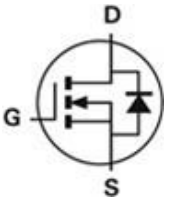
MS0003Y

N-Channel Enhancement Mode MOSFET

Features

- 100V, 103A, $R_{DS(ON)}$(Typ.) = 4.5mΩ@V_{GS} = 10V.
- Reliable and Rugged
- Fast Switching Speed
- Green Device Available
- 100% EAS Guaranteed

PDFN-5x6 (TOP view)	Symbol
	

Application

- High Frequency Switching and Synchronous
- DC/DC Converter

Absolute Maximum Ratings T_C = 25° C unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	
I_D	Drain Current-Continuous, T_C =25°C	103	A
	Drain Current-Continuous, T_C =100°C	65	
I_{DM}	Drain Current-Pulsed [a]	142	
E_{AS}	Avalanche Energy, Single pulse [b]	72	mJ
I_{AS}	Avalanche Current	38	A
P_D	Maximum Power Dissipation @ T_C=25°C	89	W
T_{STG}	Store Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case Max	-	1.4	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max[c]	-	50	°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	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80V, 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	1.0	-	3.0	V
R_{DS}(on)	Static Drain-Source On-Resistance [d]	V_{GS} = 10V, I_D = 20A	-	4.5	5.5	mΩ
		V_{GS} = 4.5V, I_D = 10A	-	6.5	8.5	
gfs	Forward Transconductance	V_{DS}= 5V, I_D= 10A	-	30.2	-	S

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Ciss	Input Capacitance	V_{DS} = 50V, V_{GS} = 0V, Freq.= 1.0MHz	-	3358	-	pF
Coss	Output Capacitance		-	924	-	
Crss	Reverse Transfer Capacitance		-	42	-	

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 25V, I_D =1A, R_G = 3Ω,V_{GS}=10V	-	13.3	-	ns
t_r	Turn-On Rise Time		-	4.2	-	
$t_{d(off)}$	Turn-Off Delay Time		-	2.9	-	
t_f	Turn-Off Fall Time		-	101.4	-	
Qg	Total Gate Charge	V_{DS} = 50V, I_D = 20A, V_{GS} = 4.5V	-	32.9	-	
Qg	Total Gate Charge	V_{DS} = 50V, I_D = 20A, V_{GS} = 10V	-	64.3		nC
Qgs	Gate-Source Charge		-	15.2	-	
Qgd	Gate-Drain Charge		-	14.6	-	

Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	V_{DS}=V_{GS}=0V, Freq.=1MHz	-	0.5	-	Ω
V_{SD}	Drain-Source Diode Forward Voltage[d]	V_{GS} = 0V, I_{SD} = 10A	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_F= 20A,V_R=50V di/dt=1A/us, T_J=25°C	-	47.7	-	ns
Q_{rr}	Reverse Recovery Charge		-	59.4	-	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=0.1mH,I_{AS}=23A.

