



Features

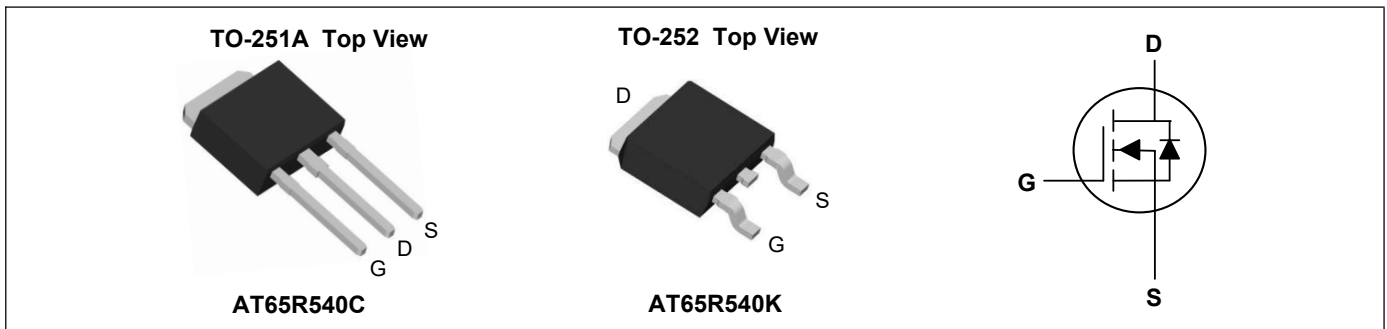
- New technology for high voltage device
- Low on-resistance and low conduction losses
- Small package
- 100% avalanche tested
- RoHS compliant

Key Performance Parameters

Parameter	Value	Unit
V_{DS}	650	V
$R_{DS(ON),max}$	540	m Ω
I_D	8	A
$Q_{g,typ}$	14.5	nC
I_{DM}	24	A

Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current	$I_D@T_C=25^\circ\text{C}$	8	A
Continuous Drain Current	$I_D@T_C=100^\circ\text{C}$	5.2	A
Pulsed Drain Current ¹	I_{DM}	24	A
Single Pulse Avalanche Energy ²	EAS	185	mJ
Avalanche Current	I_{AS}	4	A
Repetitive Avalanche energy, t_{AR} limited by T_{Jmax}	E_{AR}	0.4	mJ
MOSFET dv/dt ruggedness, $V_{DS} \leq 480\text{V}$	dv/dt	50	V/ns
Reverse diode dv/dt $V_{DS} \leq 480\text{V}$, $I_{SD}=I_D$		15	
Total Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	80	W
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Ambient (Max)	$R_{\theta JA}$	62	$^\circ\text{C/W}$
Thermal Resistance Junction-Case (Max)	$R_{\theta JC}$	1.56	$^\circ\text{C/W}$

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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4A$	---	480	540	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.5	3	3.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_C=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=650V, V_{GS}=0V, T_C=125^\circ\text{C}$	---	---	100	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 100	nA
Forward Transconductance	g_{fs}	$V_{DS}=20V, I_D=4A$	---	5.5	---	S
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	2	---	Ω
Total Gate Charge	Q_g	$V_{DS}=480V, V_{GS}=10V, I_D=8A$	---	14.5	---	nC
Gate-Source Charge	Q_{gs}		---	2.8	---	
Gate-Drain Charge	Q_{gd}		---	5.5	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=380V, V_{GS}=10V, R_G=12\Omega, I_D=4A$	---	5.5	---	ns
Rise Time	T_r		---	3.5	---	
Turn-Off Delay Time	$T_{d(off)}$		---	55	---	
Fall Time	T_f		---	6.5	---	
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1\text{MHz}$	---	680	---	pF
Output Capacitance	C_{oss}		---	58	---	
Reverse Transfer Capacitance	C_{rss}		---	4	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Source-Drain Current(Body Diode)	I_{SD}	$T_C=25^\circ\text{C}$	---	---	8	A
Pulsed Source-Drain Current	I_{SDM}		---	---	23.4	A
Forward On Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=8A, T_J=25^\circ\text{C}$	---	0.9	1.2	V
Reverse Recovery Time	t_{rr}	$I_F=8A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	220	---	ns
Reverse Recovery Charge	Q_{rr}		---	2.2	---	μC
Peak Reverse Recovery Current	I_{rrm}		---	20	---	A

Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $T_J=25^\circ\text{C}, V_{DD}=50V, V_{GS}=10V, R_G=25\Omega$

