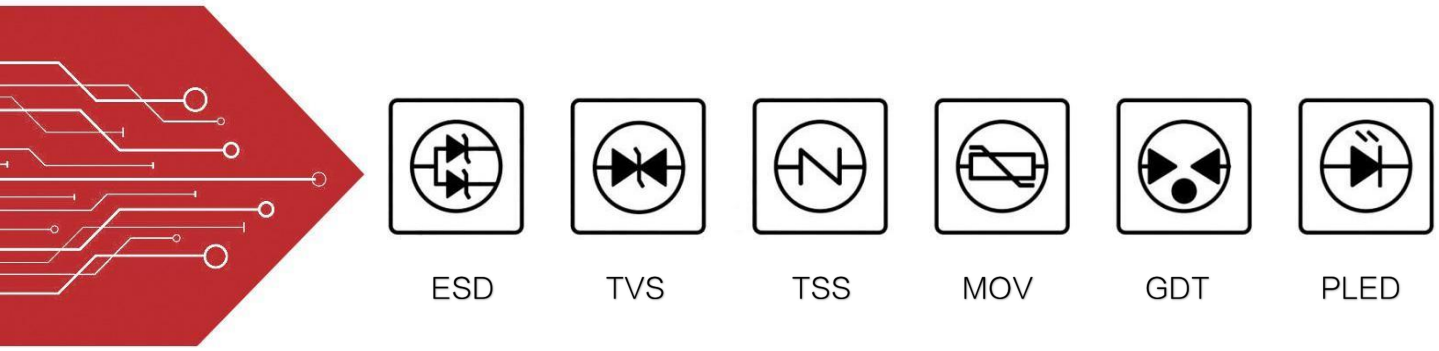
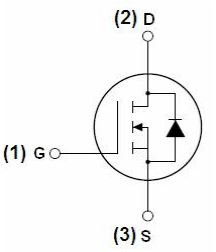
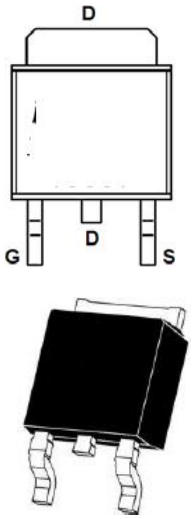
MSKSEMI
SEMICONDUCTOR



Product data sheet

Schematic diagram





TO-252

Features

- V_{DS} = 30V,ID =90A
  $R_{DS(ON)}$,3.5mΩ (Typ) @ VGS =10V
  $R_{DS(ON)}$, 7mΩ (Typ) @ VGS =4.5V
- Low on resistance
- Low gate charge
- Fast switching
- Low reverse transfer capacitances

Application

- DC-DC converters
- Synchronous Rectifier

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	90	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.

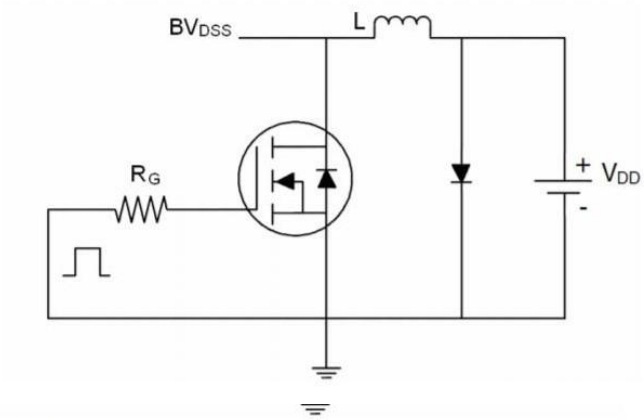
2: Surface mounted on FR4 Board, t≤10sec.

