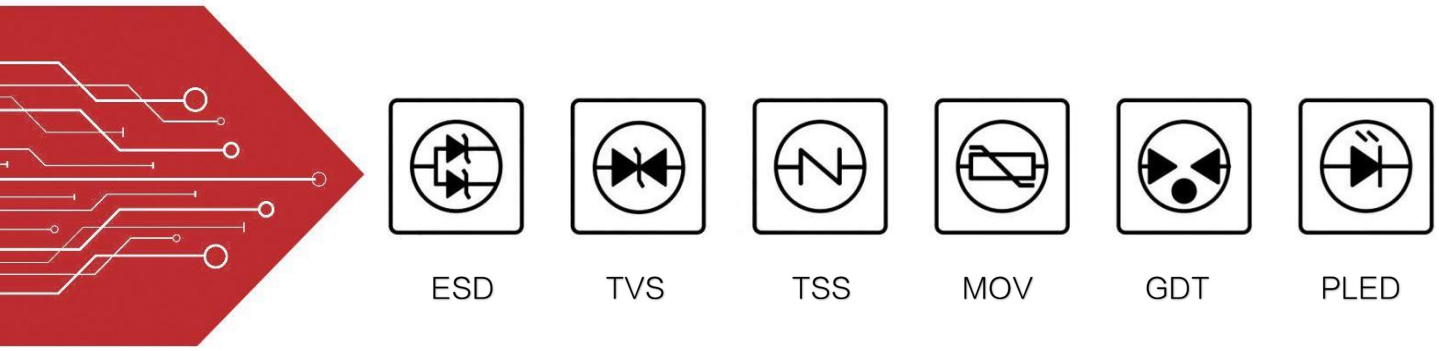
MSKSEMI
SEMICONDUCTOR



Product data sheet

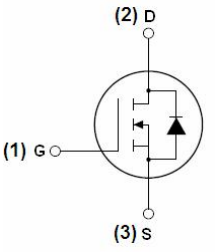
Features

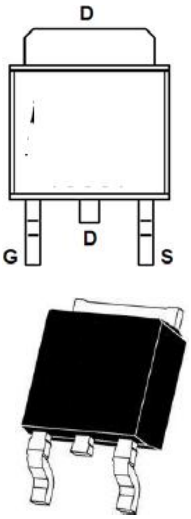
- V_{DS} = 30V,ID =80A
  $R_{DS(ON)}$,3.5m Ω (Typ) @ VGS =10V
  $R_{DS(ON)}$, 7m Ω (Typ) @ VGS =4.5V
- Low on resistance
- Low gate charge
- Fast switching
- Low reverse transfer capacitances

Application

- DC-DC converters
- Synchronous Rectifier

Schematic diagram





TO-252

Absolute Maximum Ratings(TA=25℃ unless otherwise noted)

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

Thermal Resistance

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

Electrical Characteristics(TJ=25℃ unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_{DS}=250uA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	uA
Gate-Body Leakage	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA

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

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C_{iss}	VDS =15V, VGS = 0V, f=1MHz	-	1963	-	pF
Output Capacitance	C_{oss}		-	248	-	
Reverse Transfer Capacitance	C_{rss}		-	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	$T_{d(on)}$	V_{GS}=10V,V_{Ds}=15V, R_{GEN}=3Ω I_D=20A	-	55	-	ns
Rise Time	t_r		-	36.4	-	
Turn-Off Delay Time	$T_{d(off)}$		-	37.5	-	
Fall Time	t_f		-	14	-	
Total Gate Charge at 10V	Q_g	V_{DS}=15V,I_{DS}=45A, V_{GS}=10V	-	41	-	nC
Gate to Source Gate Charge	Q_{gs}		-	6.4	-	
Gate to Drain“Miller”Charge	Q_{gd}		-	11	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_{DS}=20A	-	-	1.2	V
Reverse Recovery Time	t_{rr}	TJ=25℃,IF=20A di/dt=100A/us	-	21.7	-	nS
Reverse Recovery Charge	Q_{rr}		-	7.2	-	nC

Notes:

1: Repetitive rating, pulse width limited by maximum junction temperature.