Typical Characteristics

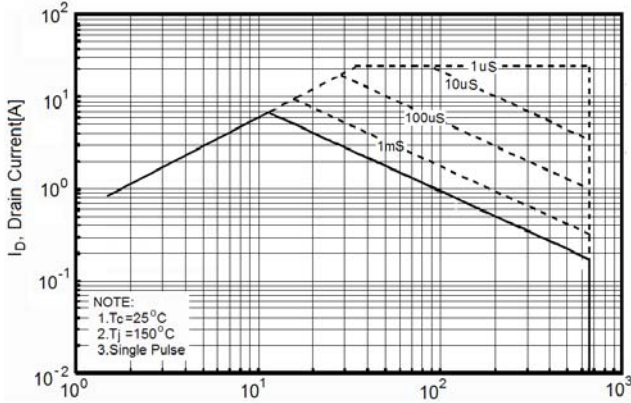


Figure1. Safe operating area

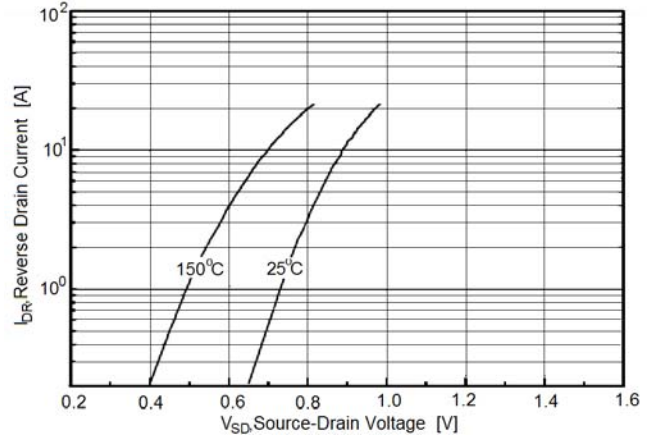


Figure2. Source-Drain Diode Forward Voltage

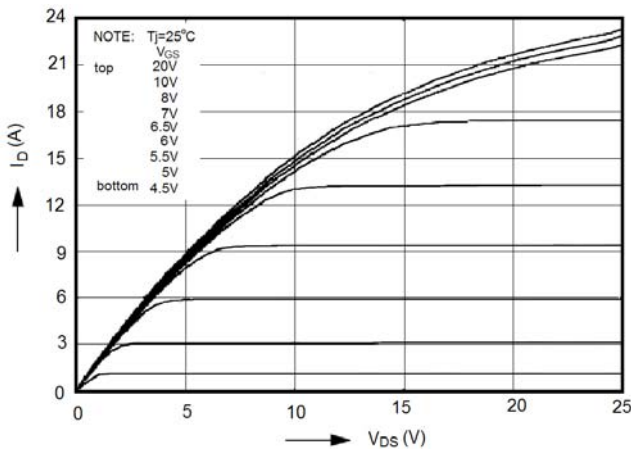


Figure3. Output characteristics

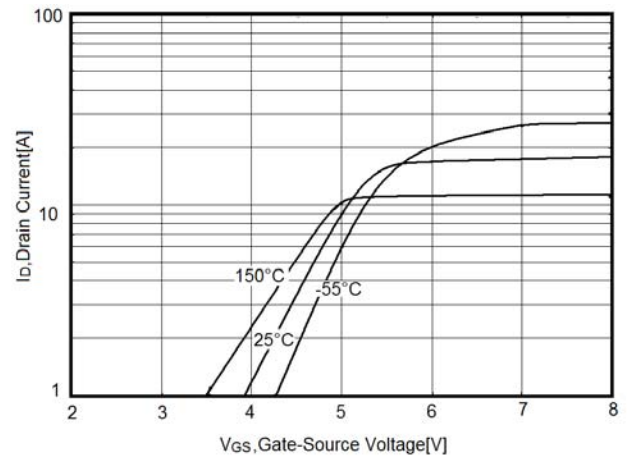


Figure4. Transfer characteristics

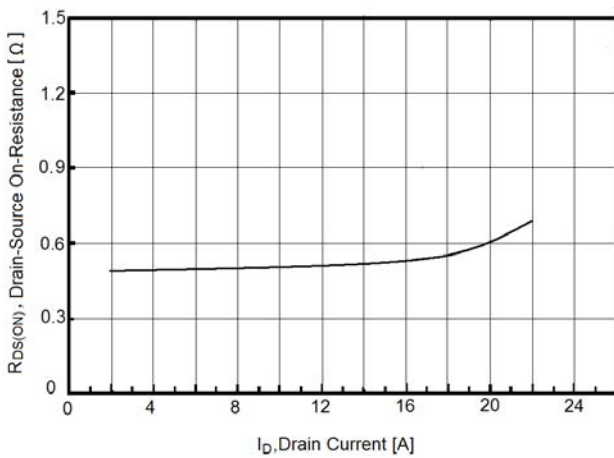


Figure5. Static drain-source on resistance

