MSDE0N04

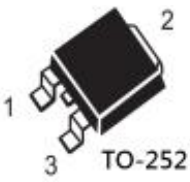
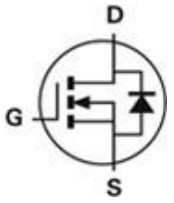
N-Channel Enhancement Mode MOSFET

Features

- 150V, 65A, $R_{DS(ON)}$(Typ.) = 15mΩ@V_{GS} = 10V.
- Reliable and Rugged
- Fast Switching Speed
- Green Device Available
- 100% EAS Guaranteed

Application

- High Frequency Switching and Synchronous
- DC/DC Converter

TO-252 (TOP view)	Symbol
	

Absolute Maximum Ratings T_C = 25° C unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	± 20	
I_D	Drain Current-Continuous, T_c =25°C	65	A
	Drain Current-Continuous, T_c =100°C	41	
I_{DM}	Drain Current-Pulsed [a]	195	
E_{AS}	Avalanche Energy, Single pulse [b]	256	mJ
I_{AS}	Avalanche Current	32	A
P_D	Maximum Power Dissipation @ T_c =25°C	179	W
T_{STG}	Store Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case Max	0.7	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max[c]	62.5	°C/W

Electrical Characteristics T_J = 25° C unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	150	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 150V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS}(th)$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D =250μA	2.0	-	4.0	V
$R_{DS}(on)$	Static Drain-Source On-Resistance [d]	V_{GS} = 10V, I_D = 20A	-	15	19	mΩ

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_g	Gate Resistance	f = 1.0MHz	-	0.7	-	Ω
Ciss	Input Capacitance	V_{DS} = 75V, V_{GS} = 0V, Freq.= 1.0MHz	-	2290	-	pF
Coss	Output Capacitance		-	210	-	
Crss	Reverse Transfer Capacitance		-	18	-	

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 75V, I_D =20A, R_{GEN} = 3Ω,V_{GS}=10V	-	15	-	ns
t_r	Turn-On Rise Time		-	19	-	
$t_{d(off)}$	Turn-Off Delay Time		-	22	-	
t_f	Turn-Off Fall Time		-	5	-	
Qg	Total Gate Charge	V_{DS} = 75V, I_D = 20A, V_{GS} = 0 to10V	-	32		nC
Qgs	Gate-Source Charge		-	13	-	
Qgd	Gate-Drain Charge		-	6	-	

Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Maximum Continuous Body Diode Forward Current		-	-	65	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	215	
V_{SD}	Drain-Source Diode Forward Voltage[d]	V_{GS} = 0V, I_{SD} = 20A	-	-	1.2	V
t_{rr}	Reverse Recovery Time	I_F= 20A, di/dt=100A/us,	-	85	-	ns
Q_{rr}	Reverse Recovery Charge		-	206	-	nC

Notes:

a：Max. current is limited by junction temperature.

b：The EAS data shows Max. Rating. The test condition is V_{DD}=50V,V_{GS}=10V,L=0.5mH,I_{AS}=32A.

c：Surface Mounted on 1in2 FR-4 board with 1oz.

d：Pulse test (pulse width≤300us, duty cycle≤2%).

e：Guaranteed by design, not subject to production testing.

