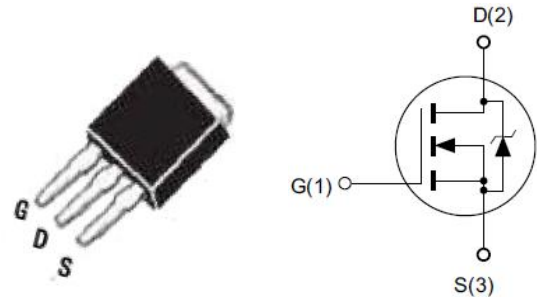


Features

- ◆ 650V, 7A, $R_{DS(ON)}(Typ.) = 1.1\Omega @ V_{GS} = 10V$.
- ◆ Low C_{rss}
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

Application

- ◆ Adaptor
- ◆ Standby Power
- ◆ Switching power supply
- ◆ LED Power



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

Symbol	Parameter	Limit	Unit
		TO-251	
V_{DS}	Drain-Source Voltage ^a	650	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 @ $T_J = 25^\circ\text{C}$	100	W
E_{AS}	Single Pulsed Avalanche Energy ^c	245	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Junction-to-Case	1.25	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient	100	$^\circ\text{C/W}$

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	$V_{GS} = 0V, I_D = 250\mu A$	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V$	-	-	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	$V_{GS} = 10V, I_D = 3.5A$	-	1.1	1.4	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS} = 25V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	1130	-	pF
C_{oss}	Output Capacitance		-	93	-	pF
C_{rss}	Reverse Transfer Capacitance		-	5.5	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 325V, I_D = 7A,$ $V_{GS} = 10V$	-	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	$V_{DS} = 520V, I_D = 7A,$ $V_{GS} = 10V$	-	24	-	nC
Q_{gs}	Gate-Source Charge		-	5.1	-	nC
Q_{gd}	Gate-Drain Charge		-	9.5	-	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	$di/dt = 100A/\mu s$ $I_S = 7A, V_{GS} = 0V$	-	380	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$di/dt = 100A/\mu s$ $I_S = 7A, V_{GS} = 0V$	-	1900	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- $L = 10mH, V_{DD} = 50V, I_{AS} = 7A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$

