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SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT

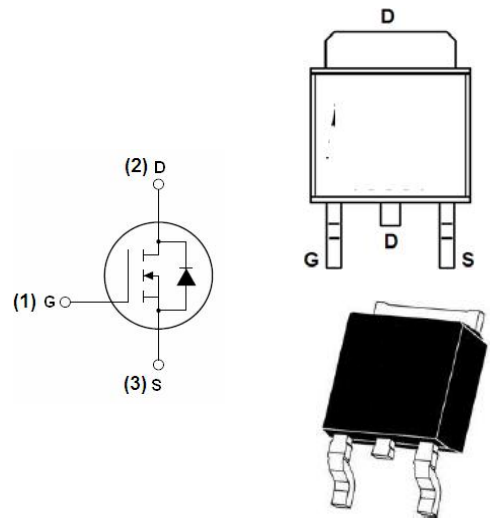


PLED

Product data sheet

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Schematic diagram



TO-252

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

Absolute Maximum Ratings(TA=25°C 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°C	I_D	80	A
	TC=100°C		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°C	P_D	105	W
Storage Temperature Range		T_{STG}	-55 to +150	°C
Operating Junction Temperature Range		T_J	-55 to +150	°C

Thermal Resistance

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

Electrical Characteristics(T_J=25°C 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	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =250uA	1.0	1.7	2.5	V
Drain-Source On-State Resistance	R _{DS(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}	V _{DS} =15V, V _{GS} = 0V, f=1MHz	-	1963	-	pF
Output Capacitance	C _{OSS}		-	248	-	
Reverse Transfer Capacitance	C _{rss}		-	221	-	
Gate Resisitance	R _g	V _{DD} =0V, V _{GS} =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	-	

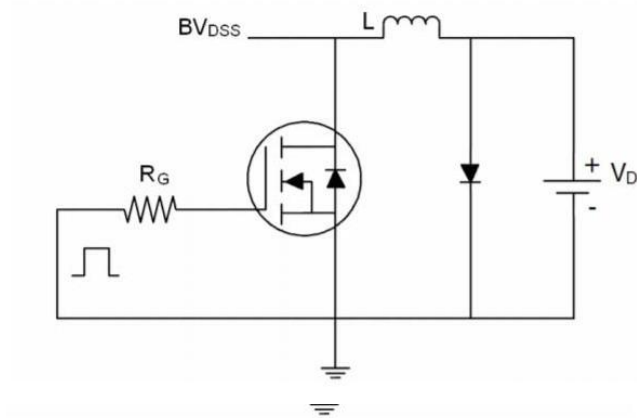
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{DS} =20A	-	-	1.2	V
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =20A	-	21.7	-	nS
Reverse Recovery Charge	Q _{rr}	di/dt=100A/us	-	7.2	-	nC

Notes:

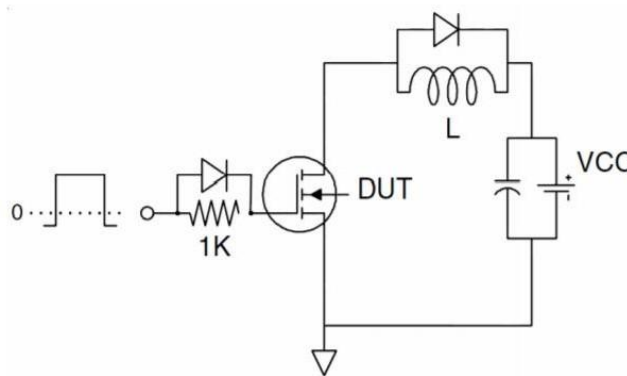
- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t_s≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: EAS condition: L=0.5mH, V_{DD}=15V, V_G=10V, V_{GATE}=30V, Start T_J=25°C.

Test Circuit

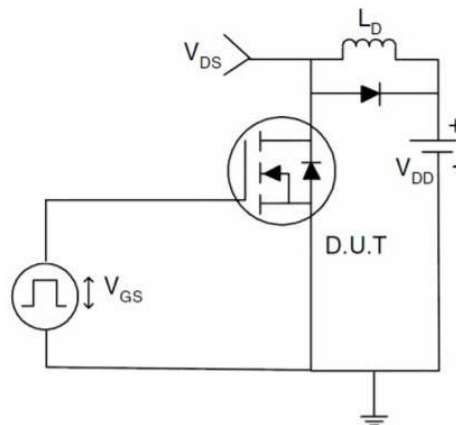
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