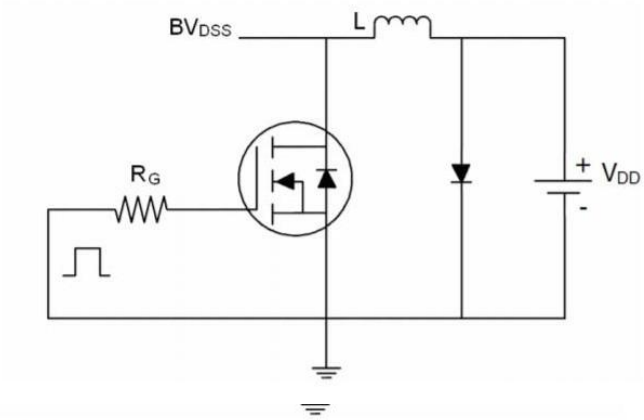
2: Surface mounted on FR4 Board, t≤10sec.

3: Pulse width ≤ 300μs, duty cycle ≤ 2%.

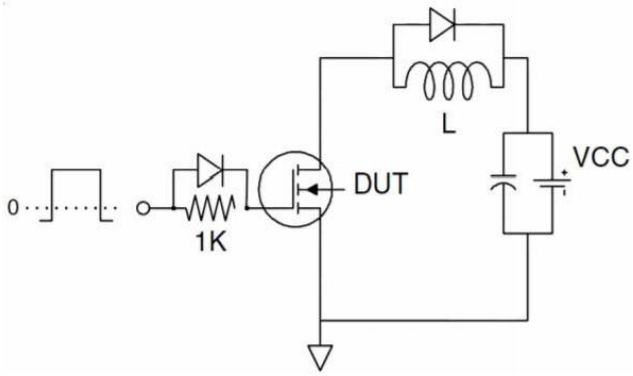
4: EAS condition: L=0.5mH,VDD=15V,VG=10V,V_{GATE}=30V,Start T_J=25℃.

Test Circuit

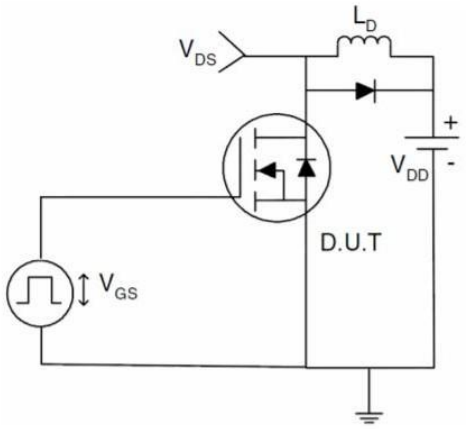
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