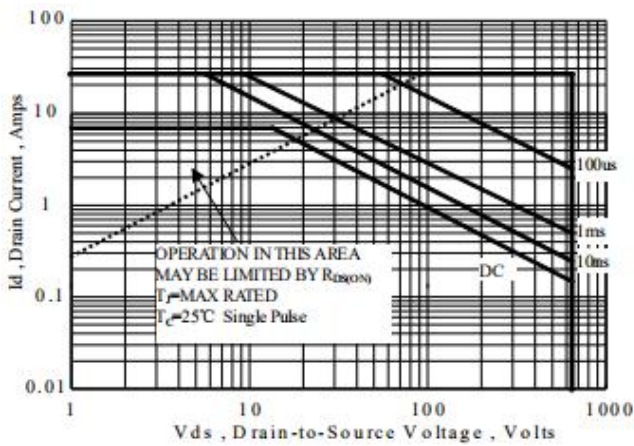


Figure 1. Maximum Forward Bias Safe Operating Area

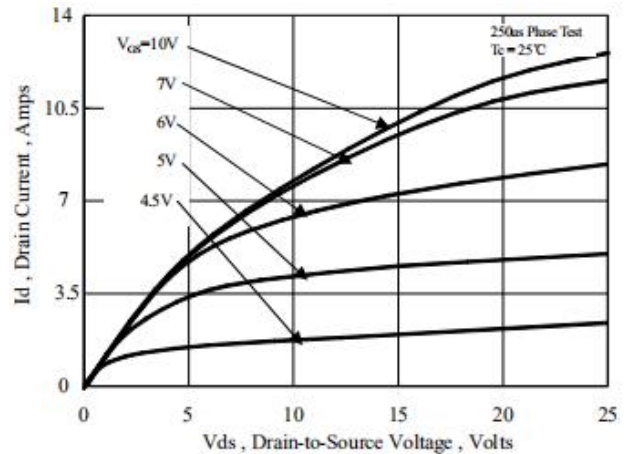


Figure 2. On-State Characteristics

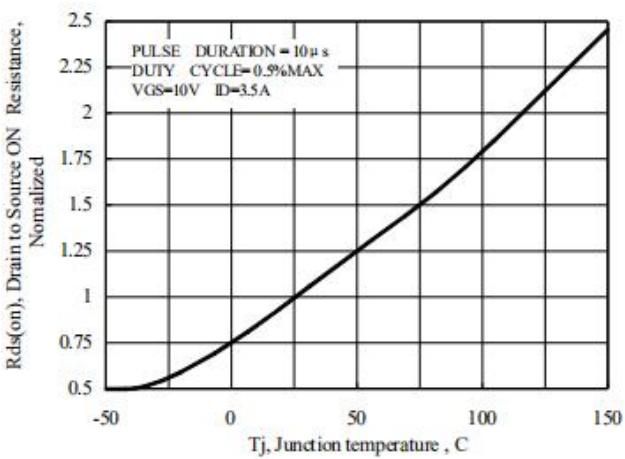


Figure 3. Normalized On-Resistance Variation with Temperature

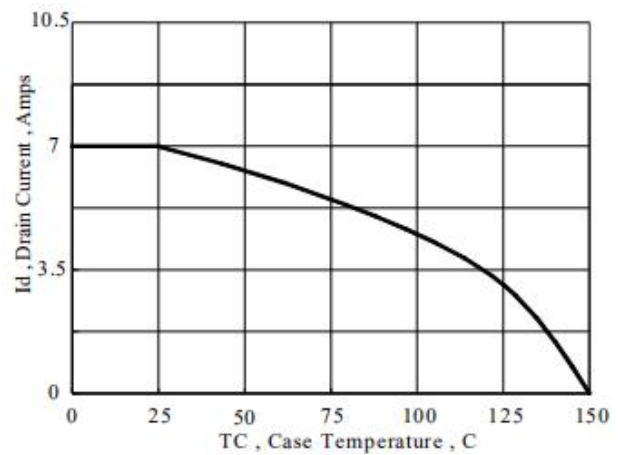


Figure 4. Maximum Continuous Drain Current vs Case Temperature

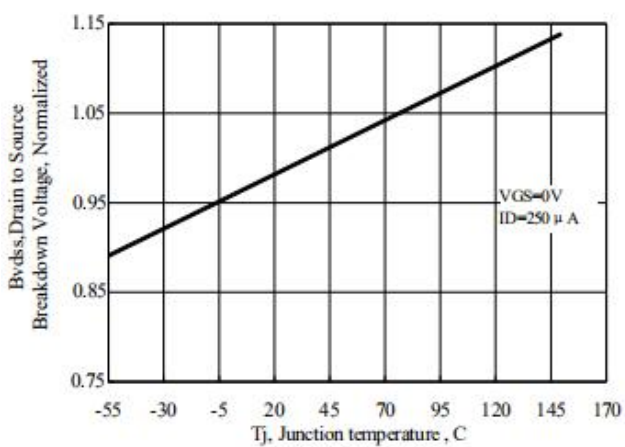


Figure 5. Typical Breakdown Voltage vs Junction Temperature

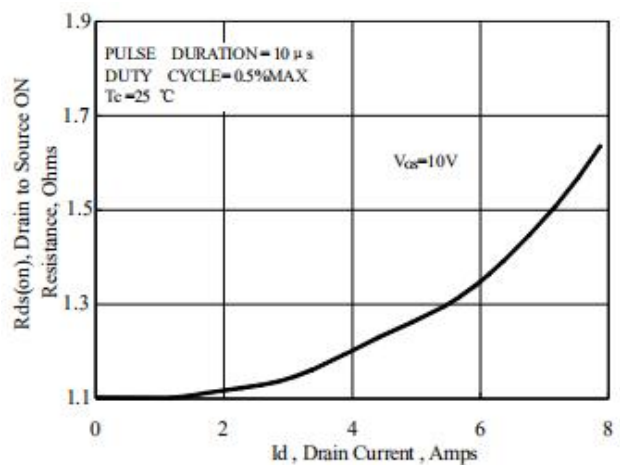


