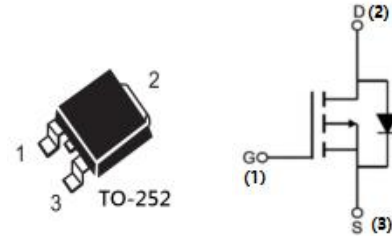


Features

- ◆ -40V, -40A, $R_{DS(on)}$ (Typ.) = $8.3m\Omega @ V_{GS} = 10V$
- ◆ 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 $T_c = 25^\circ\text{C}$ 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	-160	
P_D	Maximum Power Dissipation, $T_C = 25^\circ\text{C}$	39	W
E_{AS}	Single Pulsed Avalanche Energy ^c	156	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-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	42	

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

■ 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	-1.5	-2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^d	$V_{GS} = -10V, I_D = -30A$	-	8.3	10.5	mΩ
		$V_{GS} = -4.5V, I_D = -20A$	-	10.0	12.5	

■ 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	$V_{DS} = -20V, V_{GS} = 0V, f = 1.0MHz$	-	3800	-	pF
C_{oss}	Output Capacitance		-	329	-	
C_{rss}	Reverse Transfer Capacitance		-	289	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -20V, V_{GS} = -10V, I_D = -20A, R_{GEN} = 2.4\Omega$	-	10	-	ns
t_r	Turn-On Rise Time		-	82	-	
$t_{d(off)}$	Turn-Off Delay Time		-	93	-	
t_f	Turn-Off Fall Time		-	74	-	
Q_g	Total Gate Charge	$V_{DS} = -20V, V_{GS} = -10V, I_D = -20A$	-	68	-	nC
Q_{gs}	Gate-Source Charge		-	10	-	
Q_{gd}	Gate-Drain Charge		-	14	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	$V_G = V_D = 0V, \text{Force Current}$	-	-	-40	A
I_{SM}	Maximum Pulsed Current		-	-	-160	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = -30A$	-	-0.8	-1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$I_F = -30A, di_F/dt = 100A/\mu s$	-	20	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = -30A, di_F/dt = 100A/\mu s$	-	13	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $L = 0.5mH, V_{DD} = -25V, I_{AS} = -25A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

