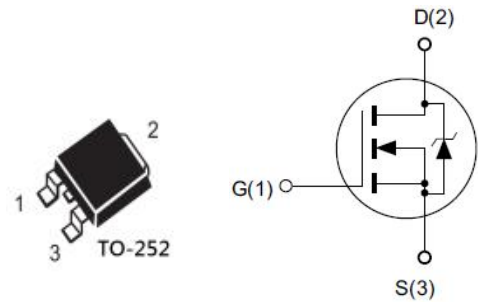


Features

- ◆ 40V, 50A, $R_{DS(on)}$ (Typ.) = 8.0mΩ@ $V_{GS} = 10V$
- ◆ Excellent $R_{DS(on)}$ and Low Gate Charge
- ◆ 100% E_{AS} Guaranteed
- ◆ Halogen-free; RoHS-compliant

Application

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power Management



Absolute Maximum Ratings $T_c = 25^\circ\text{C}$ 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	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
I_{DM}	Drain Current-Pulsed ^b	200	
P_D	Maximum Power Dissipation, $T_C = 25^\circ\text{C}$	39	W
E_{AS}	Single Pulsed Avalanche Energy ^c	76	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.2	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	43	

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	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	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	±100	nA



MU4003D

N-Channel Enhancement Mode MOSFET

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	-	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^d	$V_{GS} = 10V, I_D = 30A$	-	8.0	10	mΩ
		$V_{GS} = 4.5V, I_D = 20A$	-	10.5	13	

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	$V_{DS} = V_{GS} = 0V,$ $f = 1.0MHz$	-	2.2	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 20V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	1912	-	pF
C_{oss}	Output Capacitance		-	126	-	
C_{rss}	Reverse Transfer Capacitance		-	105	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 20V,$ $V_{GS} = 10V,$ $I_D = 20A,$ $R_{GEN} = 3.0\Omega$	-	8.0	-	ns
t_r	Turn-On Rise Time		-	28	-	
$t_{d(off)}$	Turn-Off Delay Time		-	35	-	
t_f	Turn-Off Fall Time		-	7.0	-	
Q_g	Total Gate Charge	$V_{DS} = 20V,$ $V_{GS} = 0 \text{ to } 10V,$ $I_D = 20A$	-	37	-	nC
Q_{gs}	Gate-Source Charge		-	8.0	-	
Q_{gd}	Gate-Drain Charge		-	7.0	-	

■ 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	-	-	50	A
I_{SM}	Maximum Pulsed Current		-	-	200	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 30A$	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	10	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	5.0	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $L = 0.5mH, V_{DD} = 25V, I_{AS} = 17.5A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 0.5\%$.

