

**Features**

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

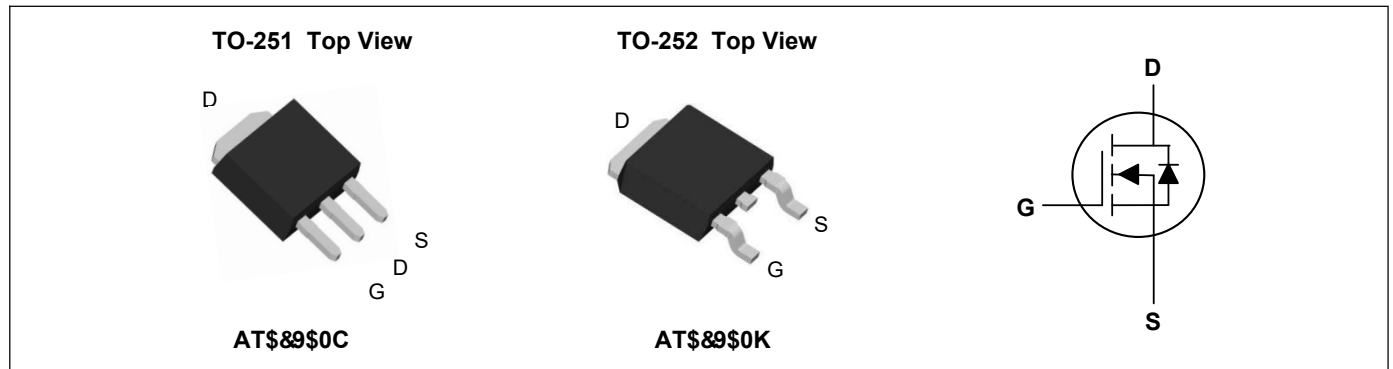
**Product Summary**



$V_{DS}$	20	V
$I_D$	90	A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$ )	4	m $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=2.5V$ )	6	m $\Omega$

**Applications**

- High Frequency Point-of-Load, Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch



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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>1</sup>	$I_D$	90	A
Continuous Drain Current <sup>1</sup>	$I_D$	56	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	360	A
Single Pulse Avalanche Energy <sup>3</sup>	EAS	210	mJ
Total Power Dissipation <sup>4</sup>	$P_D$	58	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-Case <sup>1</sup>	$R_{\theta JC}$	---	2.1	$^{\circ}C/W$

**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20	---	---	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	---	2.8	4.0	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =20A	---	4.0	6.0	mΩ
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	0.4	0.7	1	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	---	---	±100	nA
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =20A	---	16	---	S
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	---	24	---	nC
Gate-Source Charge	Q <sub>gs</sub>		---	4.3	---	
Gate-Drain Charge	Q <sub>gd</sub>		---	5	---	
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =20A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =3Ω	---	8.5	---	ns
Rise Time	T <sub>r</sub>		---	72	---	
Turn-Off Delay Time	T <sub>d(off)</sub>		---	82	---	
Fall Time	T <sub>f</sub>		---	57	---	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	---	2535	---	pF
Output Capacitance	C <sub>oss</sub>		---	295	---	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	220	---	

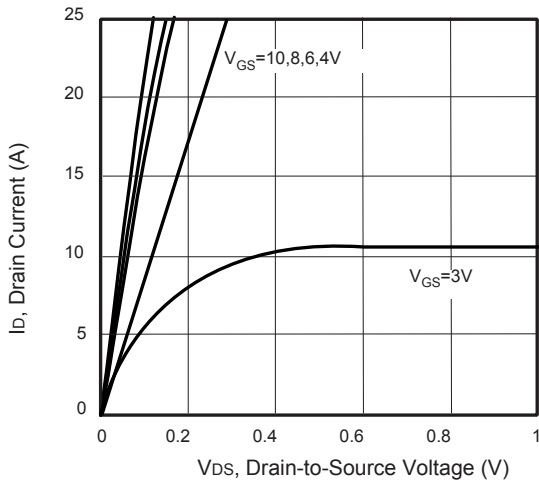
**Drain-Source Diode Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current <sup>1</sup>	I <sub>S</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	90	A
Diode Forward Voltage <sup>2</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	0.7	1.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =20A, di/dt=100A/μs, T <sub>J</sub> =25°C	---	12.8	---	nS
Reverse Recovery Charge	Q <sub>rr</sub>		---	2.5	---	nC

