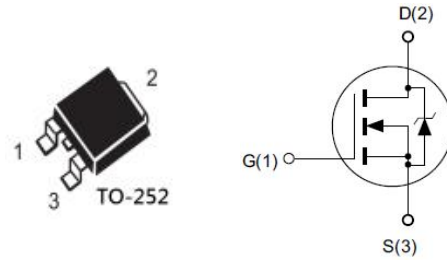


Features

- ◆ 40V, 80A, $R_{DS(on)}$ (Typ.) = $4.5m\Omega @ V_{GS} = 10V$
- ◆ Excellent $R_{DS(on)}$ and Low Gate Charge
- ◆ Advanced Trench Technology
- ◆ 100% E_{AS} Guaranteed

Application

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



Absolute Maximum Ratings $T_c = 25^\circ C$ 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	$T_C = 25^\circ C$	A
		$T_C = 100^\circ C$	
I_{DM}	Drain Current-Pulsed ^b	320	
P_D	Maximum Power Dissipation, $T_C = 25^\circ C$	142	W
E_{AS}	Single Pulsed Avalanche Energy ^c	175	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.88	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	31	

Electrical Characteristics $T_J = 25^\circ C$ 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



MU4006D

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	$V_{GS} = 10V, I_D = 30A$	-	4.5	5.8	mΩ
		$V_{GS} = 4.5V, I_D = 20A$	-	6.1	8.2	

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	$V_{DS} = V_{GS} = 0V,$ $f = 1.0MHz$	-	TBD	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 20V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	3778	-	pF
C_{oss}	Output Capacitance		-	267	-	
C_{rss}	Reverse Transfer Capacitance		-	224	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 20V,$ $V_{GS} = 10V,$ $I_D = 30A,$ $R_{GEN} = 3.0\Omega$	-	12	-	ns
t_r	Turn-On Rise Time		-	29	-	
$t_{d(off)}$	Turn-Off Delay Time		-	60	-	
t_f	Turn-Off Fall Time		-	16	-	
Q_g	Total Gate Charge	$V_{DD} = 20V,$ $V_{GS} = 0 \text{ to } 10V,$ $I_D = 30A$	-	73	-	nC
Q_{gs}	Gate-Source Charge		-	15	-	
Q_{gd}	Gate-Drain Charge		-	16	-	

■ 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	-	-	80	A
I_{SM}	Maximum Pulsed Current		-	-	320	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 30A$	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	16	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	10	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $L = 0.5mH, V_{DD} = 25V, I_{AS} = 26.5A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 0.5\%$.