Characteristic Curve

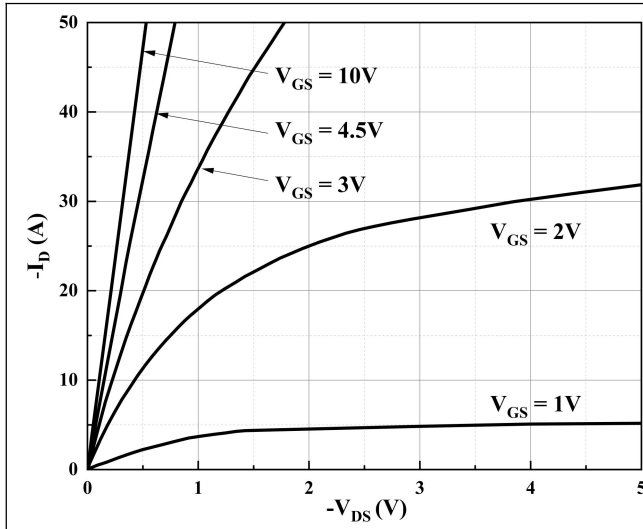


Figure 1. Typical Output Characteristics

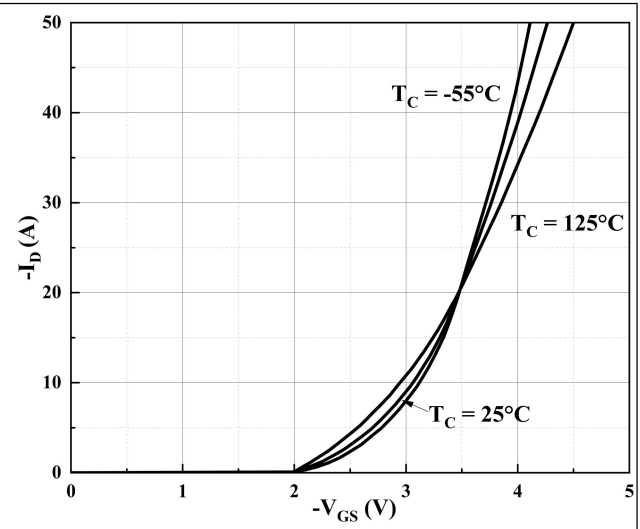


Figure 2. Typical Transfer Characteristics

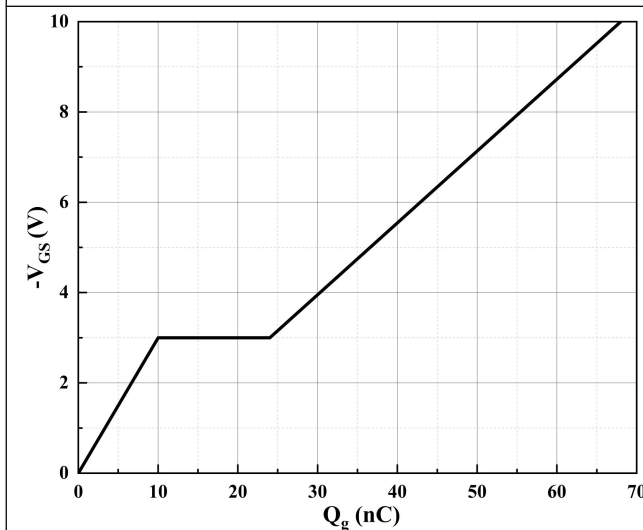


Figure 3. Typical Gate Charge

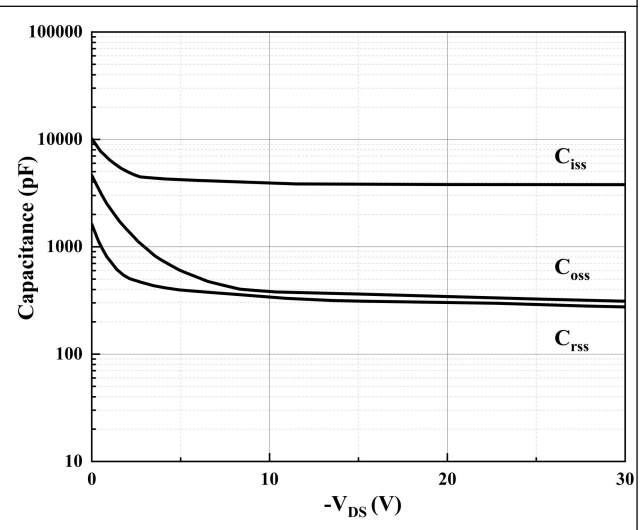


Figure 4. Typical Capacitance

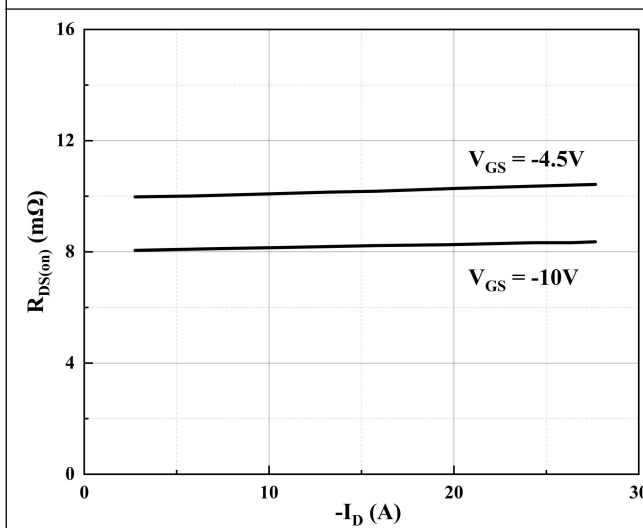


