

**Features**

- Fast switching
- Low Gate Charge
- Improved dv/dt capability
- 100% avalanche tested
- Green Device Available

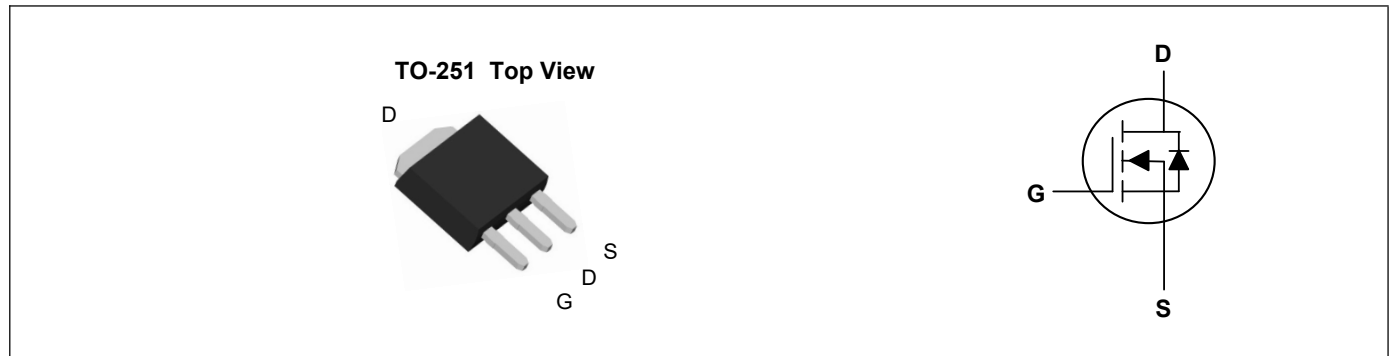
**Applications**

- High Efficiency Switch Mode Power Supplies
- Electronic Lamp Ballasts
- UPS

**Product Summary**



$V_{DS}$	650	V
$I_D$	5	A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	2.8	$\Omega$



**Absolute Maximum Ratings( $T_C=25^\circ C$ , unless otherwise noted)**

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current <sup>1</sup>	$I_D$	5	A
Continuous Drain Current <sup>1</sup>	$I_D$	3.2	A
	$T_C=100^\circ C$		
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	20	A
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	252	mJ
Total Power Dissipation <sup>4</sup>	$P_D$	90	W
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to 150	$^\circ C$

**Thermal Characteristics**

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	---	62.5	$^\circ C/W$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	---	1.35	$^\circ C/W$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	---	---	V
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.5A$	---	2.4	2.8	$\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	---	4	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	$\mu A$
		$V_{DS}=480V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	$\pm 100$	nA
Total Gate Charge	$Q_g$	$V_{DS}=480V, V_{GS}=10V, I_D=5A$	---	14.3	---	nC
Gate-Source Charge	$Q_{gs}$		---	2.9	---	
Gate-Drain Charge	$Q_{gd}$		---	6.3	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=300V, V_{GS}=10V, R_G=25\Omega, I_D=5A$	---	15.7	---	ns
Rise Time	$T_r$		---	37.3	---	
Turn-Off Delay Time	$T_{d(off)}$		---	39.7	---	
Fall Time	$T_f$		---	31.3	---	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	480	---	pF
Output Capacitance	$C_{oss}$		---	61	---	
Reverse Transfer Capacitance	$C_{rss}$		---	5.7	---	

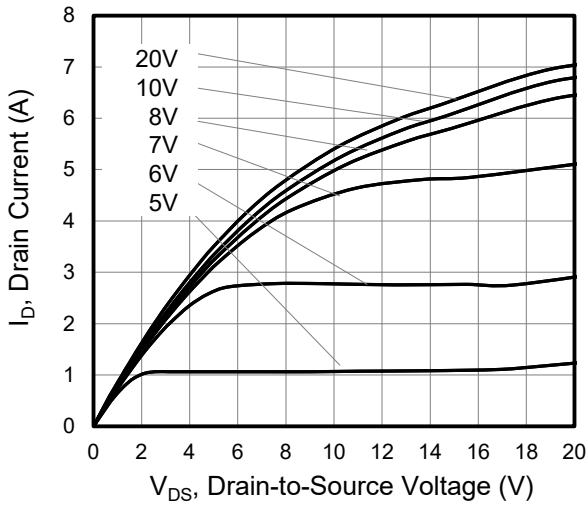
**Drain-Source Diode Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current <sup>1</sup>	$I_S$	$T_C=25^{\circ}\text{C}$	---	---	5	A
Pulsed Source Current <sup>2</sup>	$I_{SM}$		---	---	20	A
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$V_{GS}=0V, I_S=5A, T_J=25^{\circ}\text{C}$	---	---	1.5	V