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

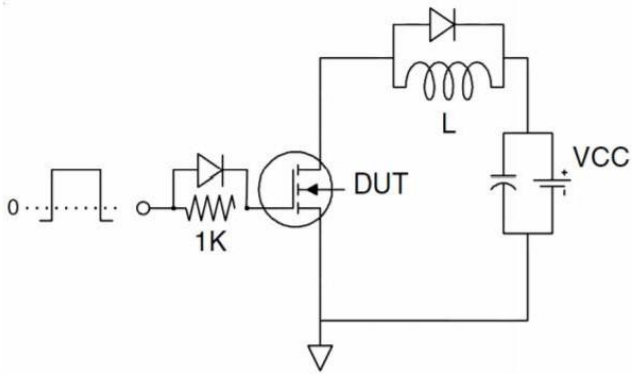
4: EAS condition: L=0.5mH,VDD=15V,VG=10V,V_{GATE}=30V,Start T_J=25℃.

Test Circuit

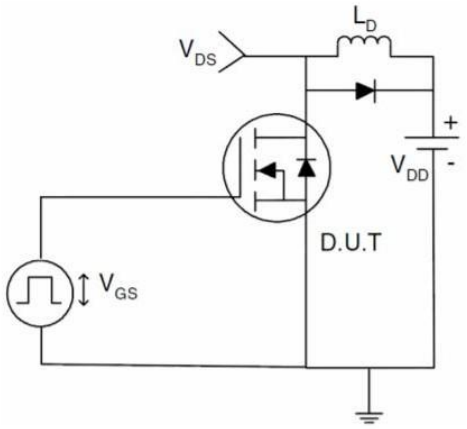
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