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

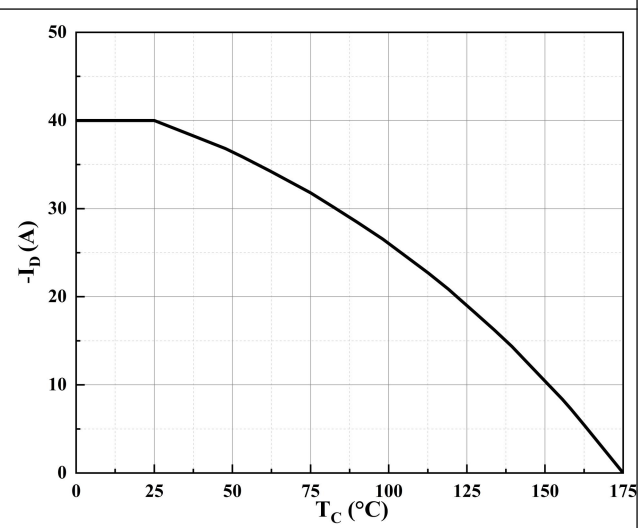


Figure 6. Maximum Continuous Drain Current vs. Case Temperature

■ Characteristic Curve

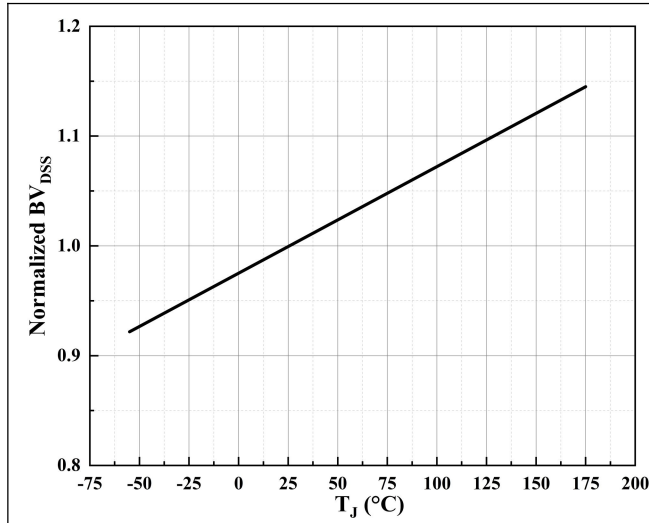


Figure 7. Normalized Drain-Source Breakdown Voltage vs. Junction Temperature

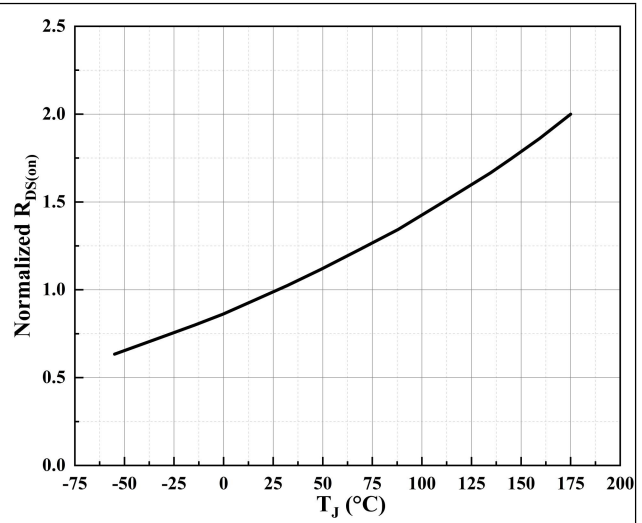


Figure 8. Normalized Static Drain-Source On-Resistance vs. Junction Temperature

