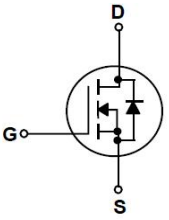
MU4008Y

N-Channel Enhancement Mode MOSFET

Features

- 40V, 210A, $R_{DS(on)}$(Typ.) = 1.4mΩ@V_{GS} = 10V
- Excellent $R_{DS(on)}$ and Low Gate Charge
- Halogen-free; RoHS-compliant
- 100% E_{AS} Guaranteed



Application

- Motor Controllers
- DC-to-DC Convertors
- Battery-Driven Electronic Products, Electrical Equipment and Machines

Absolute Maximum Ratings T_c = 25°C unless otherwise noted

Symbol	Parameter		Rating	Unit
V_{DS}	Drain-Source Voltage [a]		40	V
V_{GS}	Gate-Source Voltage		±20	
I_D	Drain Current-Continuous	T_C = 25°C	210	A
		T_C = 100°C	137	
I_{DM}	Drain Current-Pulsed [b]		840	
P_D	Maximum Power Dissipation, T_C = 25°C		125	W
E_{AS}	Single Pulsed Avalanche Energy [c]		495	mJ
T_J, T_{STG}	Operating and Store Temperature Range		150, -55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.0	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	41	

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	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 40V, V_{GS} = 0V	-	-	1.0	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	-	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance [d]	V_{GS} = 10V, I_D = 30A	-	1.2	1.6	mΩ
		V_{GS} = 4.5V, I_D = 20A	-	1.9	2.5	

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	V_{DS} = V_{GS} = 0V, f = 1.0MHz	-	2.8	-	Ω
C_{iss}	Input Capacitance	V_{DS} = 20V, V_{GS} = 0V, f = 1.0MHz	-	14.7	-	nF
C_{oss}	Output Capacitance		-	843	-	pF
C_{rss}	Reverse Transfer Capacitance		-	830	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 20V, V_{GS} = 10V, I_D = 30A, R_{GEN} = 3.0Ω	-	13	-	ns
t_r	Turn-On Rise Time		-	9.0	-	
$t_{d(off)}$	Turn-Off Delay Time		-	101	-	
t_f	Turn-Off Fall Time		-	15	-	
Q_g	Total Gate Charge	V_{DS} = 20V, V_{GS} = 0 to 10V, I_D = 30A	-	95	-	nC
Q_{gs}	Gate-Source Charge		-	15	-	
Q_{gd}	Gate-Drain Charge		-	19	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	V_G = V_D = 0V, Force Current	-	-	210	A
I_{SM}	Maximum Pulsed Current		-	-	840	
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 30A	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	I_F = 30A, dI_F/dt = 100A/μs	-	-	35	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F = 30A, dI_F/dt = 100A/μs	-	-	24.2	nC

Notes:

a. T_J = +25 ℃ to +150 ℃.

b. Repetitive rating: pulse width limited by maximum junction temperature.

c. L = 0.5mH, V_{DD} = 25V, I_{AS} = 44.5A, R_G = 25Ω Starting T_J = 25 ℃.

d. Pulse width ≦ 300μs; duty cycle ≦ 2%.

