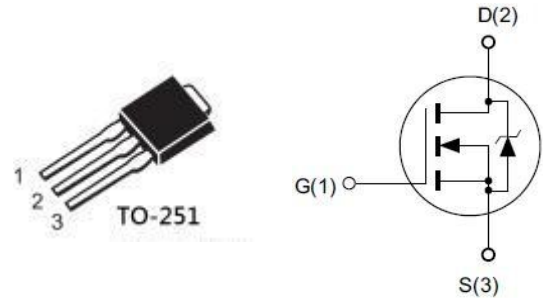


Features

- ◆ 600V, 7A, $R_{DS(ON)}(Typ.) = 1.0\Omega @ V_{GS} = 10V$.
- ◆ Low C_{rss}
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

Application

- ◆ Adapter
- ◆ LCD Panel Power
- ◆ E-Bike Charger
- ◆ Switching Mode Power Supply



Absolute Maximum Ratings $T_c = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Limit	Unit
		TO-251	
V_{DS}	Drain-Source Voltage ^a	600	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, $T_c = 25^\circ\text{C}$	7	A
	Drain Current-Continuous, $T_c = 100^\circ\text{C}$	4.4	A
I_{DM}	Drain Current-Pulsed ^b	28	A
P_D	Maximum Power Dissipation @ $T_J = 25^\circ\text{C}$	108	W
EAS	Single Pulsed Avalanche Energy ^d	245	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-Case Max.	1.16	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max.	62.5	$^\circ\text{C/W}$

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	$V_{GS} = 0V, I_D = 250\mu A$	600	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^c	$V_{GS} = 10V, I_D = 3.5A$	-	1.0	1.3	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	1121	-	pF
C_{oss}	Output Capacitance		-	90	-	pF
C_{rss}	Reverse Transfer Capacitance		-	5	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 300V, I_D = 7A, R_G = 10\Omega, V_{GS} = 10V$	-	19	-	ns
t_r	Turn-On Rise Time		-	21	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	42	-	ns
t_f	Turn-Off Fall Time		-	19	-	ns
Q_g	Total Gate Charge	$V_{DS} = 480V, I_D = 7A, V_{GS} = 10V$	-	23.5	-	nC
Q_{gs}	Gate-Source Charge		-	4.9	-	nC
Q_{gd}	Gate-Drain Charge		-	9.6	-	nC

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	$V_{GS} = 0V$	-	-	7	A
I_{SM}	Maximum Pulsed Current	$V_{GS} = 0V$	-	-	28	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 7A$	-	-	1.4	V
T_{rr}	Body Diode Reverse Recovery Time	$di/dt = 100A/\mu s, I_S = 7A, V_{GS} = 0V$	-	361	-	ns
Q_{rr}	Reverse Recovery Charge		-	1912	-	nC

Notes:

a. $T_J = -55^\circ C$ to $+150^\circ C$.

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

c. Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

d. $L = 10mH, V_{DD} = 50V, I_{AS} = 7A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.