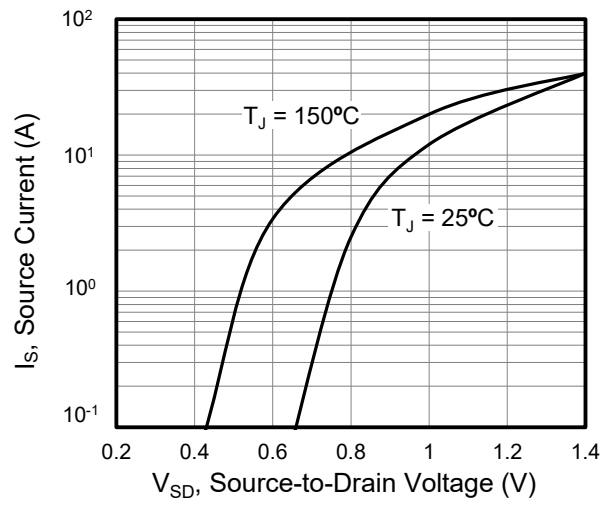
**Note:**

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=50V, V_{GS}=10V, L=30\text{mH}$
- 4.The power dissipation is limited by  $150^{\circ}\text{C}$  junction temperature

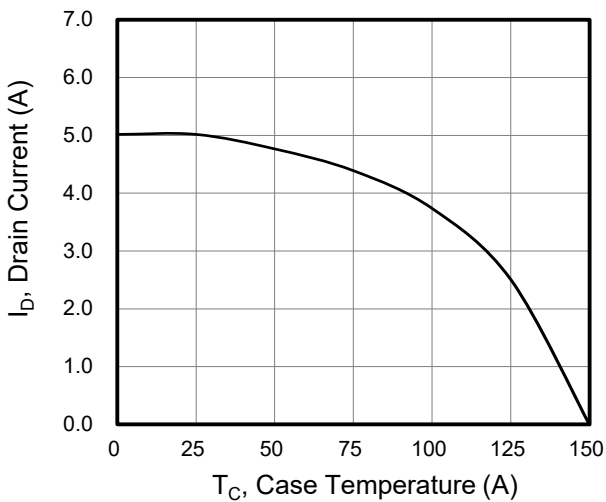
**Typical Characteristics**



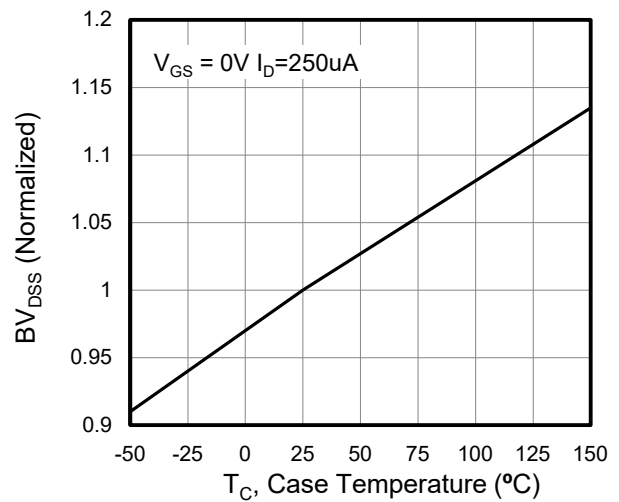