Typical Characteristics

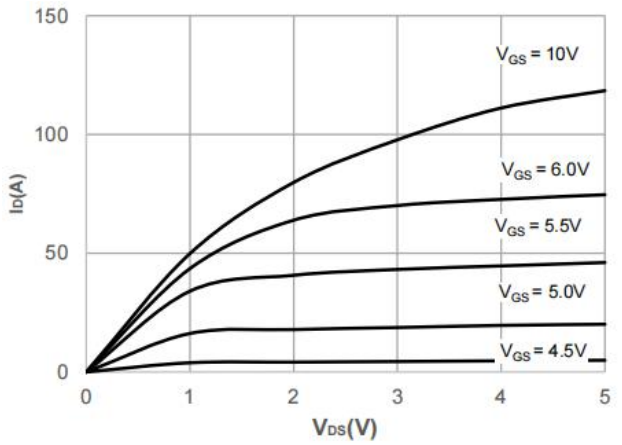


Figure 1. Output Characteristics

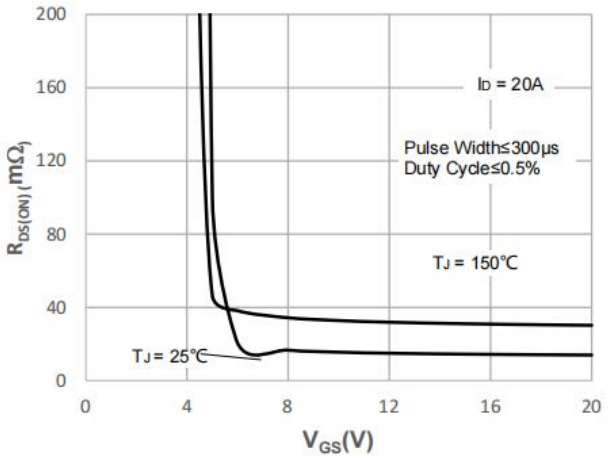


Figure 2. On-Resistance vs. V_{GS}

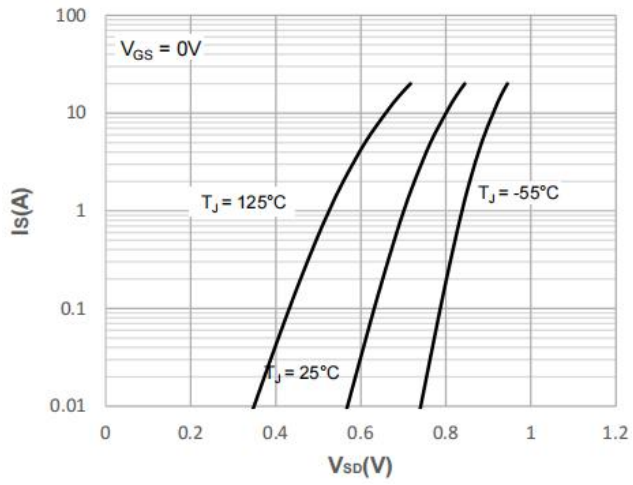


Figure 3. Source-Drain Diode Forward

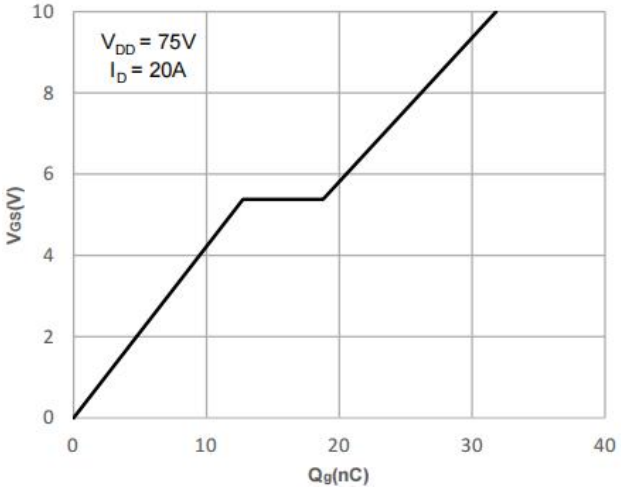


Figure 4.Gate Charge Characteristics