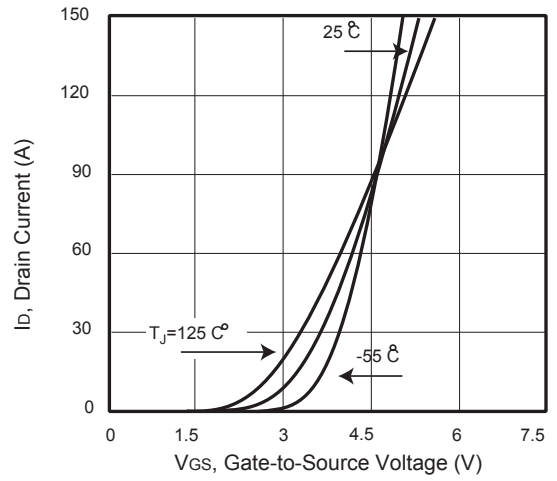
**Note:**

- 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 ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=10V, V<sub>GS</sub>=10V, L=0.5mH
- 4.The power dissipation is limited by 150°C junction temperature

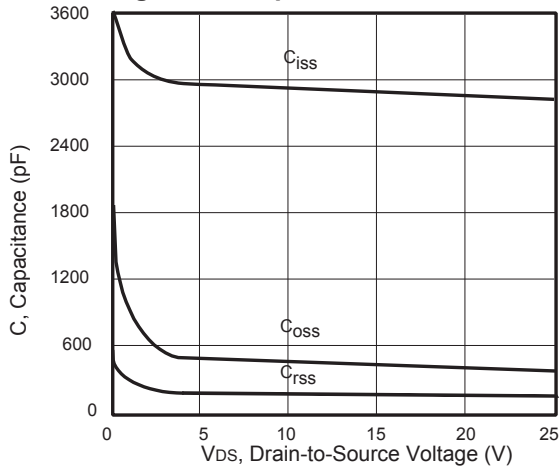
**Typical Characteristics**



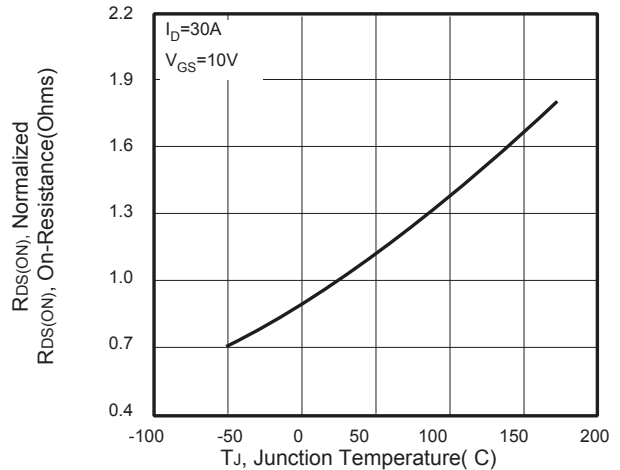
**Figure 1. Output Characteristics**



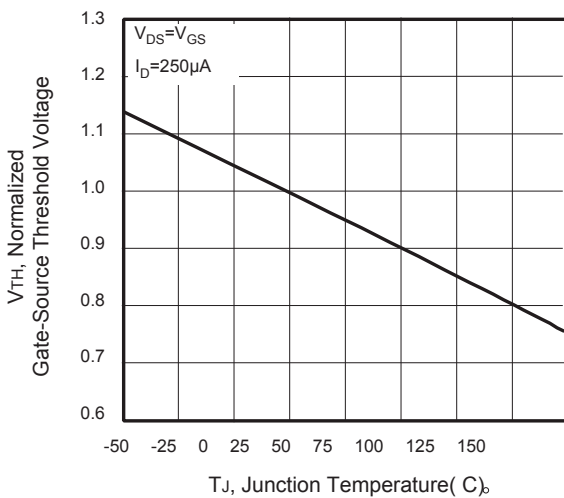