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

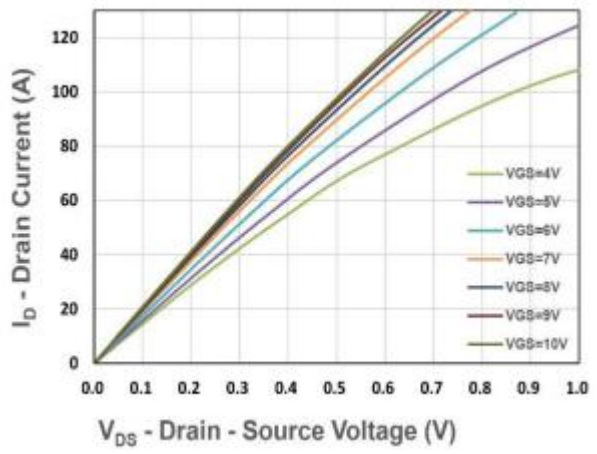


Figure 1. Output Characteristics

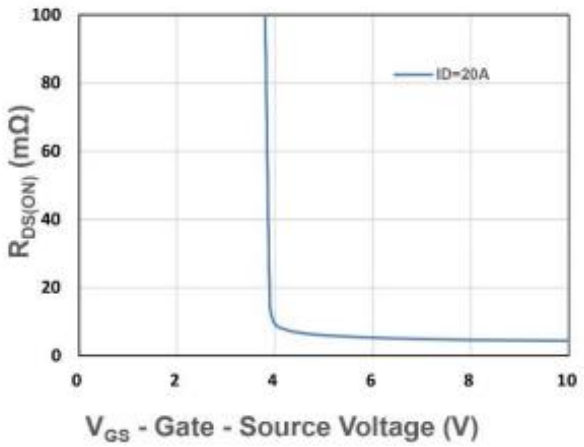


Figure 2. On-Resistance vs. V_{GS}

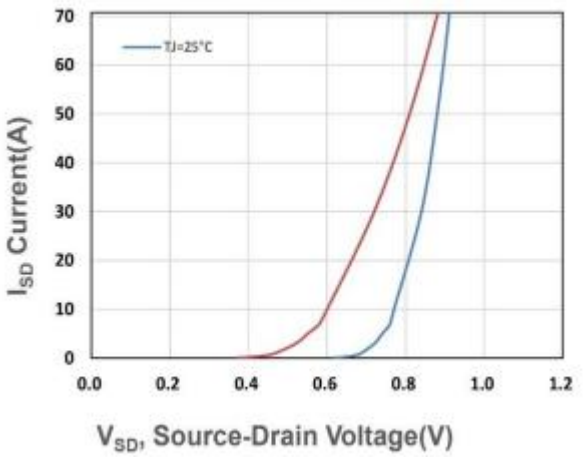


Figure 3. Source-Drain Diode Forward

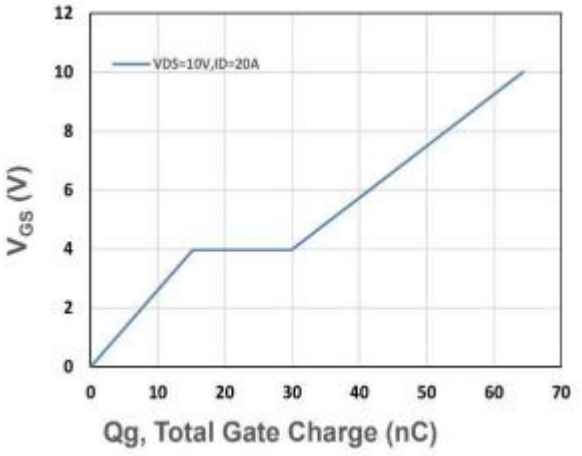


Figure 4.Gate Charge Characteristics

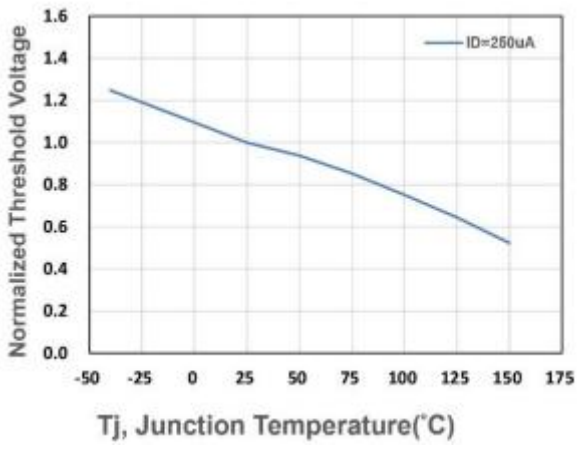


Figure 5. Gate Threshold Voltage

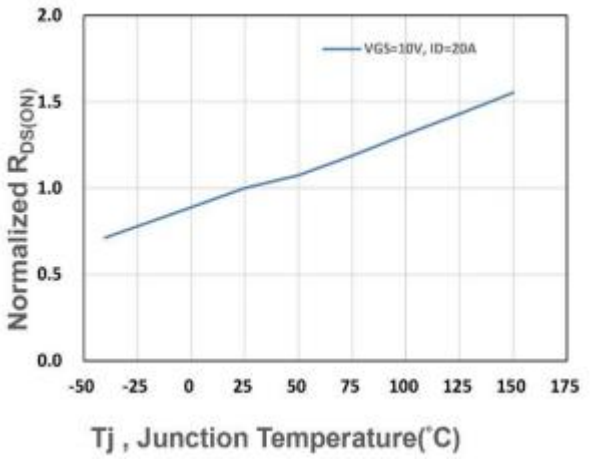