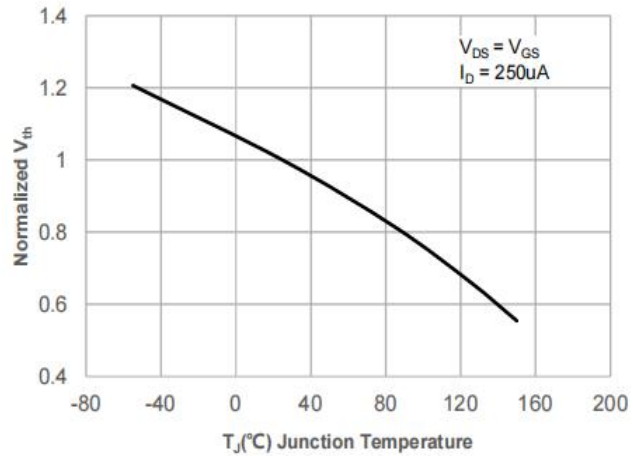


Figure 5. Gate Threshold Voltage

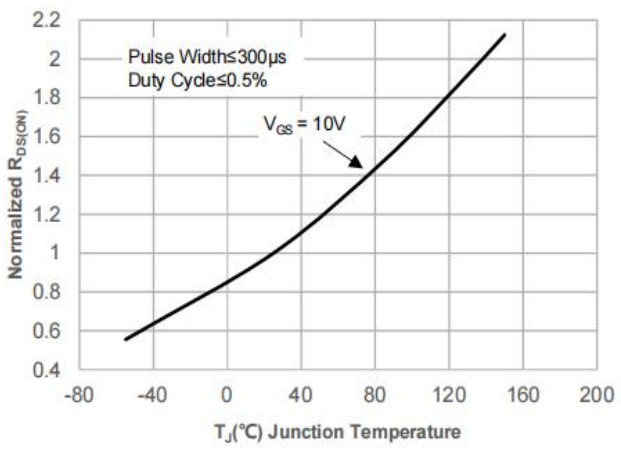


Figure 6.Drain-Source On Resistance

Typical Characteristics

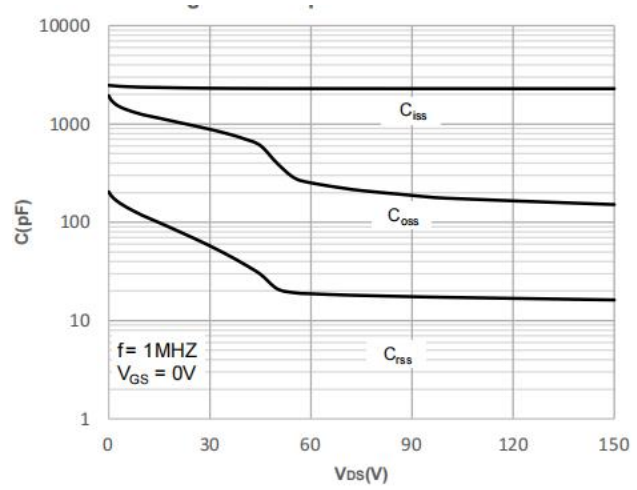


Figure 7.Capacitance

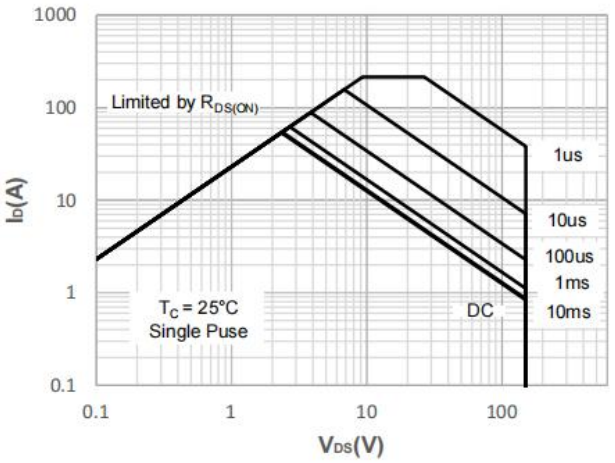


Figure 8. Safe Operating Area