Characteristic Curve

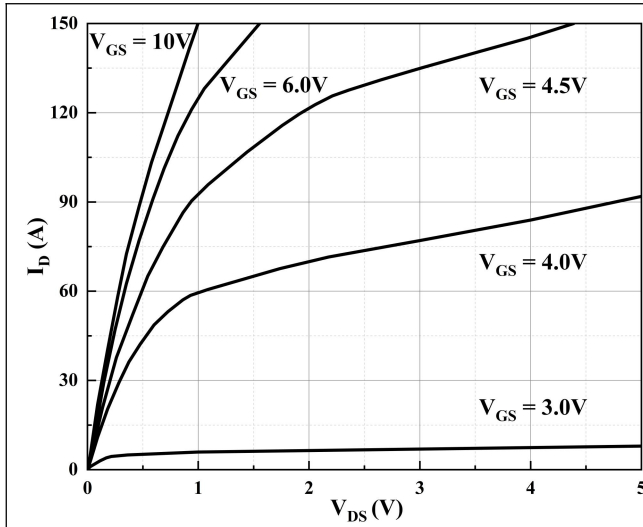


Figure 1. Typical Output Characteristics

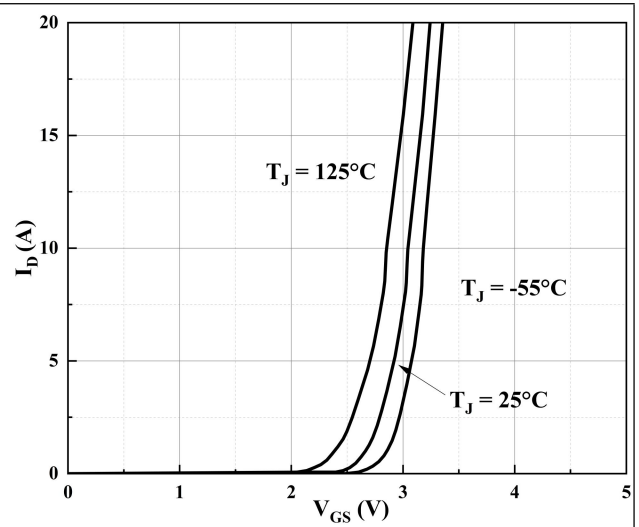


Figure 2. Typical Transfer Characteristics

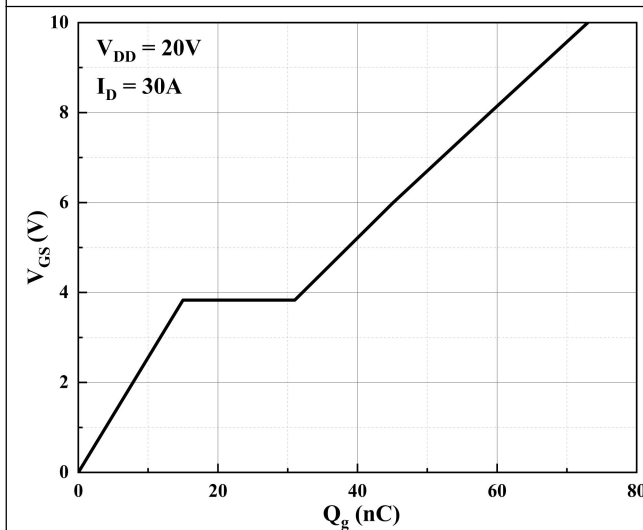


Figure 3. Typical Gate Charge

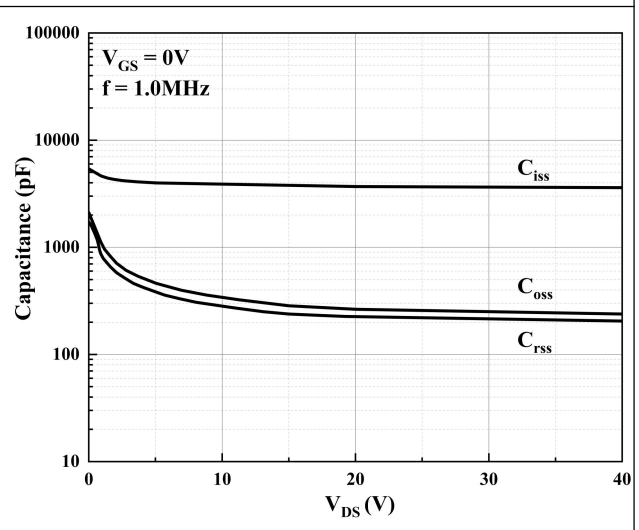


Figure 4. Typical Capacitance

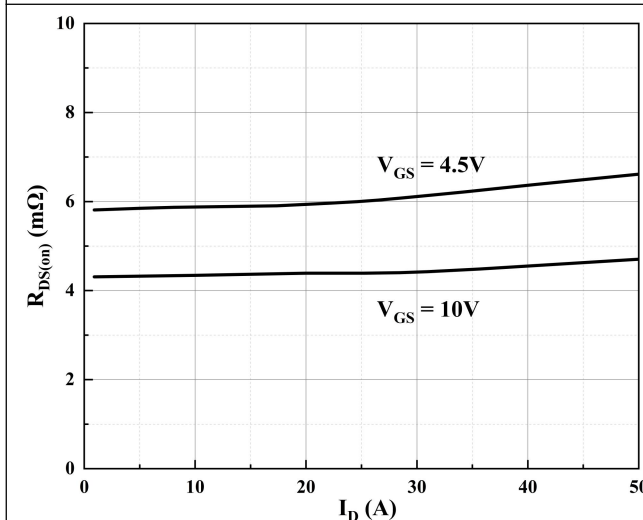


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

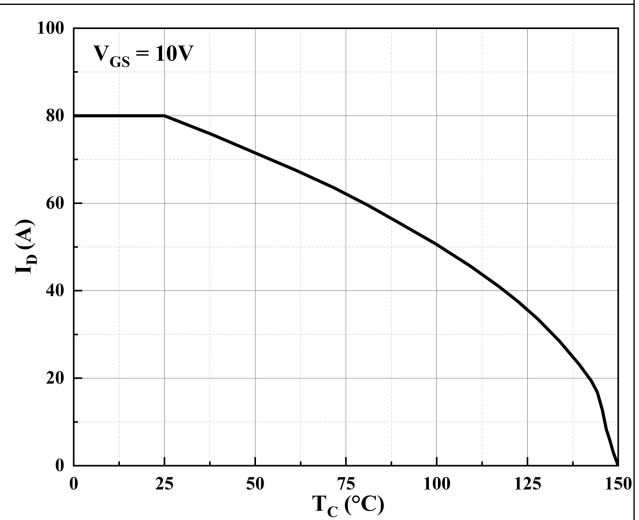