■ Characteristic Curve

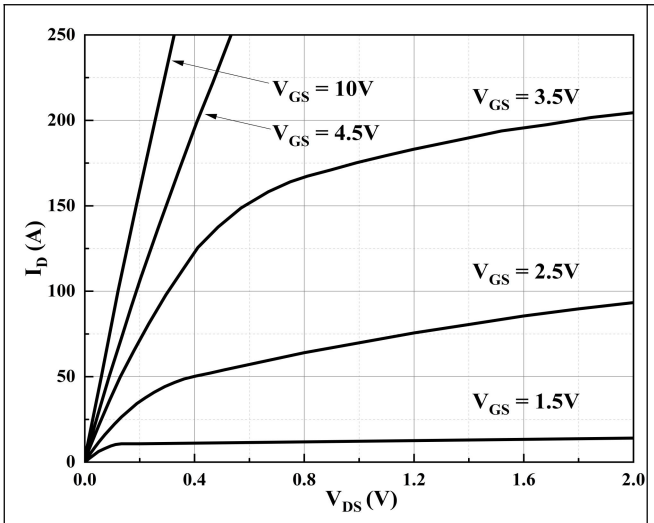


Figure 1. Typical Output Characteristics

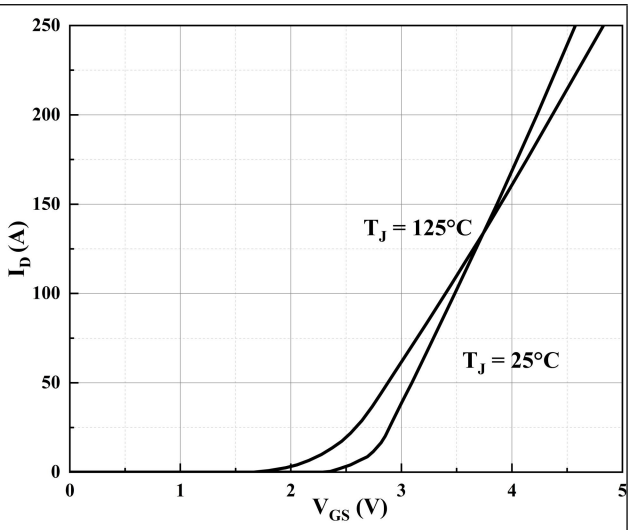


Figure 2. Typical Transfer Characteristics

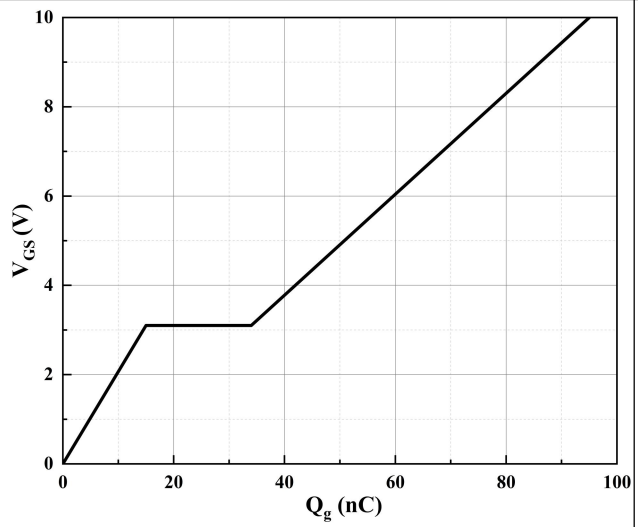


Figure 3. Typical Gate Charge

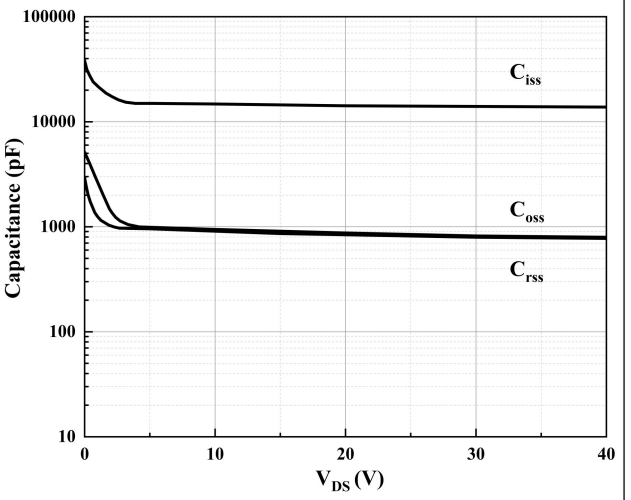


Figure 4. Typical Capacitance