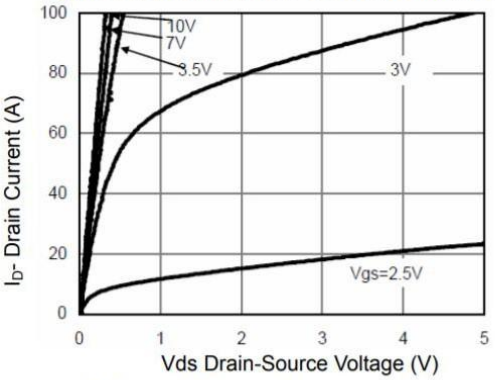


Figure 1 Output Characteristics

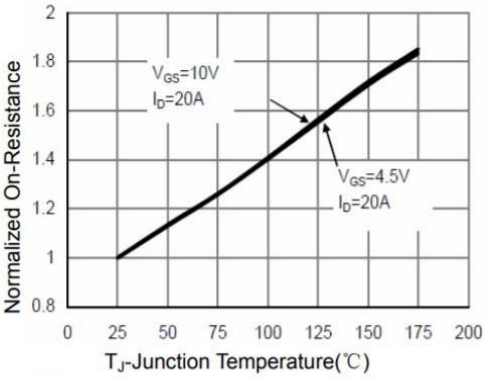


Figure 4 Rdson-Junction Temperature

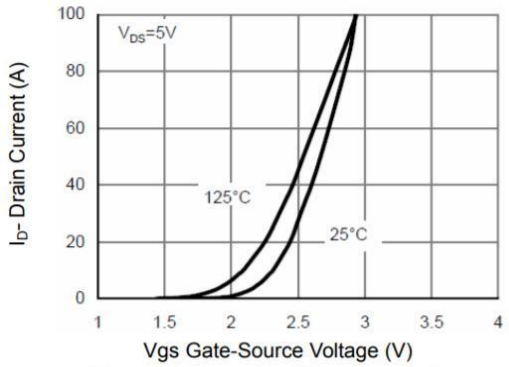


Figure 2 Transfer Characteristics

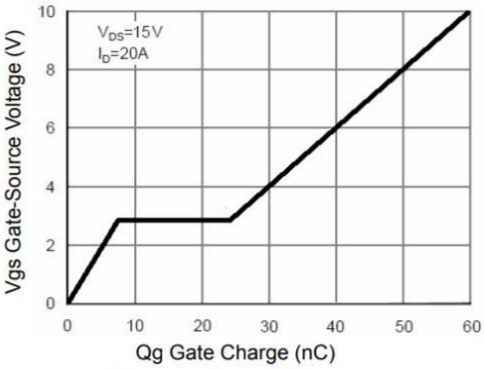


Figure 5 Gate Charge

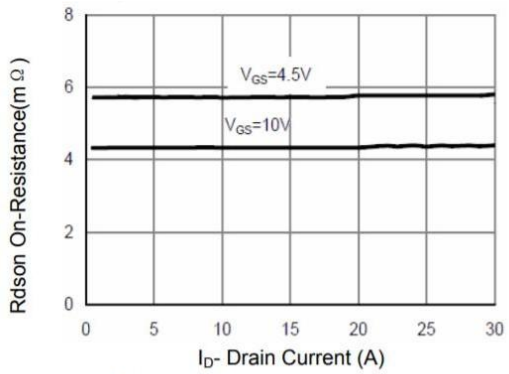


Figure 3 Rdson- Drain Current

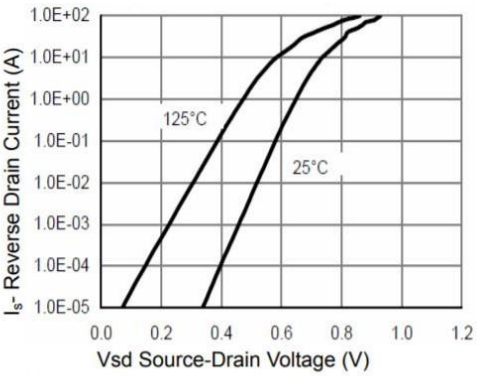


Figure 6 Source- Drain Diode Forward

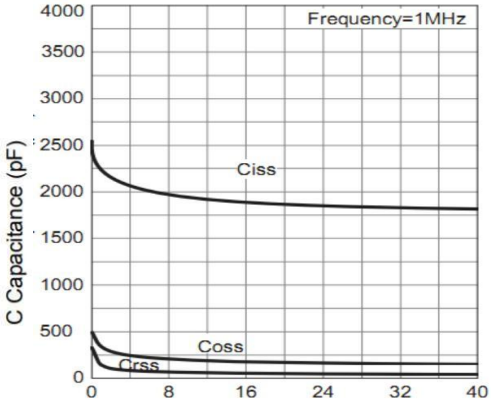


Figure 7 Capacitance vs Vds