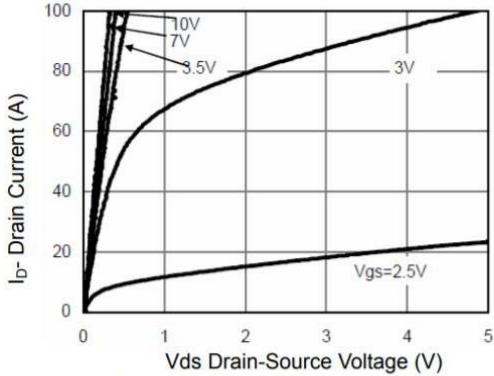


Figure 1 Output Characteristics

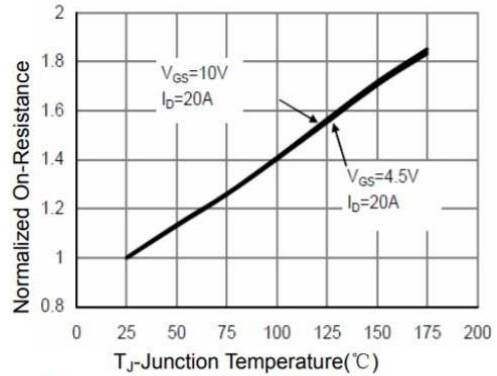


Figure 4 $R_{ds(on)}$ -Junction Temperature

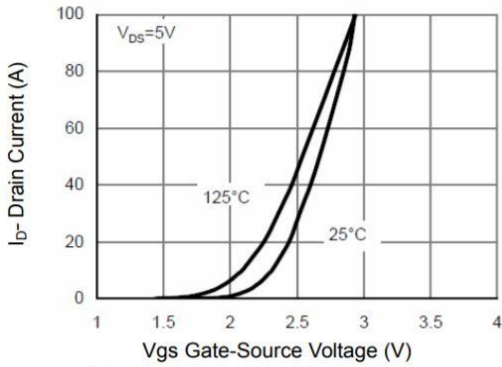


Figure 2 Transfer Characteristics

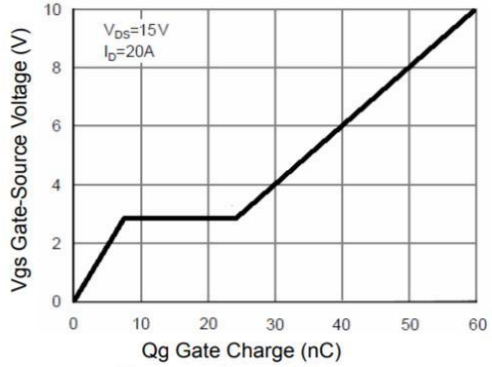


Figure 5 Gate Charge

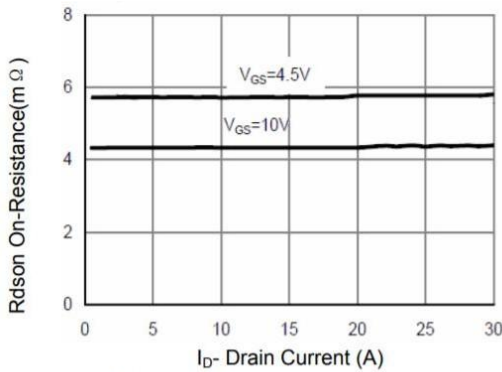


Figure 3 $R_{ds(on)}$ - Drain Current

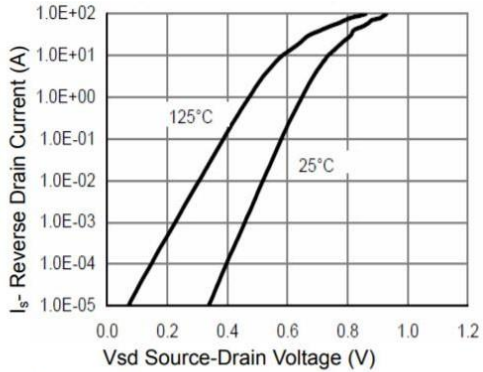