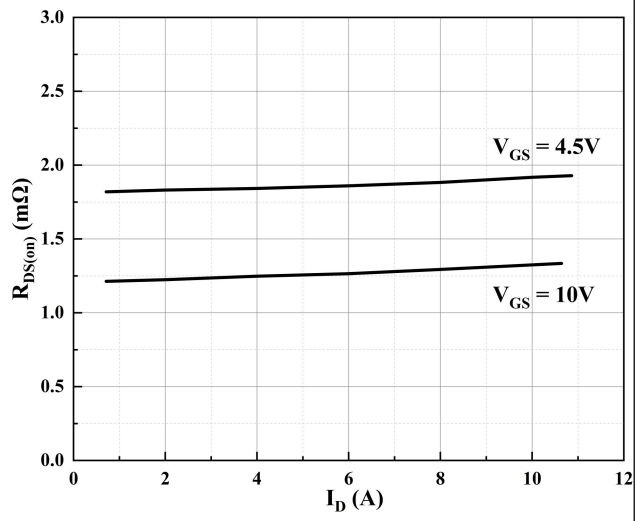


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

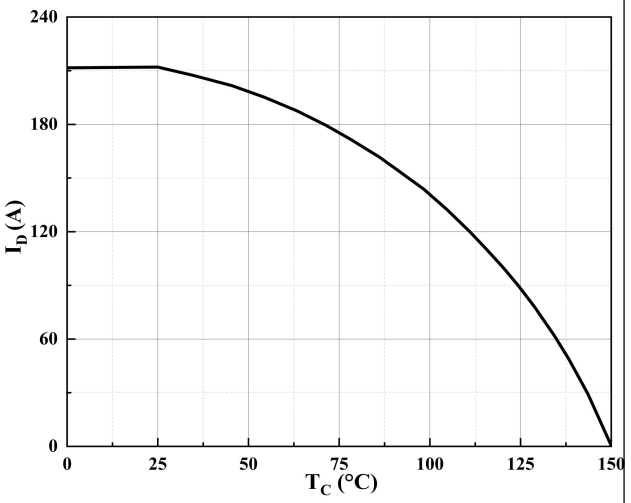


Figure 6. Maximum Continuous Drain Current vs. Case Temperature

■ Characteristic Curve

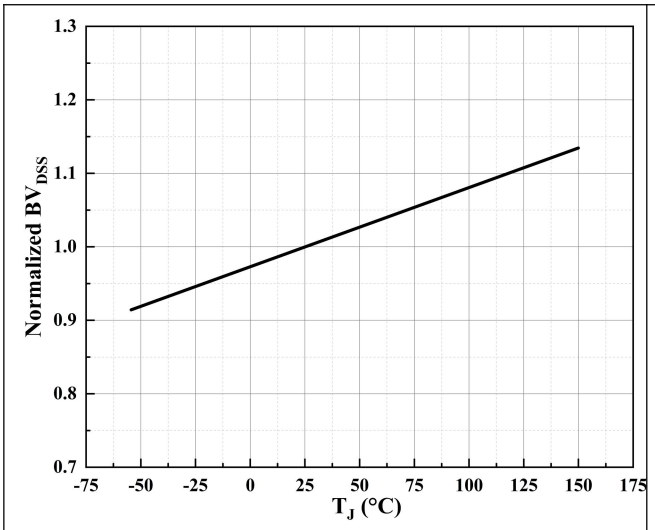


Figure 7. Normalized Drain-Source Breakdown Voltage vs. Junction Temperature