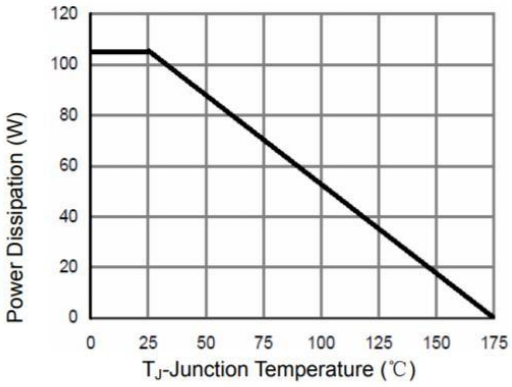


Figure 9 Power De-rating

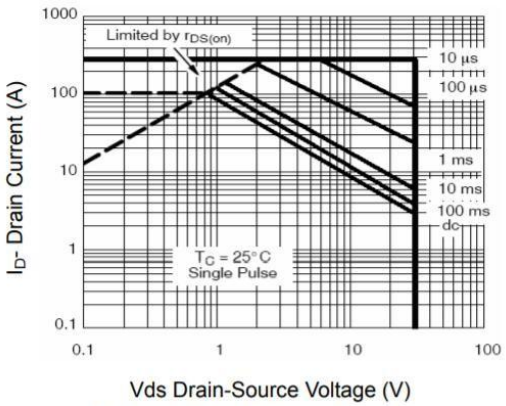


Figure 8 Safe Operation Area

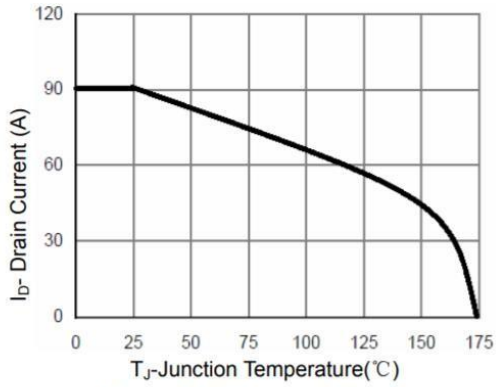


Figure 10 ID Current Derating

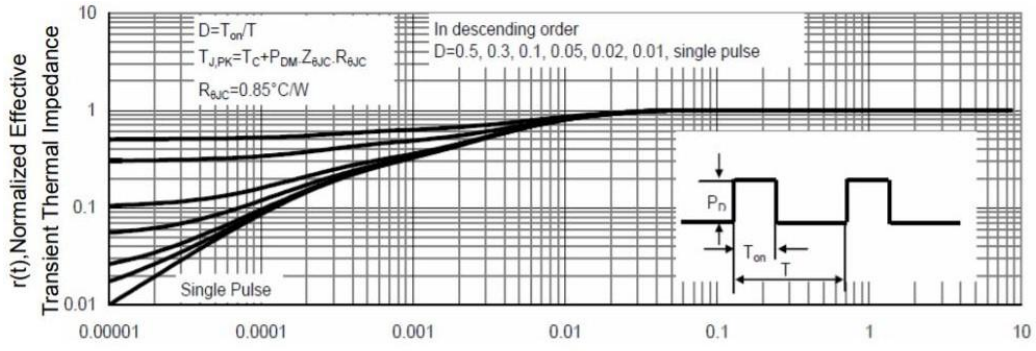
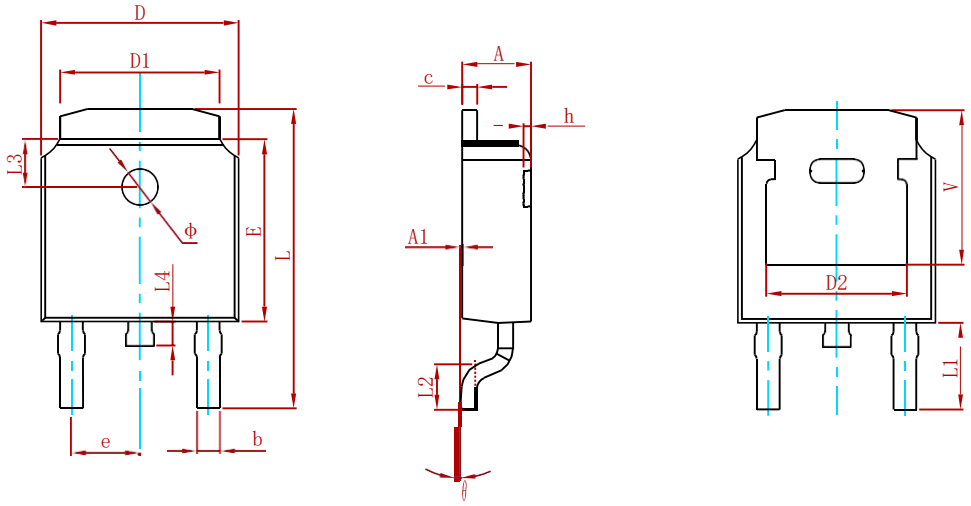


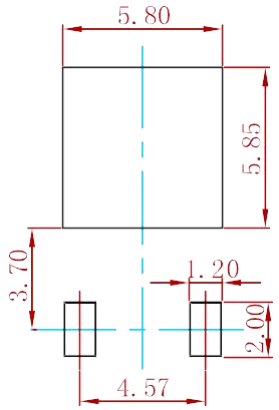
Figure 11 Normalized Maximum Transient Thermal Impedance

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.

REEL SPECIFICATION

P/N	PKG	QTY
MS80N03	TO-252	2500

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