Characteristic Curve

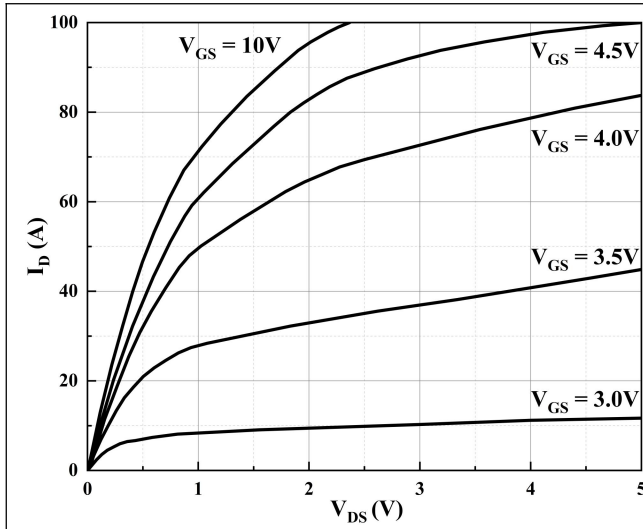


Figure 1. Typical Output Characteristics

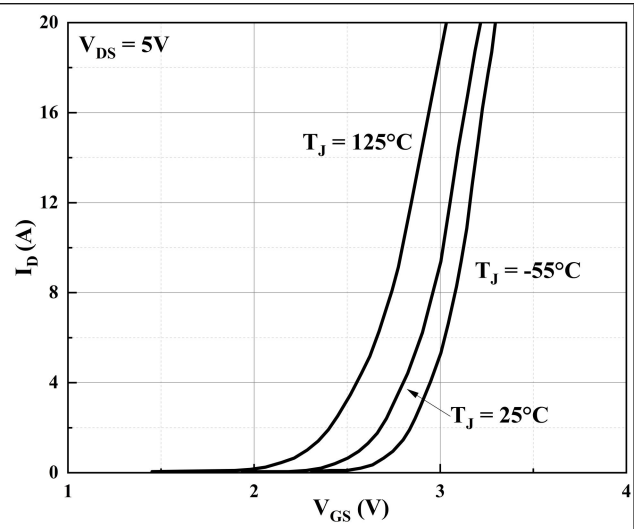


Figure 2. Typical Transfer Characteristics

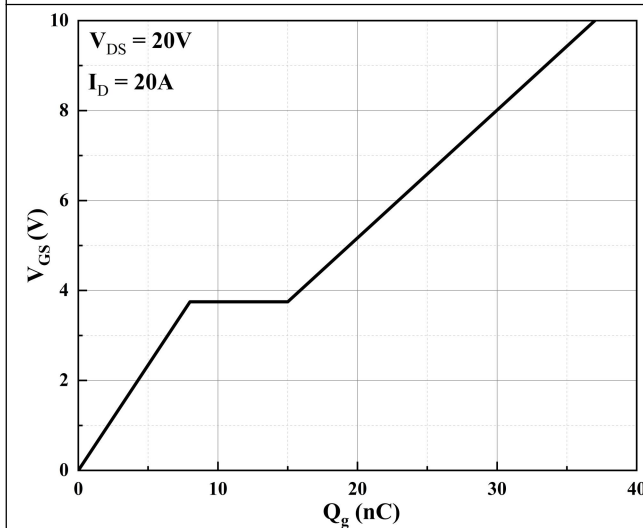


Figure 3. Typical Gate Charge

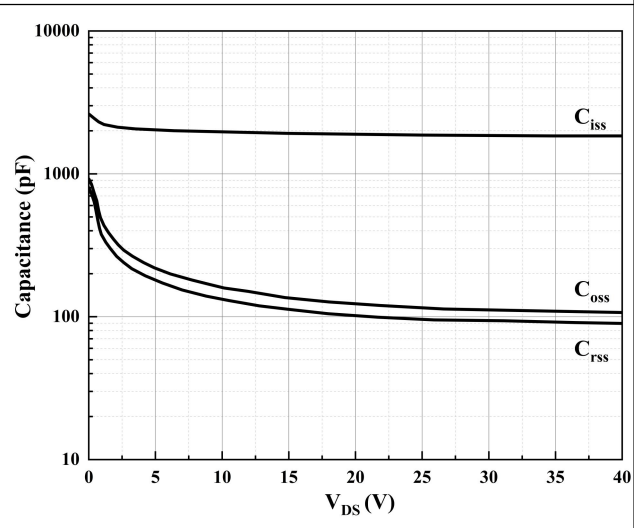


Figure 4. Typical Capacitance

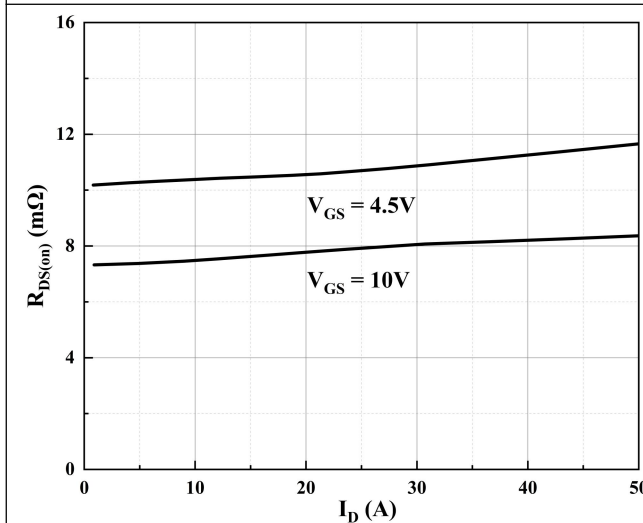


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

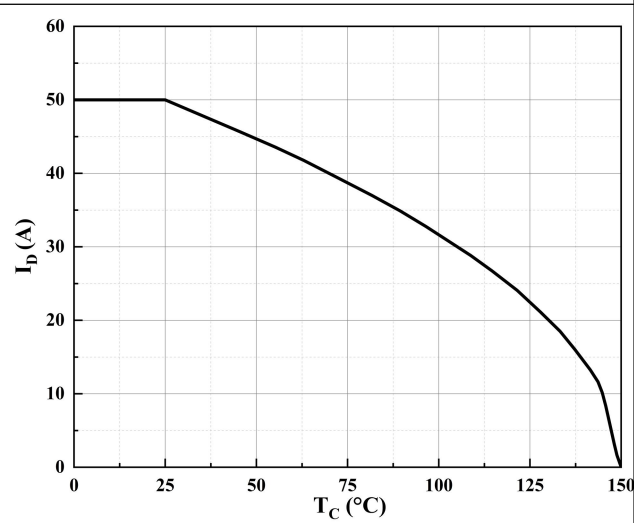