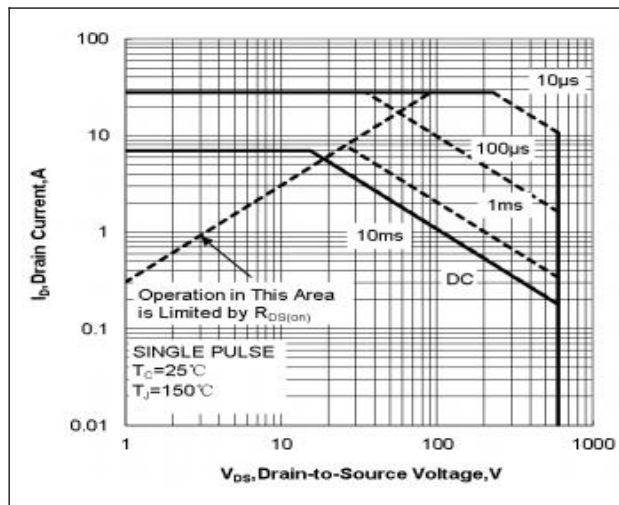


Figure 1. Maximum Safe Operating Area

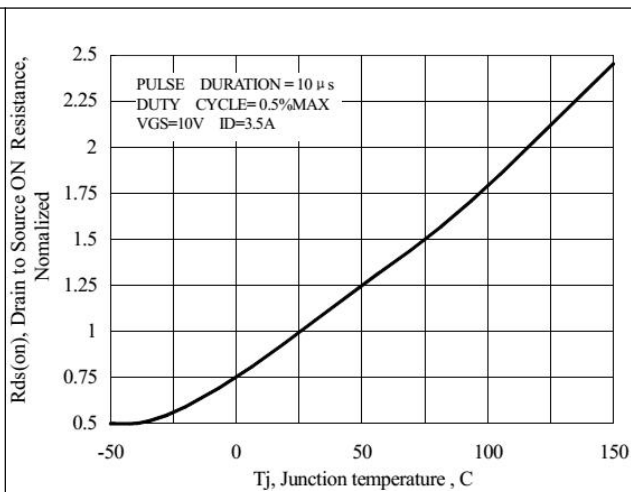


Figure 2. Normalized On-Resistance Variation with Temperature

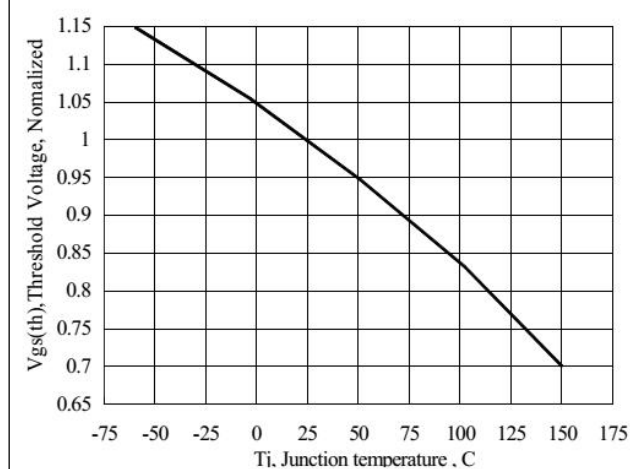


Figure 3. Typical Theshold Voltage vs Junction Temperature

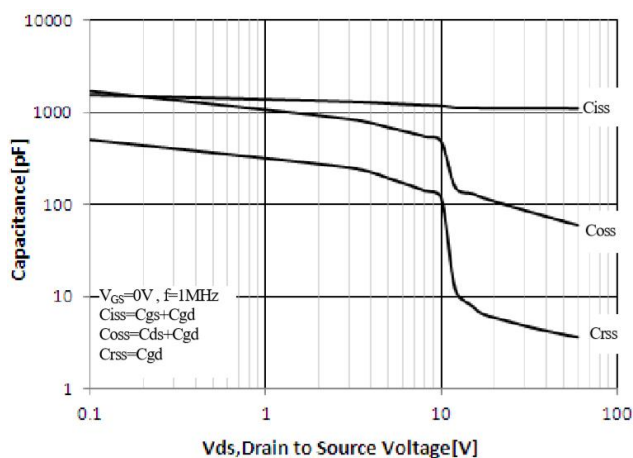


Figure 4. Capacitance Characteristics

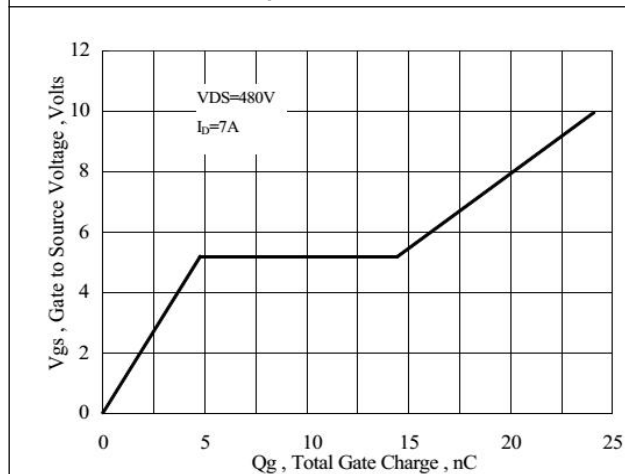


Figure 5. Gate Charge Characteristics