Figure 6. Maximum Continuous Drain Current vs. Case Temperature

■ Characteristic Curve

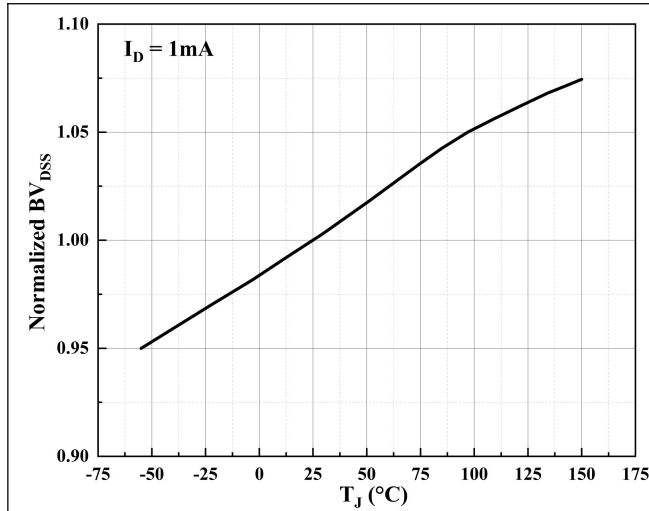


Figure 7. Normalized Drain-Source Breakdown Voltage vs. Junction Temperature

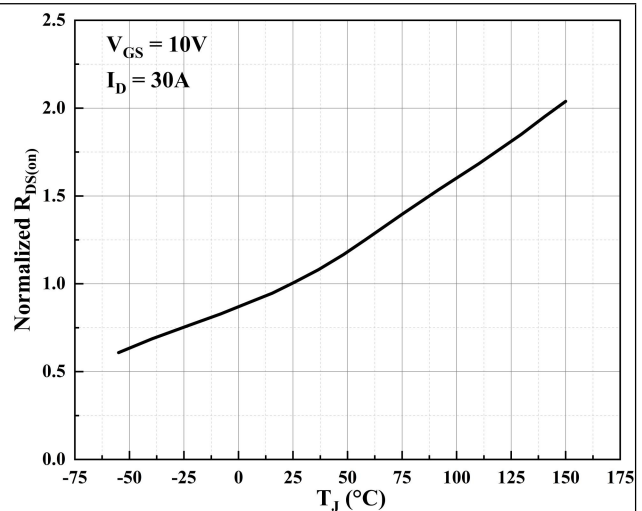


Figure 8. Normalized Static Drain-Source On-Resistance vs. Junction Temperature

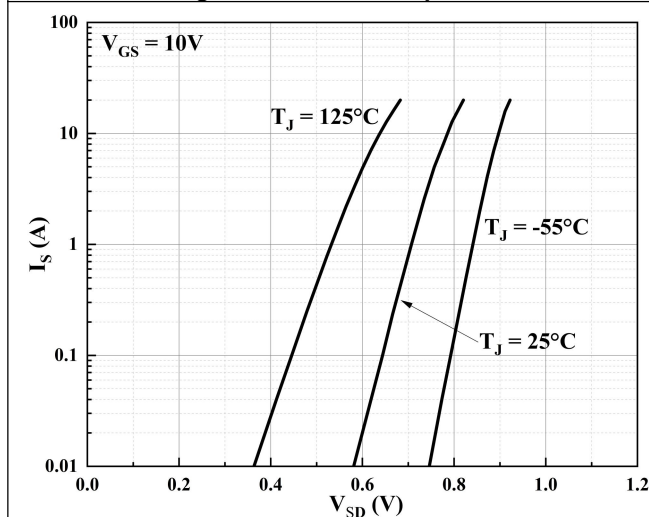


Figure 9. Body Diode Characteristics

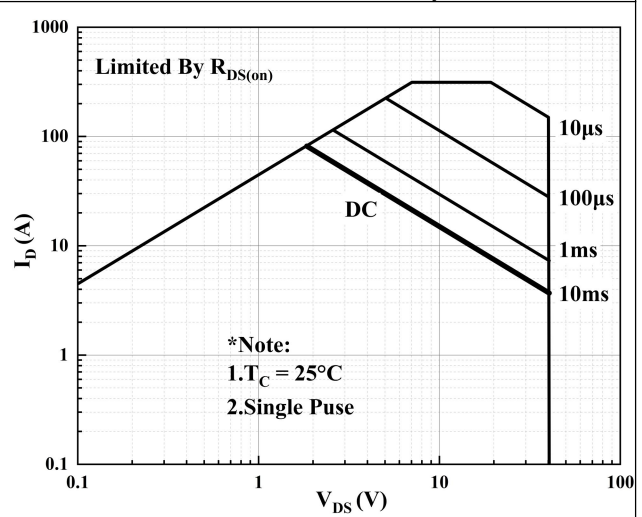