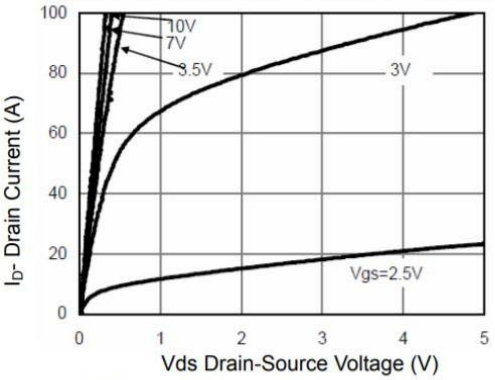


Figure 1 Output Characteristics

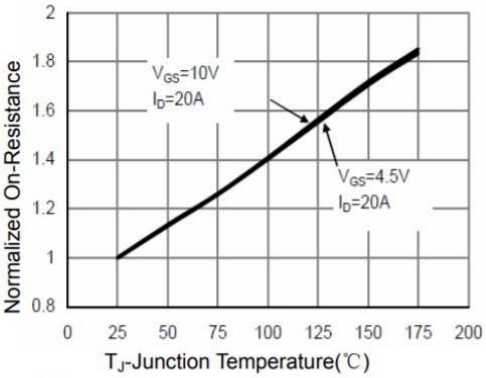


Figure 4 Rdson-Junction Temperature

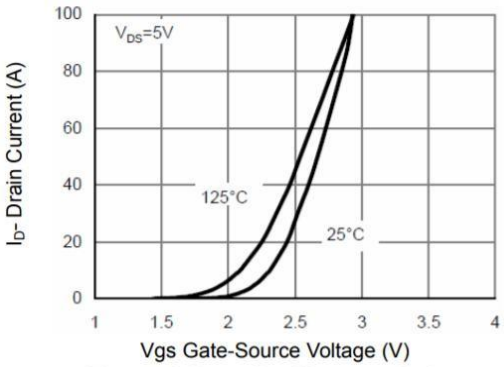


Figure 2 Transfer Characteristics

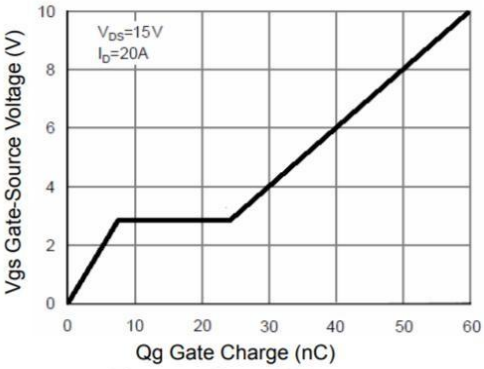


Figure 5 Gate Charge

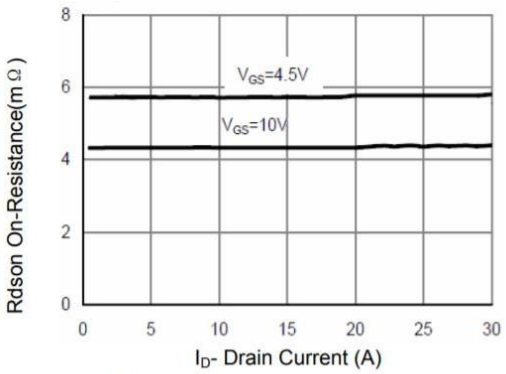


Figure 3 Rdson- Drain Current

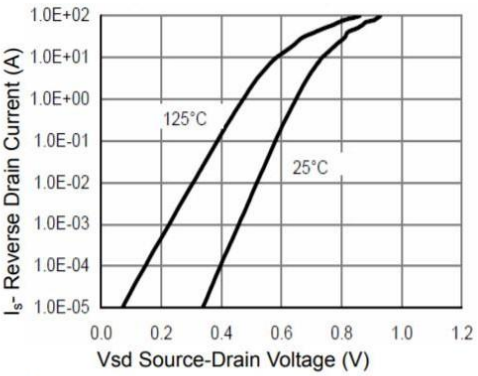


Figure 6 Source- Drain Diode Forward

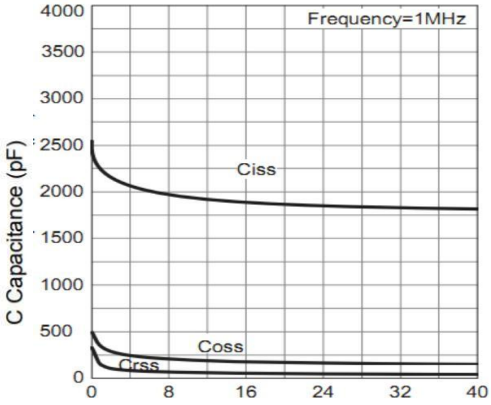


Figure 7 Capacitance vs Vds

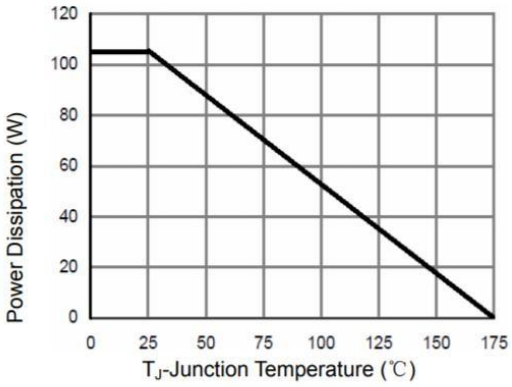


Figure 9 Power De-rating

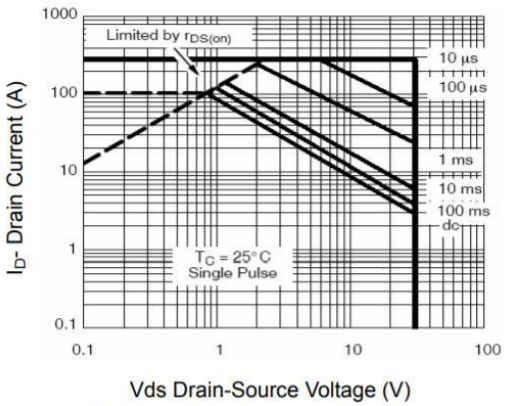


Figure 8 Safe Operation Area

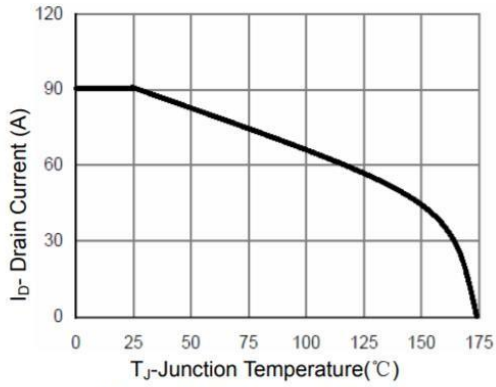


Figure 10 ID Current Derating

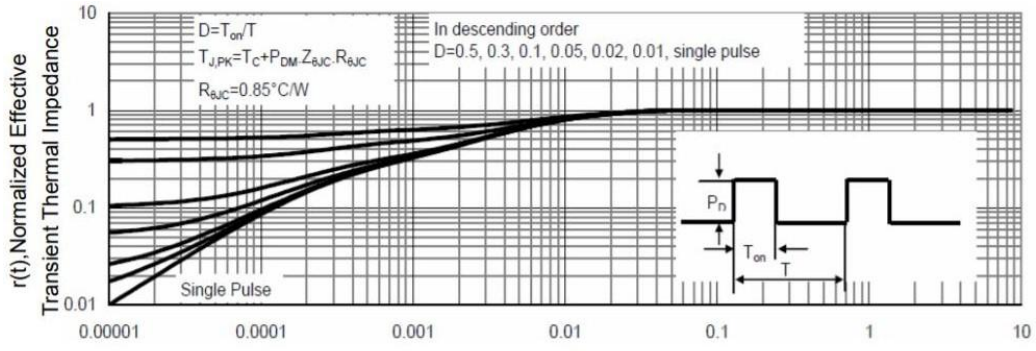
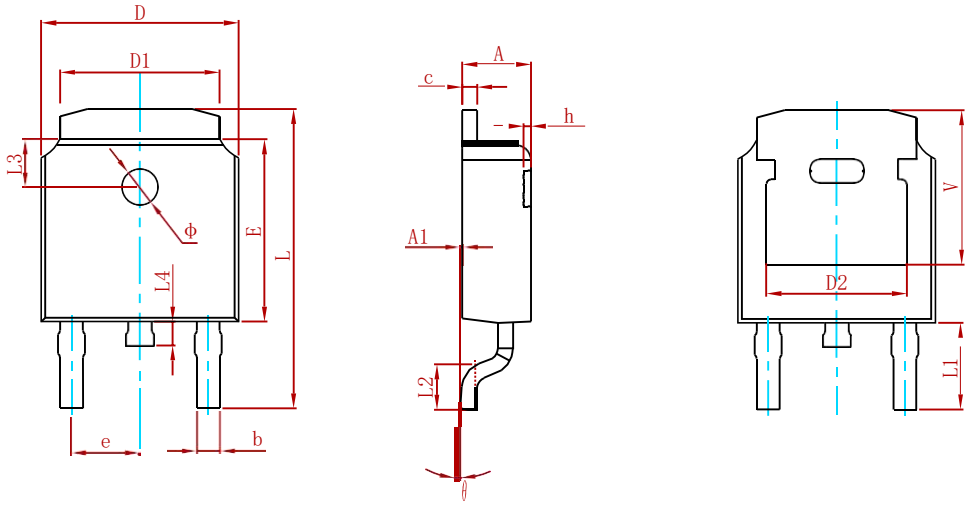


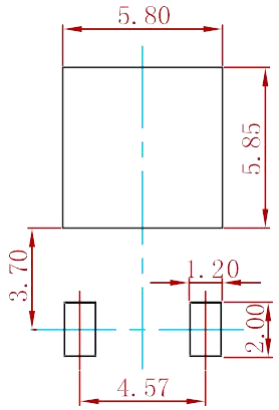
Figure 11 Normalized Maximum Transient Thermal Impedance

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
MS100N03	TO-252	2500

Attention

■ Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.

■ MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specificationsof any andall MSKSEMI Semiconductor products described orcontained herein.

■ Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer'sproducts orequipment.

■ MSKSEMI Semiconductor. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with someprobability. It is possiblethat these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits anderror prevention circuitsfor safedesign, redundant design, and structural design.

■ In the event that any or all MSKSEMI Semiconductor products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from theauthorities concerned in accordance with the above law.

■ No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringementsof intellectual property rights or other rightsof third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. Whendesigning equipment, referto the "Delivery Specification" for the MSKSEMI Semiconductor productthat you intend to use.