Figure 6. Maximum Continuous Drain Current vs. Case Temperature

Characteristic Curve

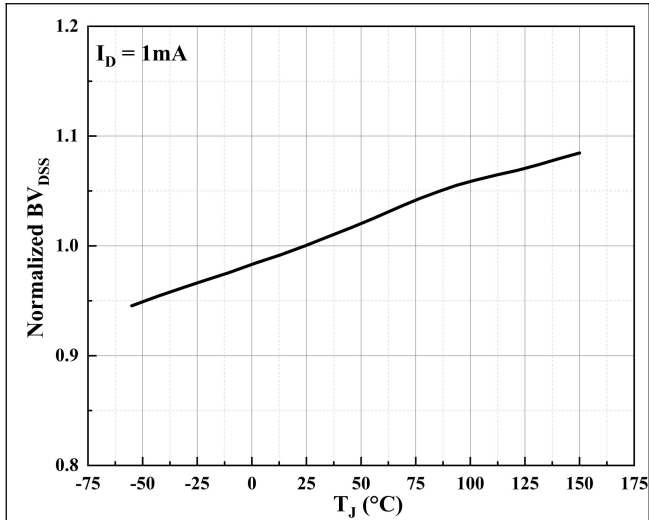


Figure 7. Normalized Breakdown Voltage vs. Junction Temperature

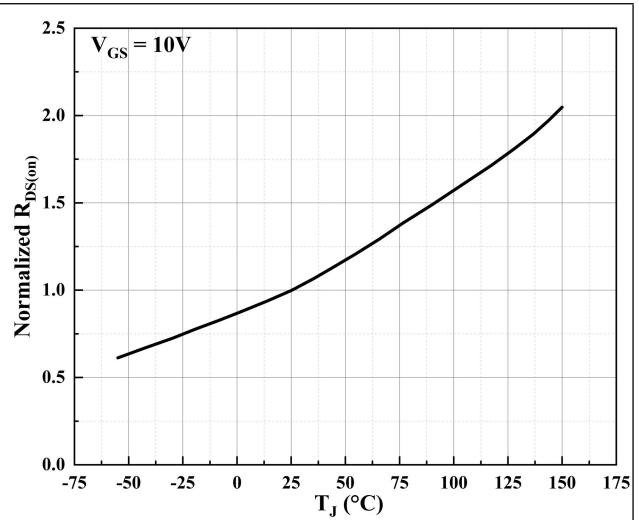


Figure 8. Normalized Breakdown Voltage vs. Junction Temperature

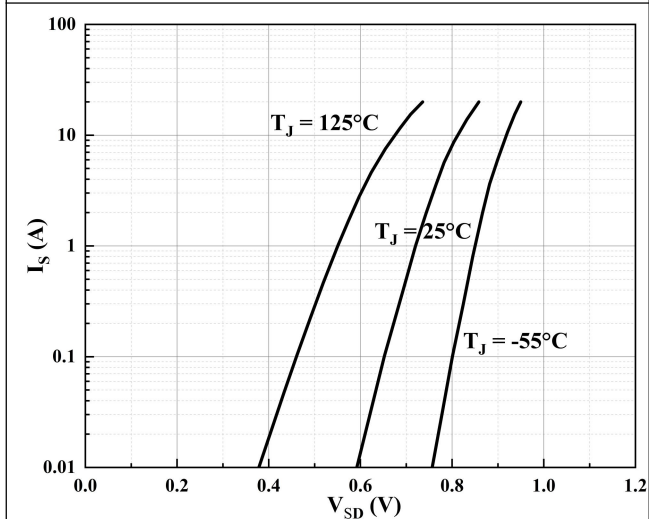


Figure 9. Body Diode Characteristics

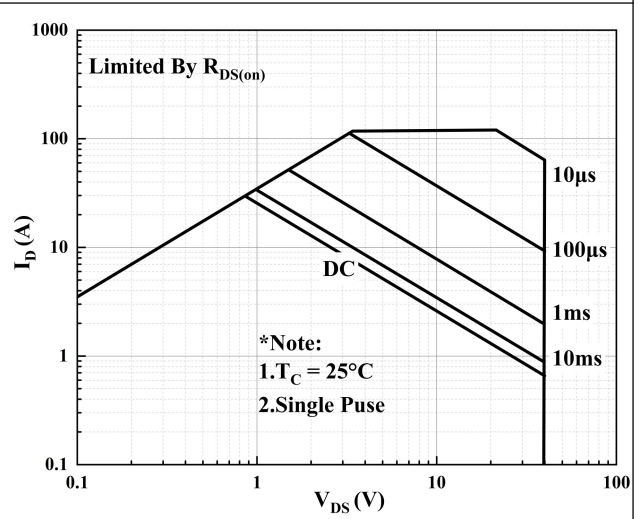


Figure 10. Maximum Safe Operating Area