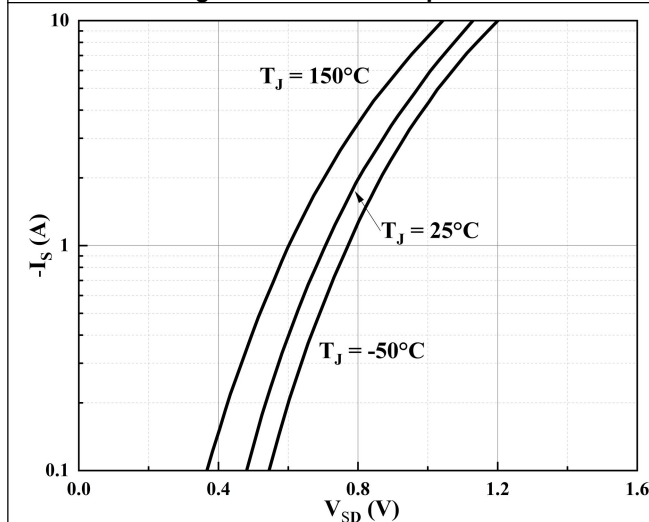


Figure 9. Body Diode Characteristics

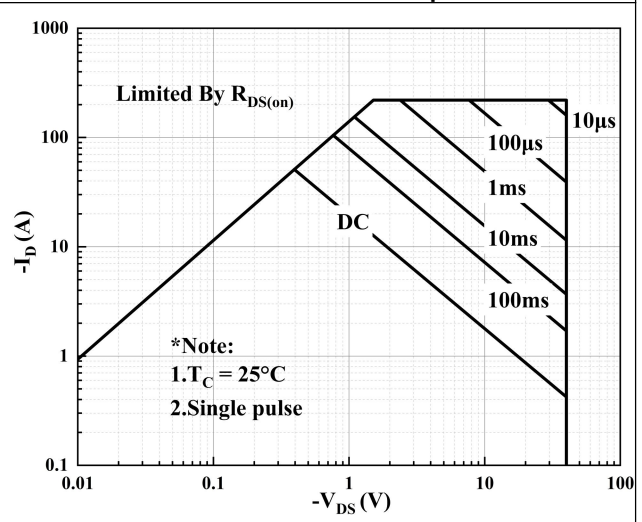


Figure 10. Maximum Safe Operating Area

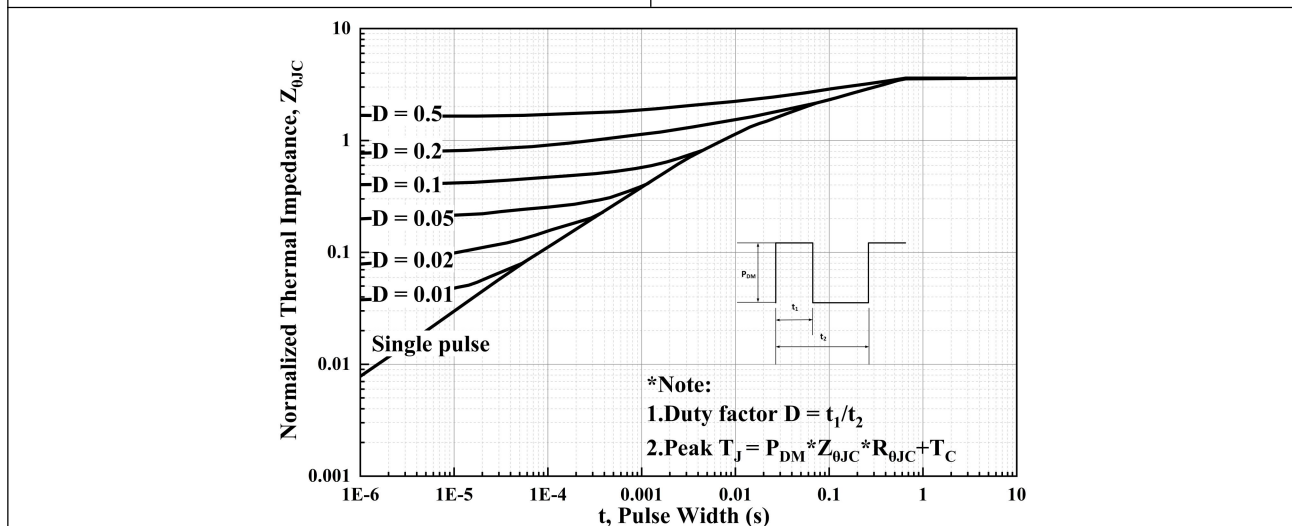
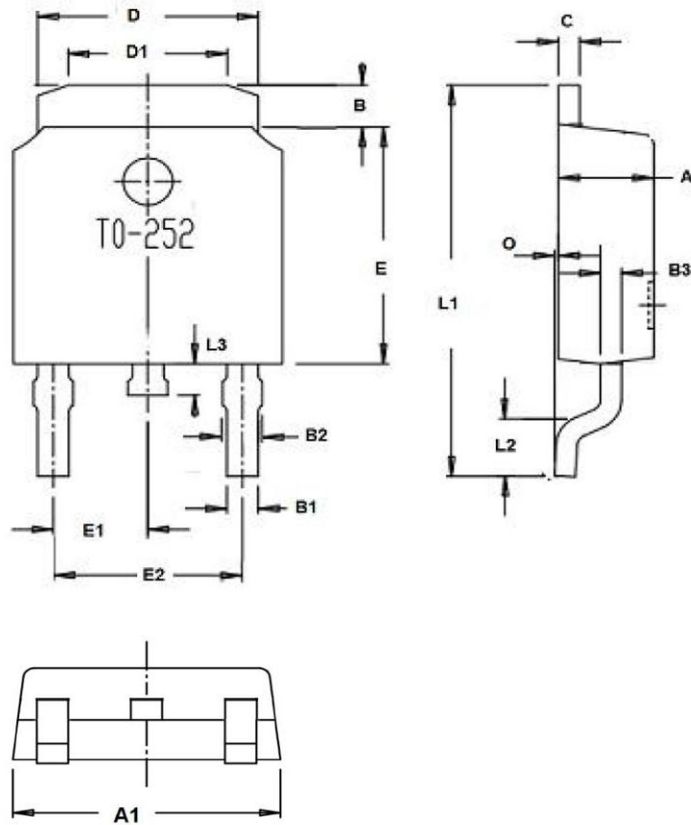


Figure 11. Normalized Gate Threshold Voltage vs. Junction Temperature

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		