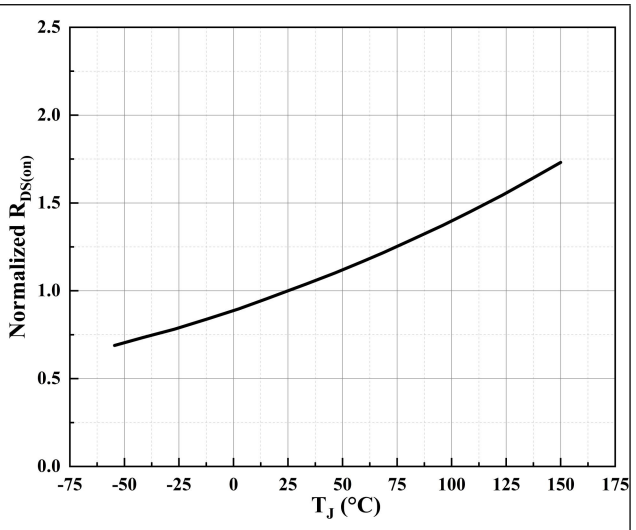


Figure 8. Normalized Static Drain-Source On-Resistance vs. Junction Temperature

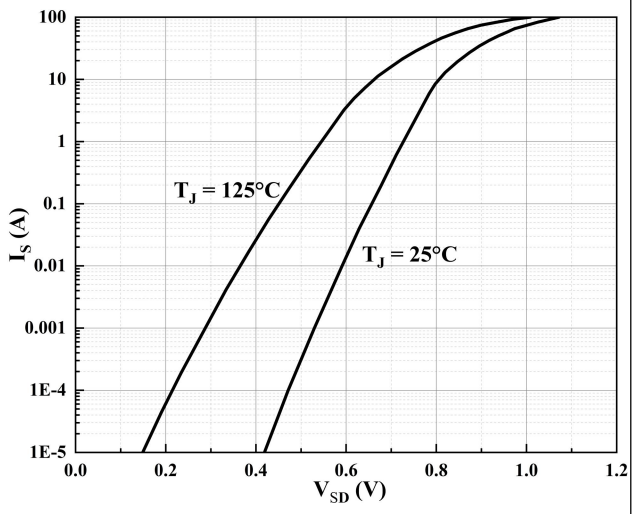


Figure 9. Body Diode Characteristics

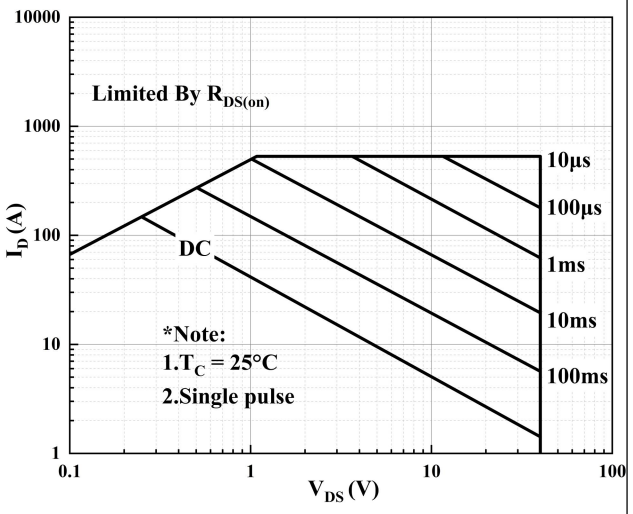


Figure 10. 13. Maximum Safe Operating Area

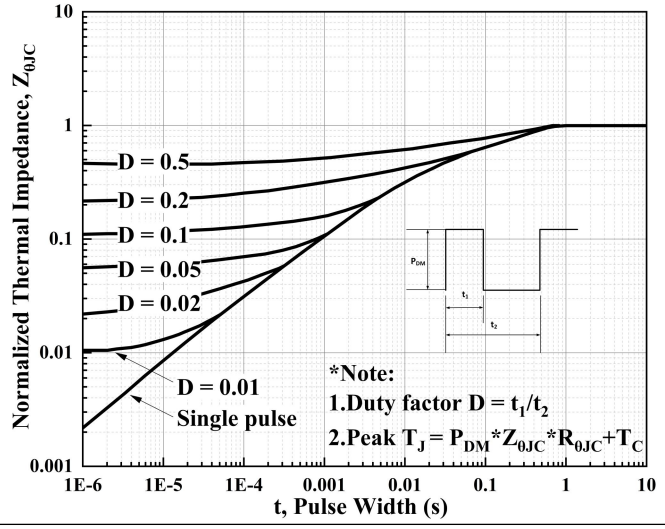