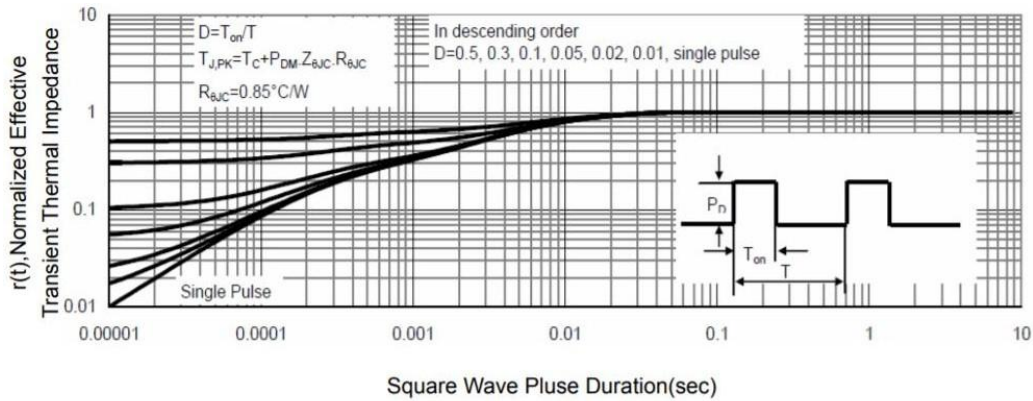
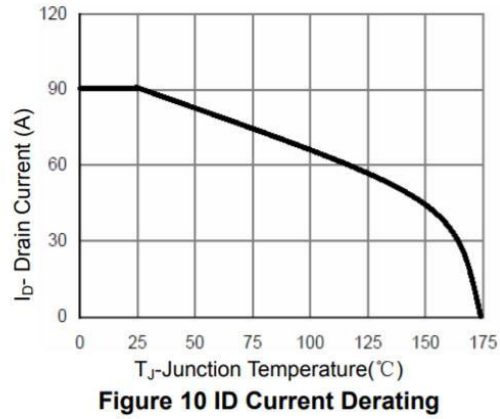
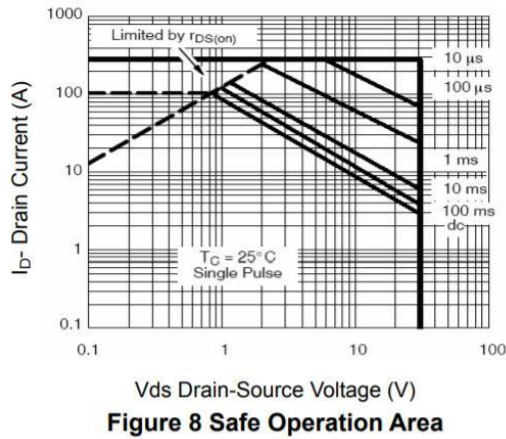
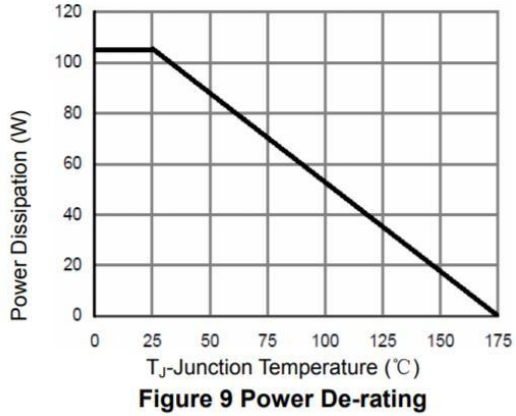
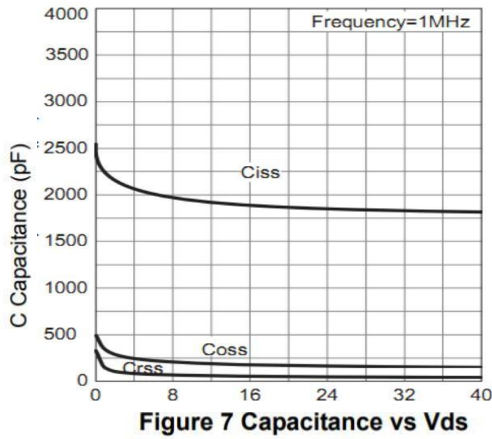
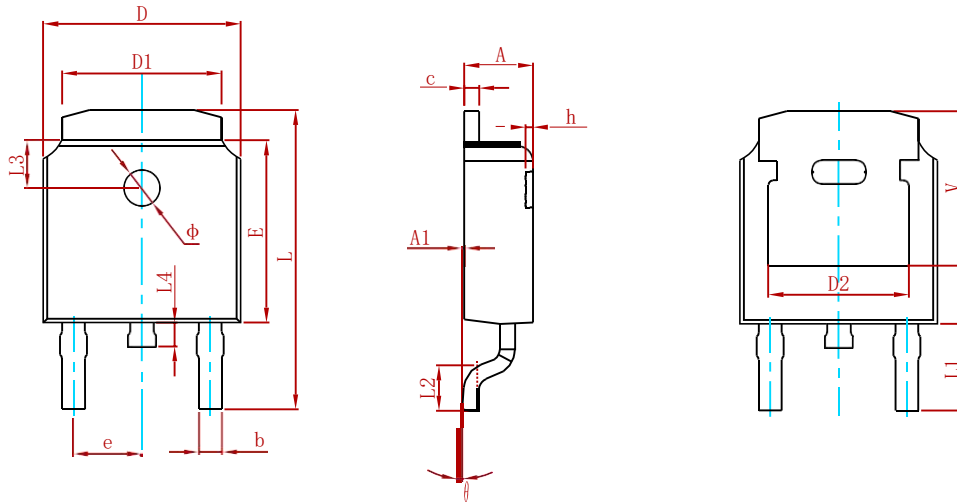


Figure 6 Source- Drain Diode Forward

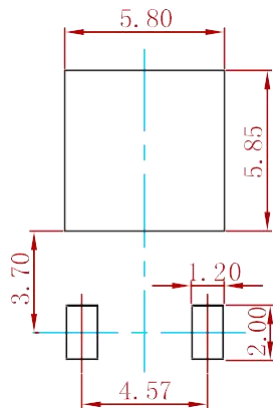


PACKAGE MECHANICAL DATA



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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