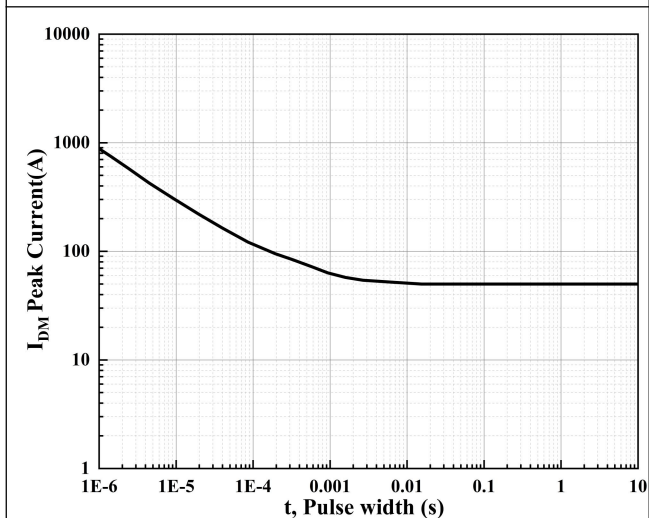


Figure 11. Peak Current Capacity

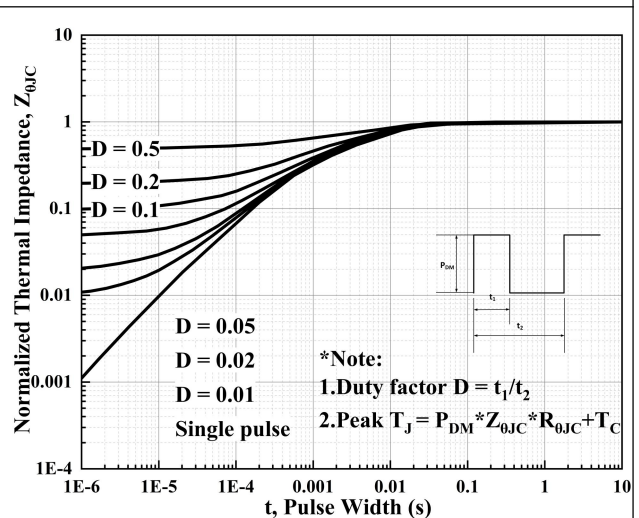
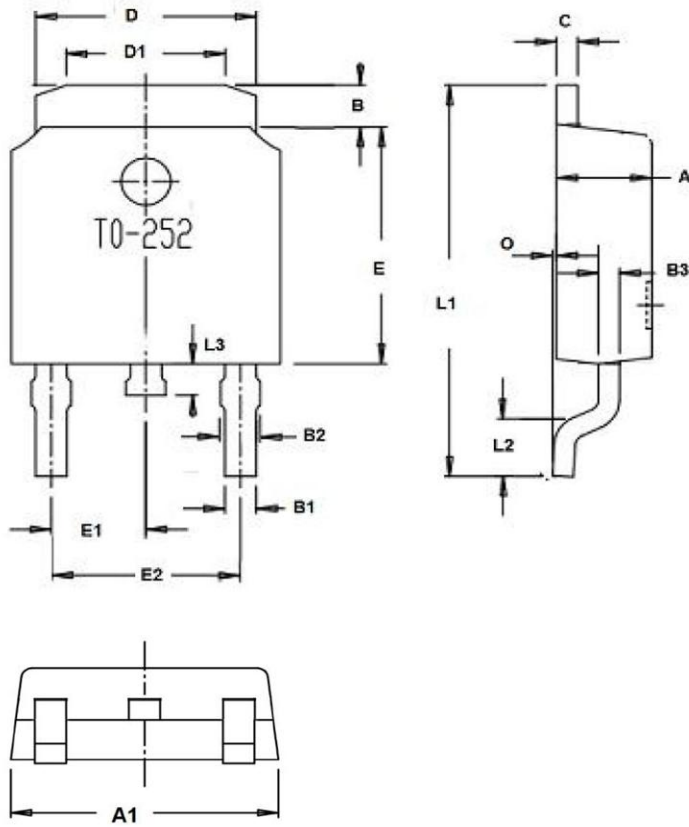


Figure 12. Normalized Maximum Transient Thermal Impedance

Package Information

TO-252



Dim.	Min.	Max.
A	2.1	2.5
A1	6.3	6.9
B	0.96	1.42
B1	0.74	0.86
B2	0.74	0.94
C	Typ0.5	
D	5.33	5.53
D1	3.65	4.05
E	6.0	6.2
E1	Typ2.29	
E2	Typ4.58	
O	0	0.15
L1	9.9	10.5
L2	Typ1.65	
L3	0.6	1.0
All Dimensions in millimeter		