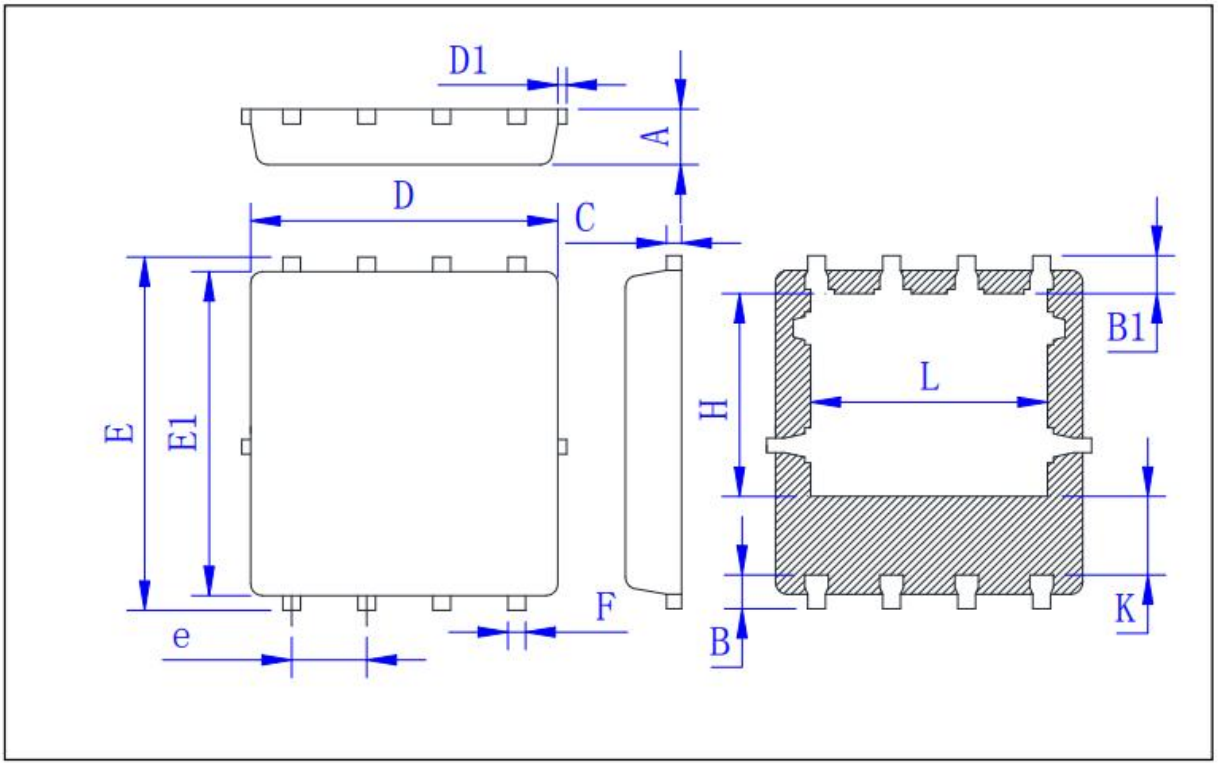


Figure 11. Normalized Maximum Transient Thermal Impedance

■ Package Information

PDFN5*6



Symbol	Min	Typ	Max
A	0.90	0.95	1.00
B	0.48	0.58	0.68
B1	0.55	0.65	0.75
C	0.20	0.254	0.30
D	5.10	5.20	5.30
D1			0.15
E	5.90	6.05	6.20
E1	5.40	5.55	5.70
e	1.22	1.27	1.32
F	0.25	0.30	0.35
H	3.27	3.47	3.67
L	3.80	4.00	4.20
K	1.20		