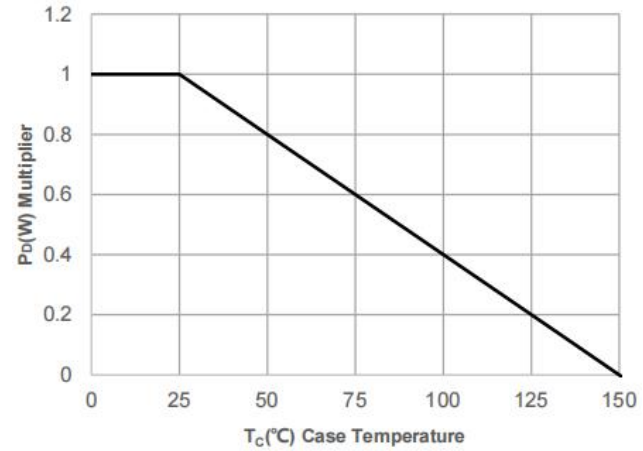


Figure 9.Power Dissipation

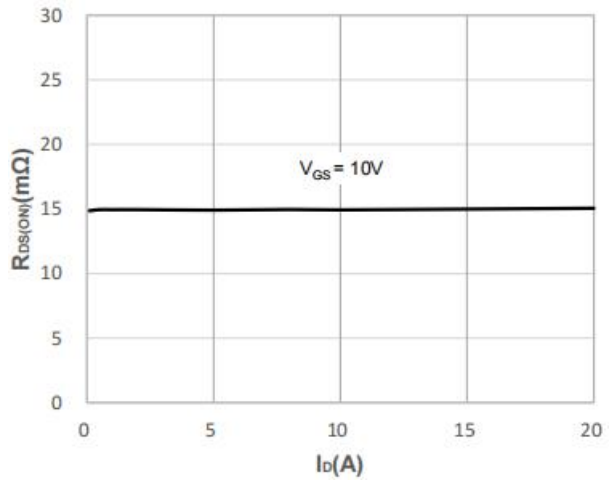


Figure 10.On-Resistance vs ID

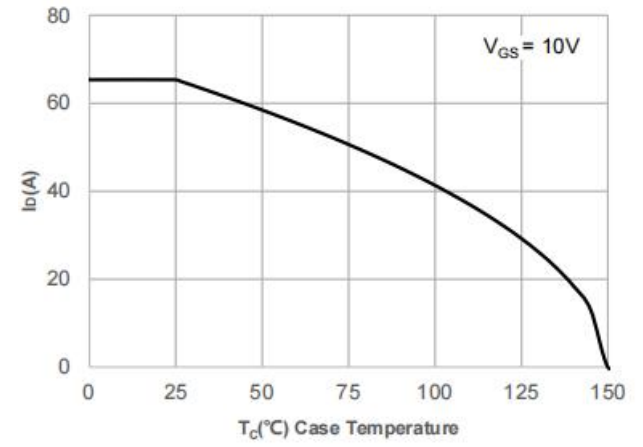


Figure11. Drain Current

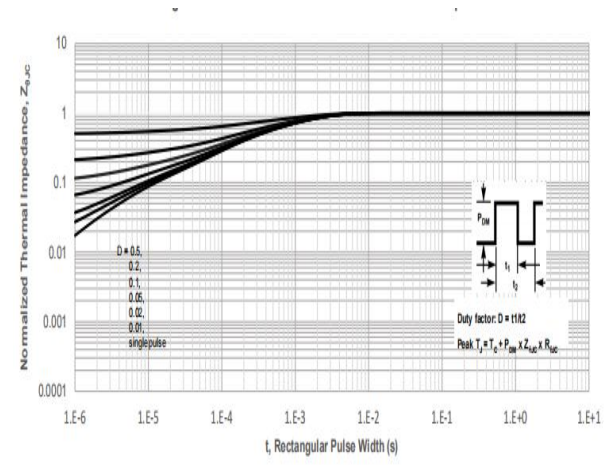


Figure 12. Normalized Maximum Transient Thermal Impedance

Package Information

TO-252

Unit：mm