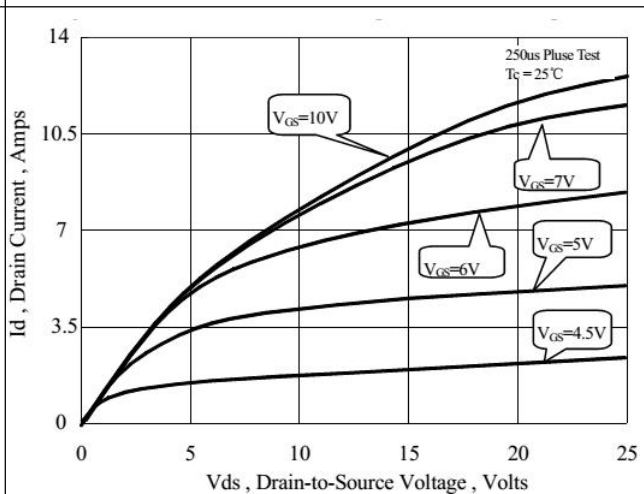


Figure 6. On-State Characteristics

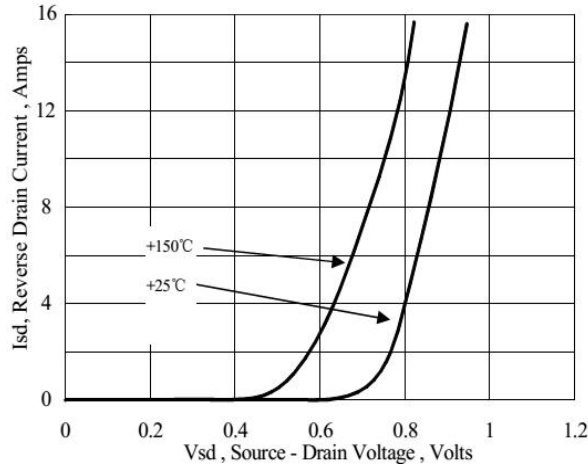


Figure 7. Typical Body Diode Transfer Characteristics

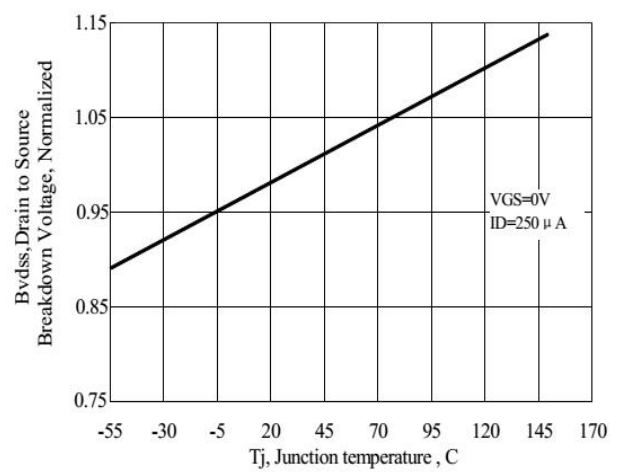


Figure 8. Typical Breakdown Voltage vs Junction Temperature

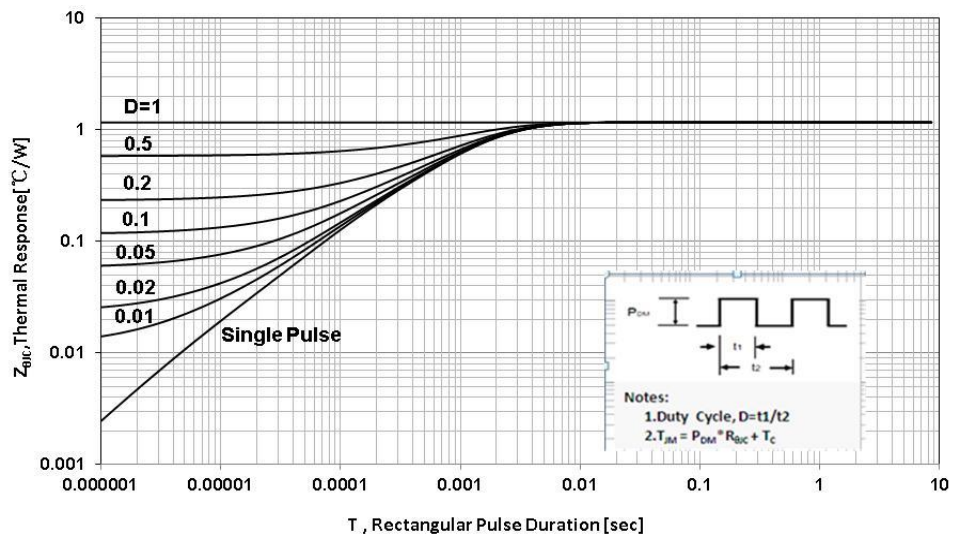
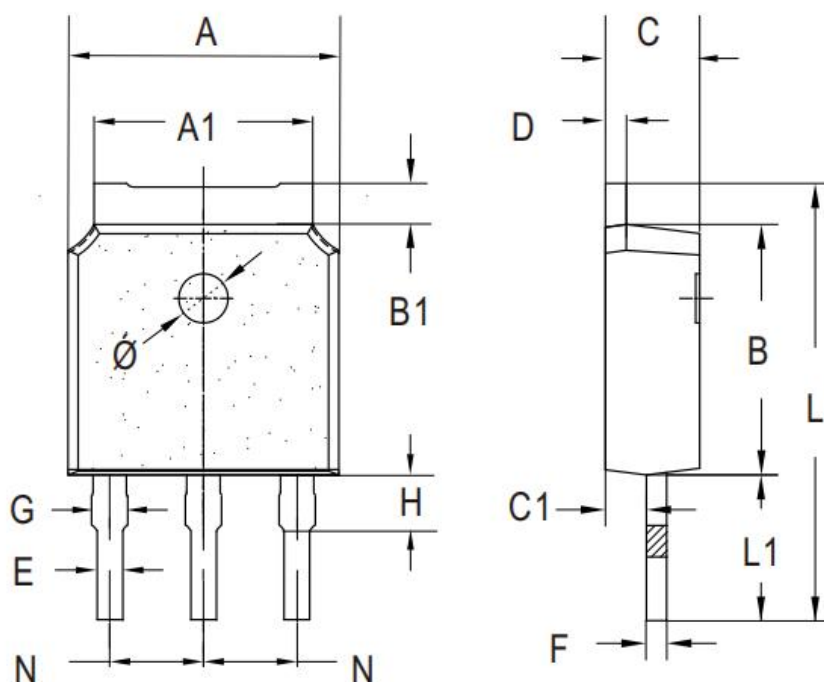


Figure 9. Normalized Effective Transient Thermal Impedance With Pulse Duration

■ Package Information

TO-251 PACKAGE



Symbol	Millimeters		Symbol	Millimeters	
	Min.	Max.		Min.	Max.
A	6.50	6.70	F	0.40	0.60
A1	5.20	5.50	G	0.75	0.95
B	5.90	6.30	H	1.20	1.50
B1	0.90	1.25	L	9.80	11.80
C	2.20	2.40	L1	3.40	3.80
C1	0.90	1.10	N	2.20	2.40
D	0.40	0.60	Ø	1.00	1.30
E	0.65	0.85			

■ Revision History

Version	Date	Subjects (major changes since last revision)
1.0	2021-04-23	Datasheet Complete
1.1	2026-06-01	Updated POD