**Figure 2. Transfer Characteristics**



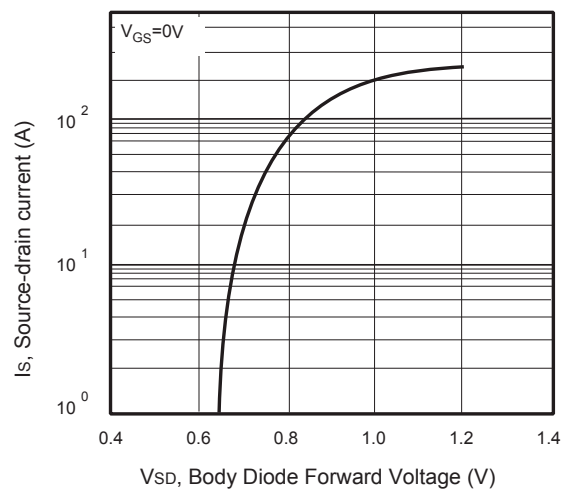
**Figure 3. Capacitance**



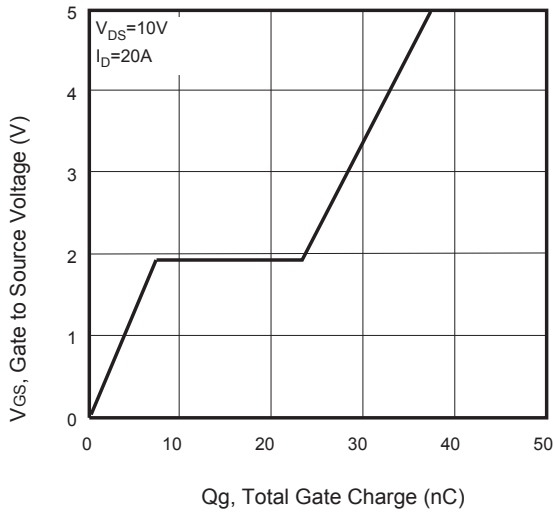
**Figure 4. On-Resistance Variation with Temperature**



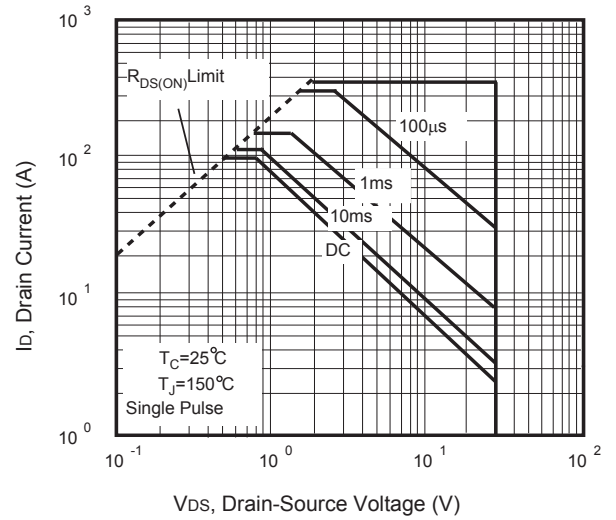
**Figure 5. Gate Threshold Variation with Temperature**



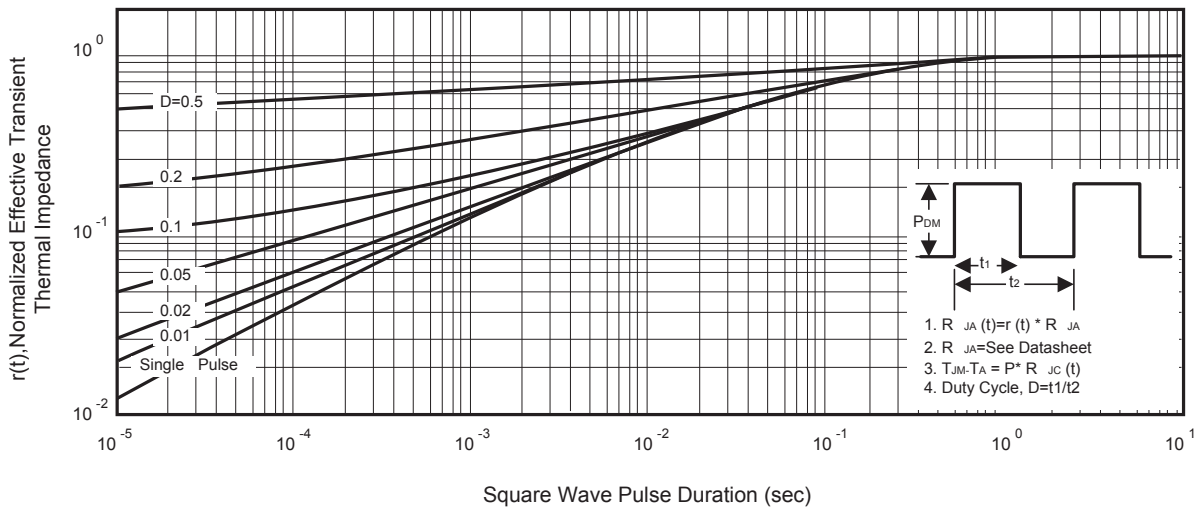
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



