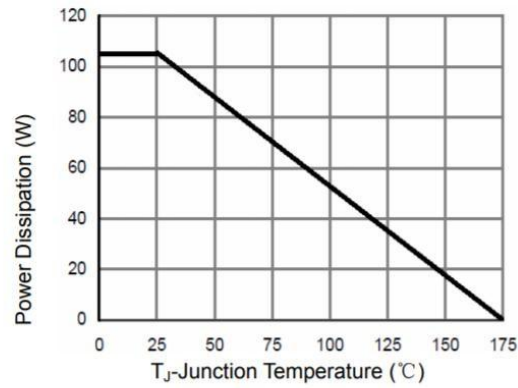
**Figure 3 Rdson- Drain Current**



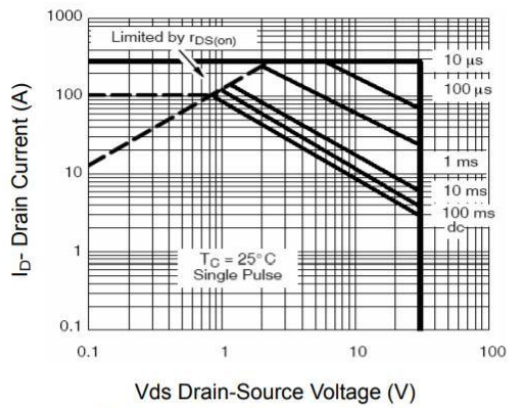
**Figure 6 Source- Drain Diode Forward**



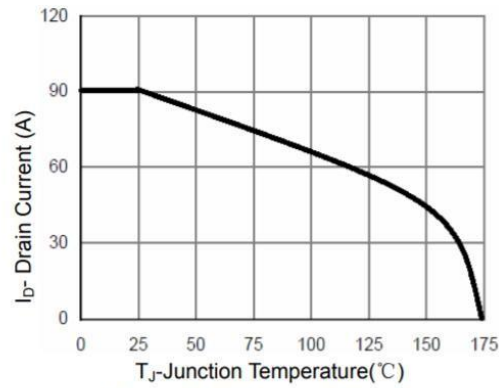
**Figure 7 Capacitance vs Vds**



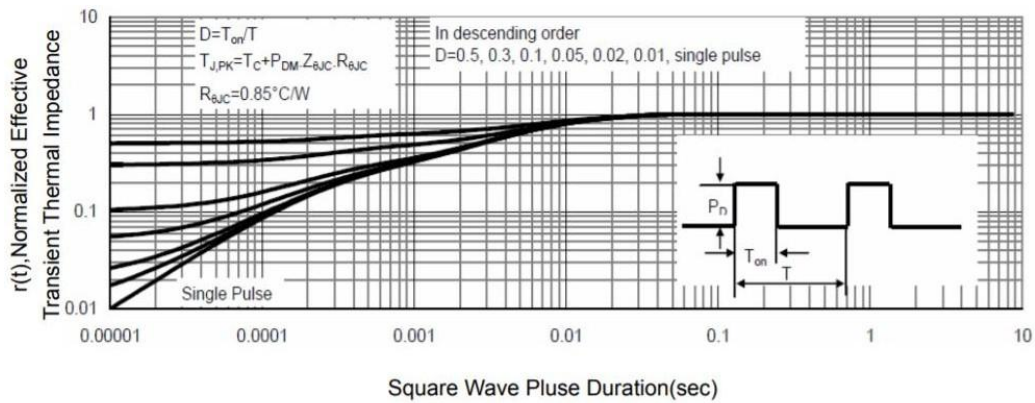
**Figure 9 Power De-rating**



**Figure 8 Safe Operation Area**

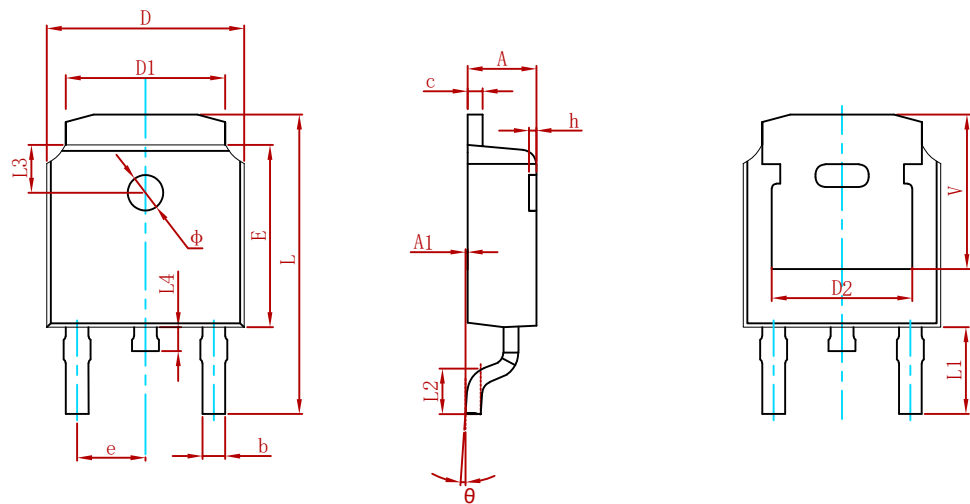


**Figure 10 ID Current Derating**



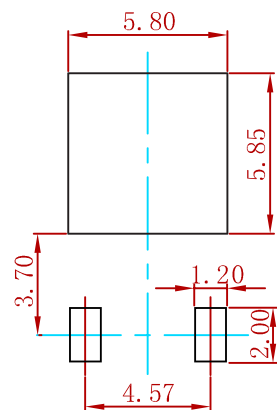
**Figure 11 Normalized Maximum Transient Thermal Impedance**

PACKAGE MECHANICAL DATA



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	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

Suggested Pad Layout



Note:  
1.Controlling dimension:in millimeters.  
2.General tolerance:± 0.05mm.  
3.The pad layout is for reference purposes only.

REELSPECIFICATION

P/N	PKG	QTY
MS80N03	TO-252	2500

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