Figure 6. Typical Drain to Source ON Resistance vs Drain Current

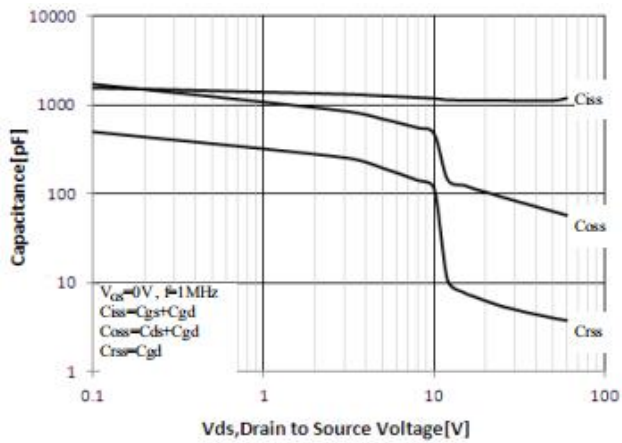


Figure 7. Typical Capacitance vs Drain to Source Voltage

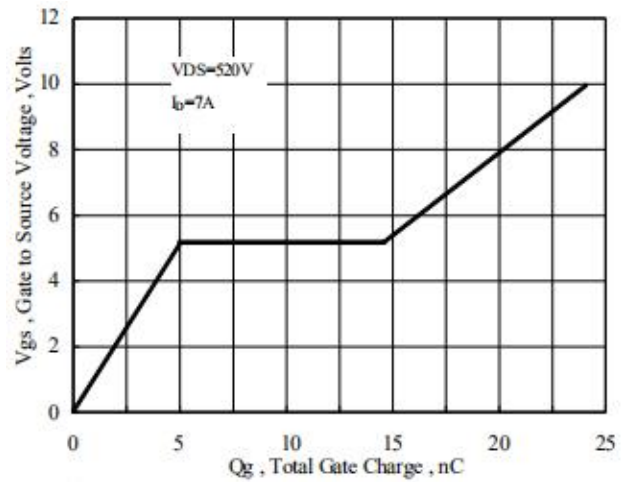


Figure 8. Typical Gate Charge vs Gate to Source Voltage

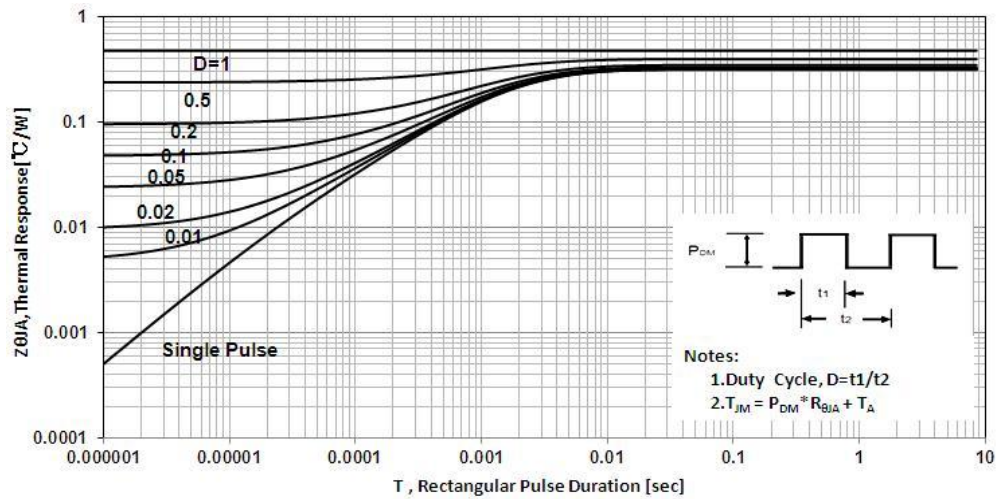
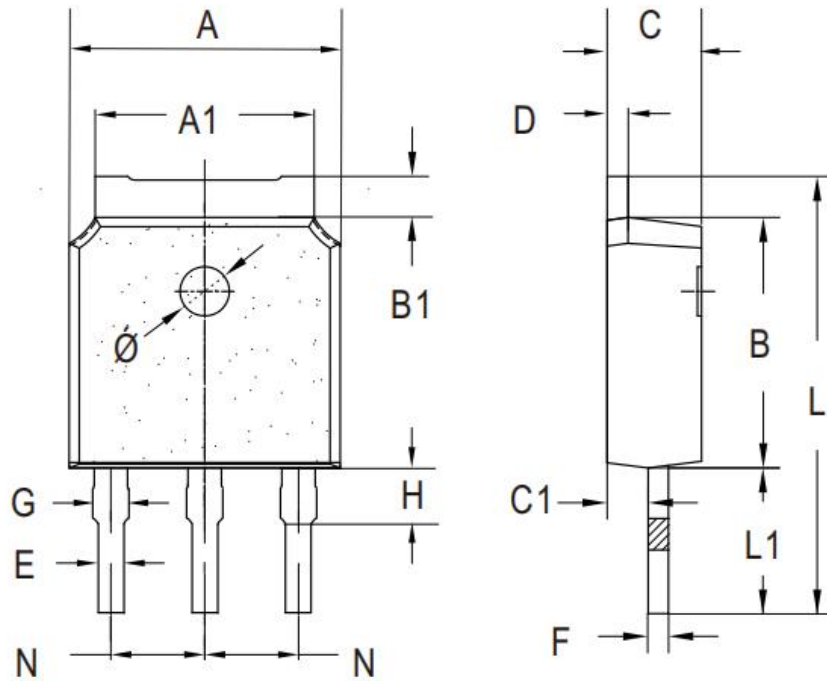


Figure 9. Normalized Effective Transient Thermal Impedance With Pulse Duration (TO-252)

■ 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