**Figure 7. Gate Charge**

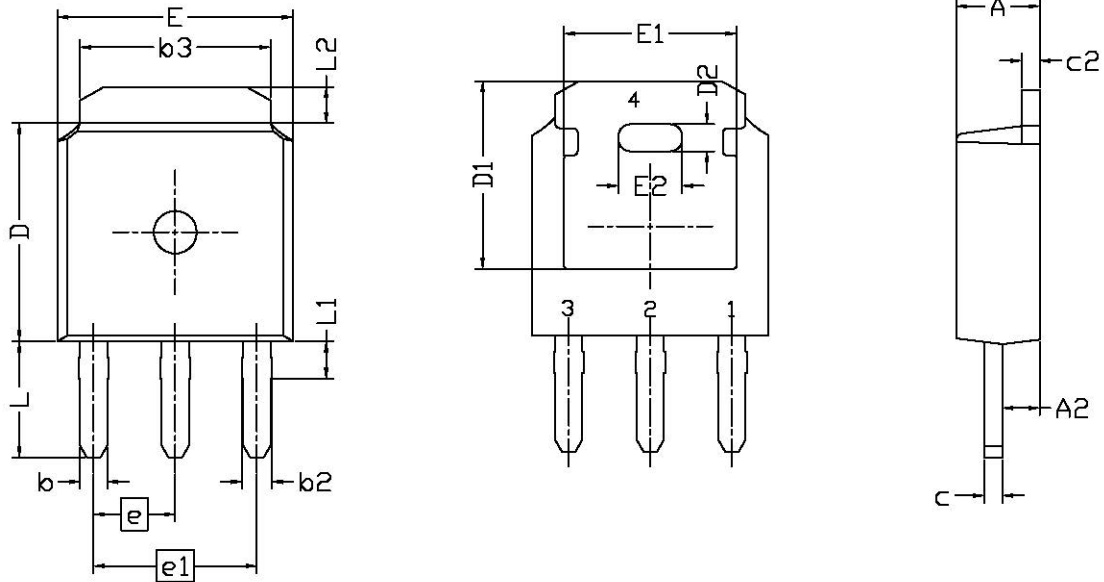


**Figure 8. Maximum Safe Operating Area**



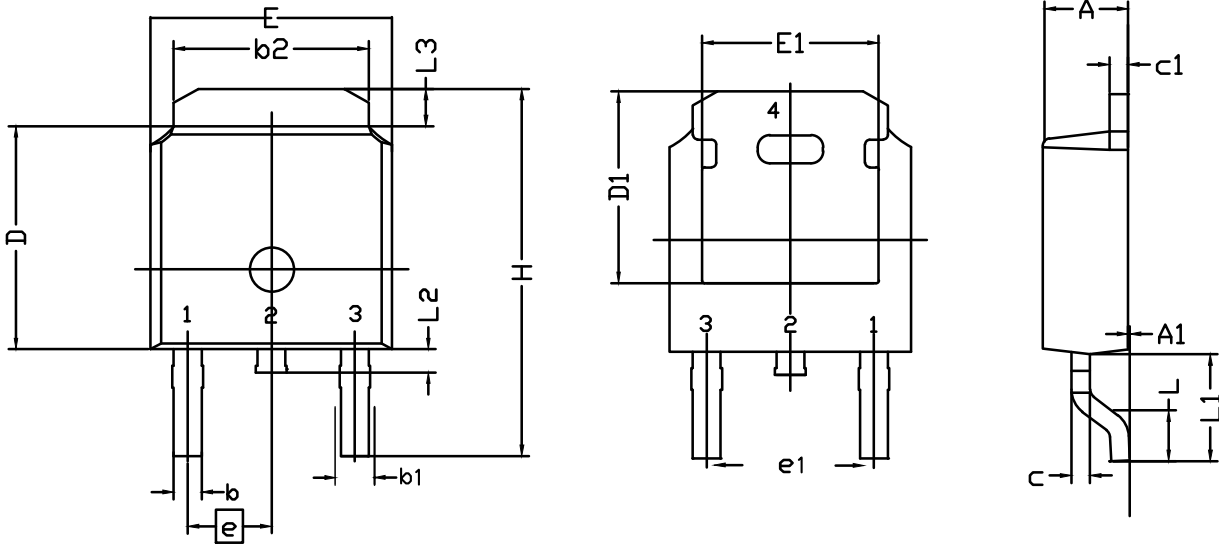
**Figure 9. Normalized Thermal Transient Impedance Curve**

**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

**TO-252 Package Outline Dimensions**



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	2.20	2.30	2.38	E	6.40	6.60	6.731
A <sub>1</sub>	0.00	0.10	0.20	E <sub>1</sub>	4.40	--	--
b	0.64	0.76	0.89	e	2.286 BSC		
b <sub>1</sub>	0.77	0.85	1.14	e <sub>1</sub>	4.572 BSC		
b <sub>2</sub>	5.00	5.33	5.46	H	9.40	10.00	10.40
c	0.458	0.508	0.610	L	1.40	1.52	1.77
C <sub>1</sub>	0.458	0.508	0.620	L <sub>1</sub>	--	2.743	--
D	5.98	6.10	6.223	L <sub>2</sub>	0.60	0.80	1.01
D <sub>1</sub>	5.20	5.25	5.38	L <sub>3</sub>	0.90	1.06	1.25