**Figure 1. Output Characteristics**



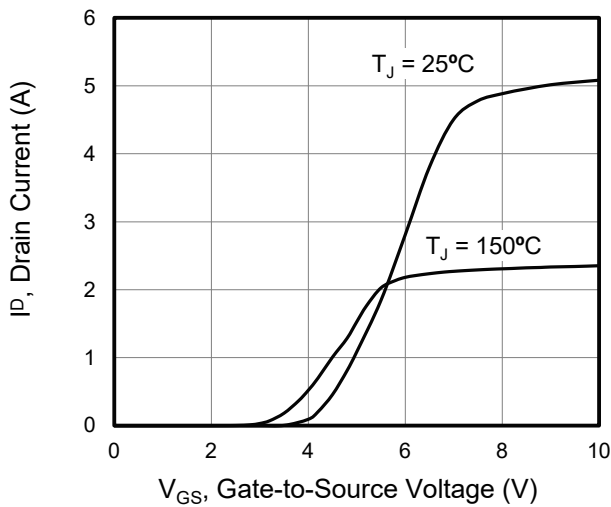
**Figure 2. Body Diode Forward Voltage**



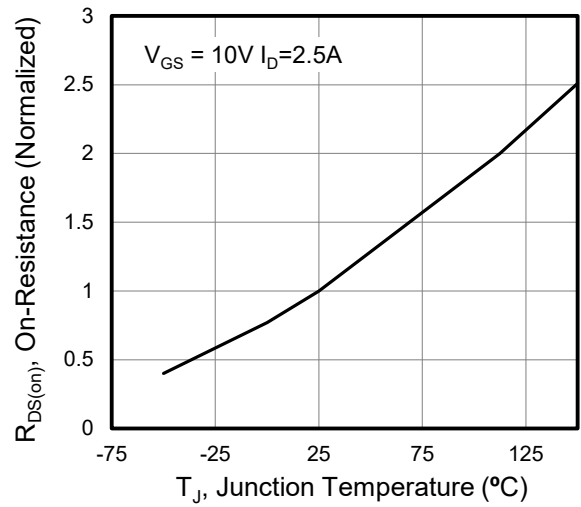
**Figure 3. Drain Current vs. Temperature**



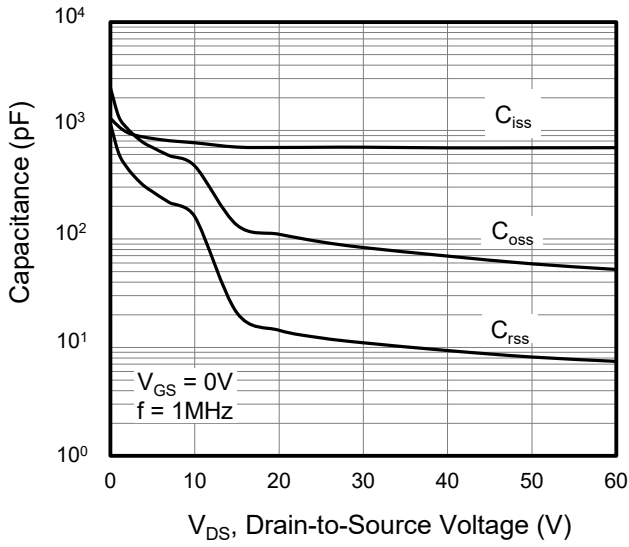
**Figure 4.  $BV_{DSS}$  Variation vs. Temperature**