Figure 6.Drain-Source On Resistance

Typical Characteristics

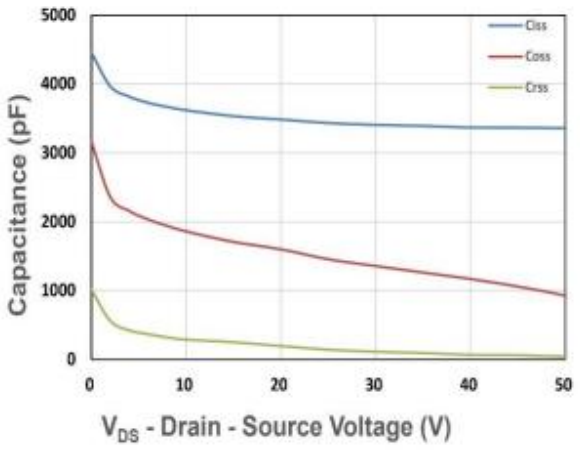


Figure 7.Capacitance

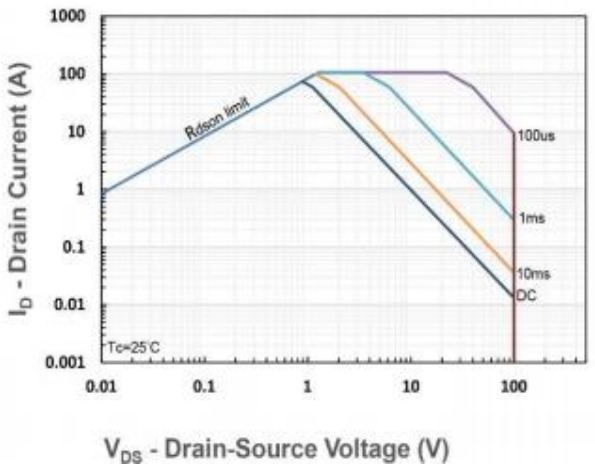


Figure 8. Safe Operating Area

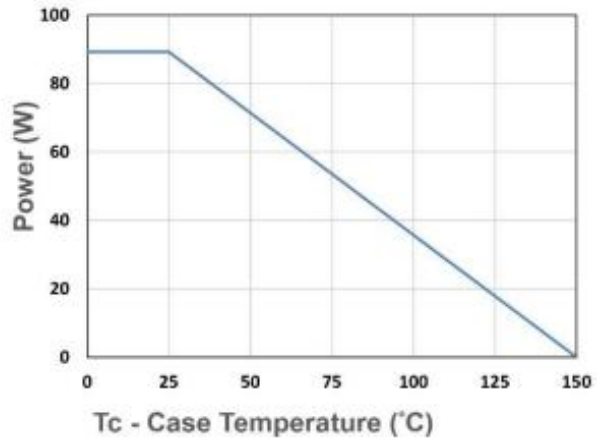


Figure 9.Power Dissipation

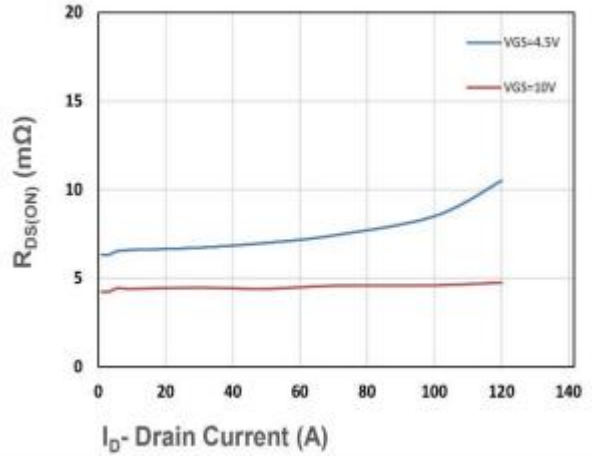


Figure 10.On-Resistance vs ID

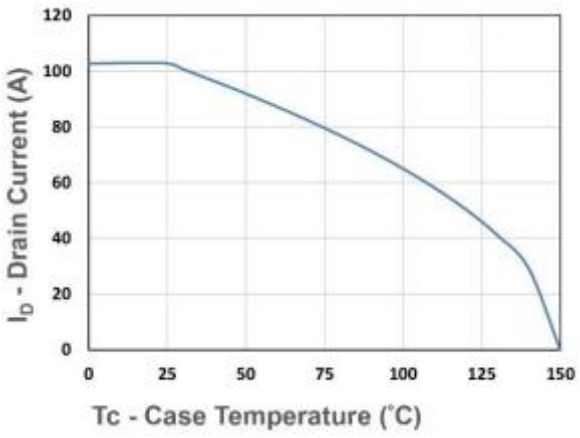


Figure11. Drain Current

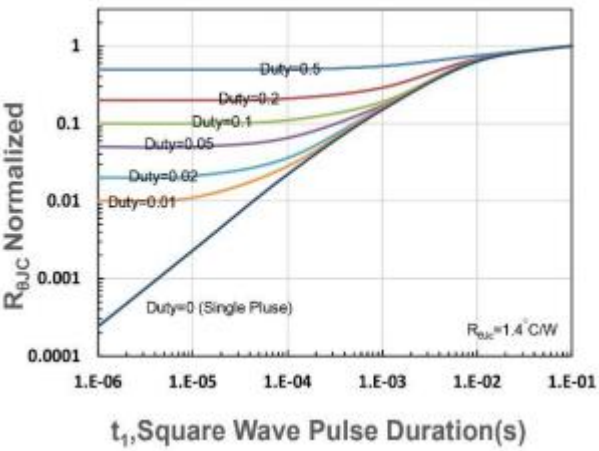
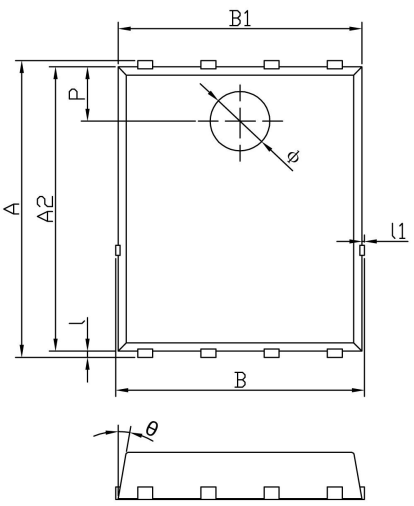
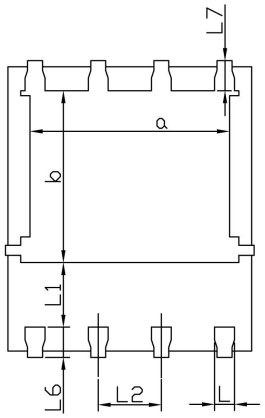


Figure 12. $R_{\theta JC}$ Transient Thermal Impedance

Package Information

PDFN5×6 Unit:mm





Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	5.90	6.00	6.10
a	3.91	4.01	4.11
A2	5.70	5.75	5.80
B	4.90	5.00	5.10
b	3.37	3.47	3.57
B1	4.80	4.90	5.00
C	0.90	0.95	1.00
L	0.35	0.40	0.45
l	0.06	0.13	0.20
L1	1.10	–	–
l1	–	–	0.10
L2	1.17	1.27	1.37
L4	0.21	0.26	0.34
L6	0.51	0.61	0.71
L7	0.51	0.61	0.71
P	1.00	1.10	1.20
θ	8°	10°	12°
Φ	1.10	1.20	1.30