Figure 10. Maximum Safe Operating Area

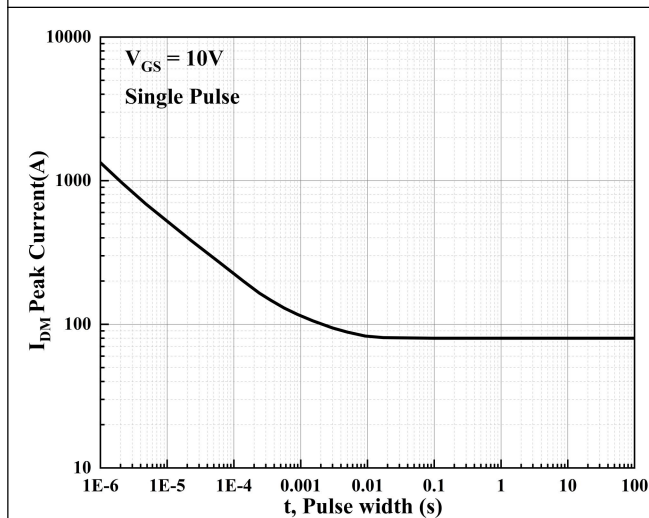


Figure 11. Peak Current Capacity

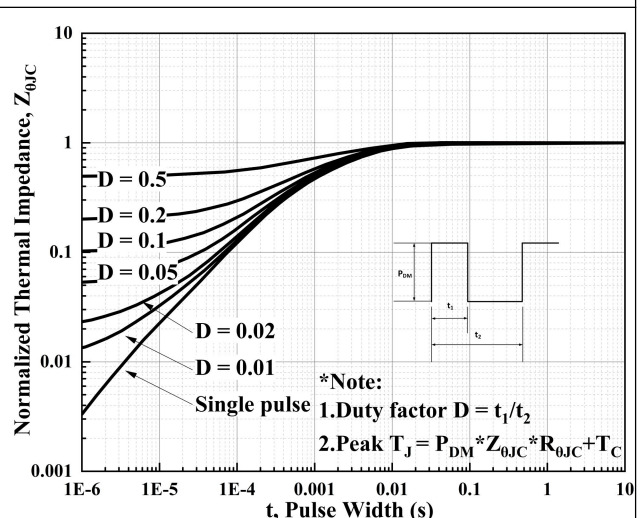
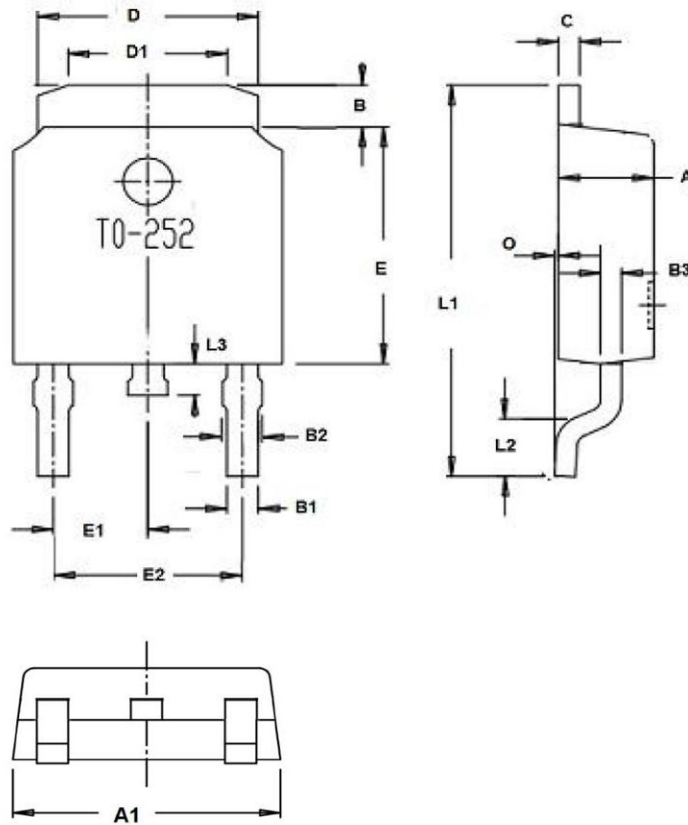


Figure 12. Normalized Maximum Transient Thermal Impedance

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
B3	Typ0.5	
C	5.33	5.53
D	3.65	4.05
D1	6.0	6.2
E	Typ2.29	
E1	Typ4.58	
E2	0	0.15
O	9.9	10.5
L1	Typ1.65	
L2	0.6	1.0
L3	All Dimensions in millimeter	