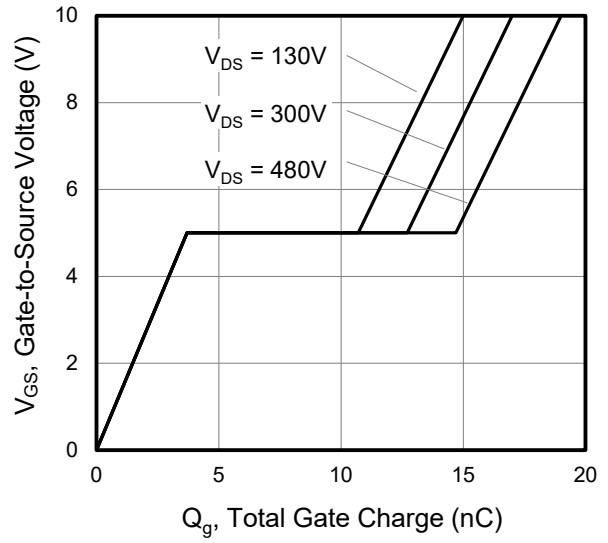
**Figure 5. Transfer Characteristics**



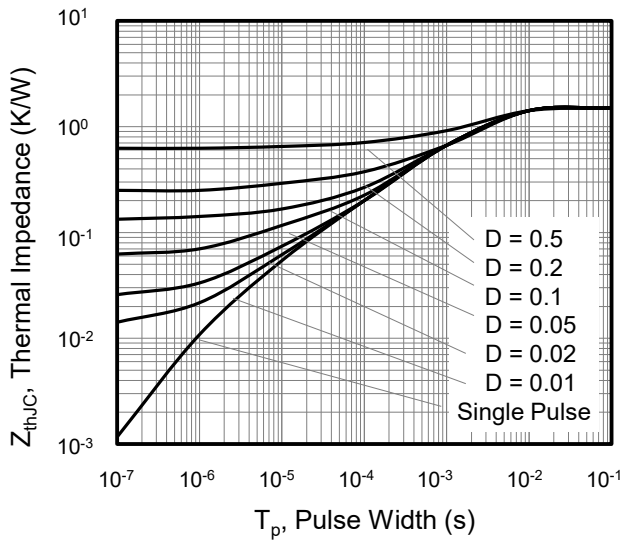
**Figure 6. On-Resistance vs. Temperature**



**Figure 7. Capacitance**

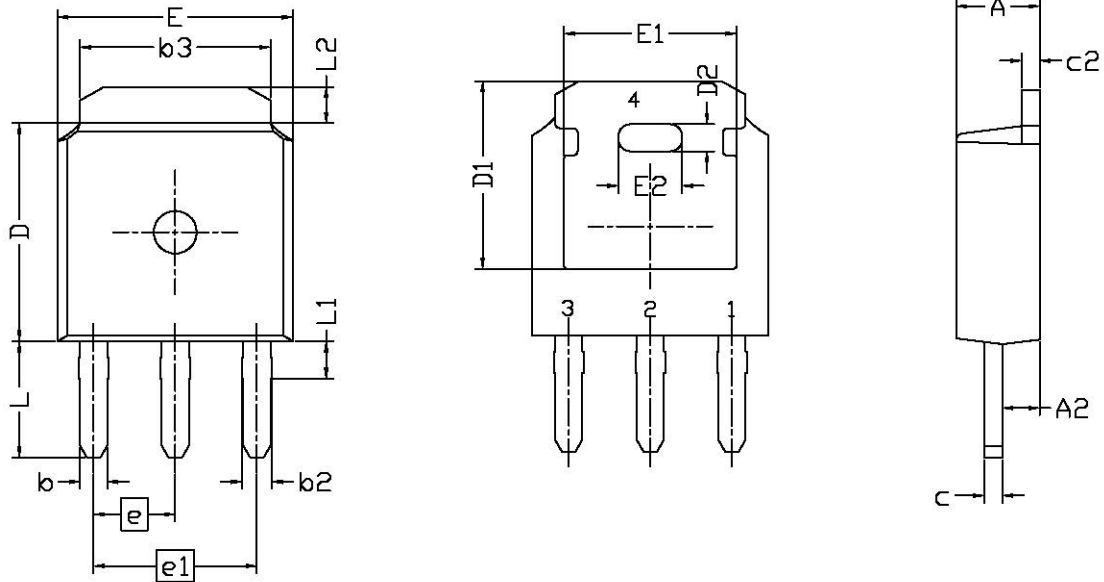


**Figure 8. Gate Charge**



**Figure 9. Transient Thermal Impedance**

**TO-251 Package Outline Dimensions**



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
<b>A</b>	2.20	2.30	2.39	<b>A2</b>	0.90	1.00	1.14
<b>b</b>	0.63	0.76	0.85	<b>b2</b>	0.76	0.85	1.05
<b>b3</b>	5.10	5.40	5.60	<b>C</b>	0.46	0.51	0.61
<b>C2</b>	0.46	0.51	0.61	<b>D</b>	5.90	6.10	6.30
<b>D1</b>	5.25 REF			<b>D2</b>	0.508 BSC		
<b>E</b>	6.35	6.55	6.70	<b>E1</b>	5.06 REF		
<b>E2</b>	1.524 BSC			<b>e</b>	2.29 BSC		
<b>e1</b>	4.57 BSC			<b>L</b>	3.70	4.00	4.40
<b>L1</b>	1.15 REF			<b>L2</b>	0.90	1.06	1.20