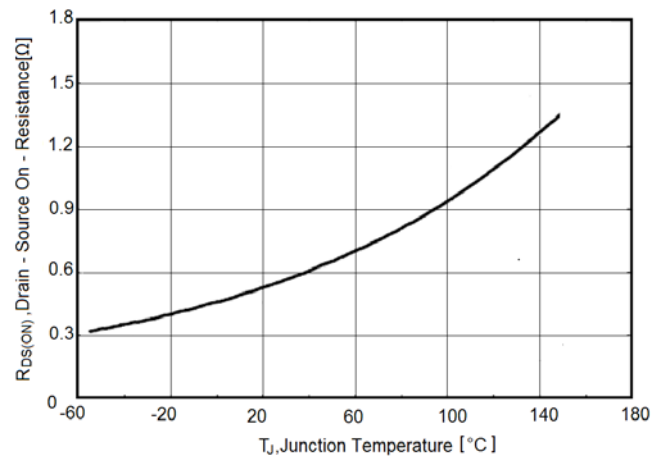


Figure6. R_{DS(ON)} vs Junction Temperature

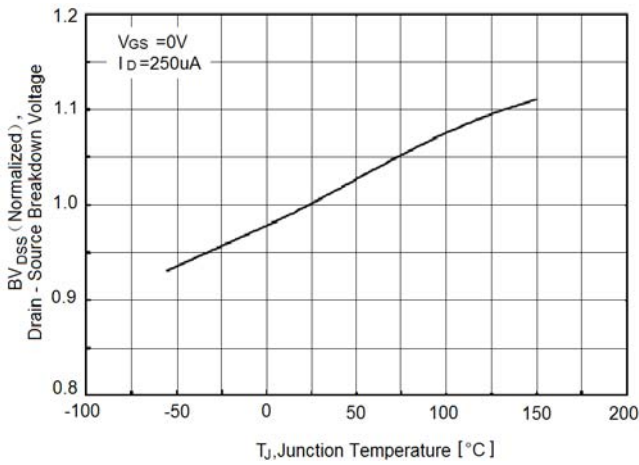


Figure7. BV_{DSS} vs Junction Temperature

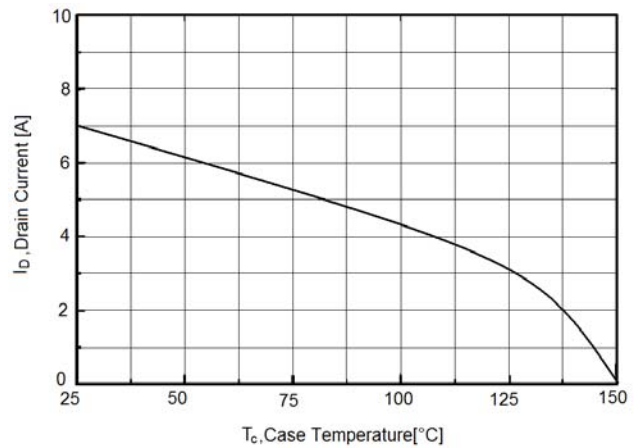


Figure8. Maximum I_D vs Junction Temperature

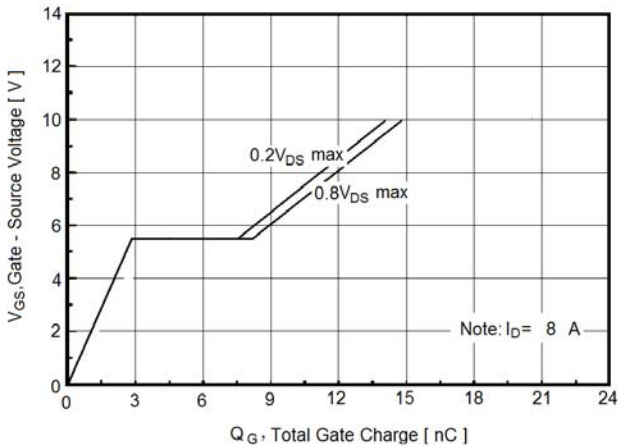


Figure9. Gate charge waveforms

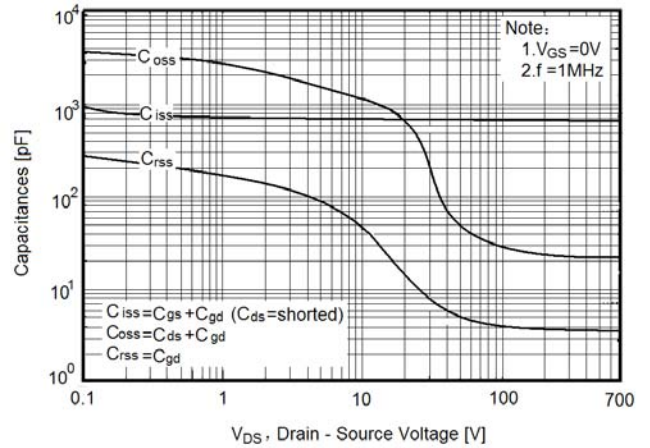


Figure10. Capacitance

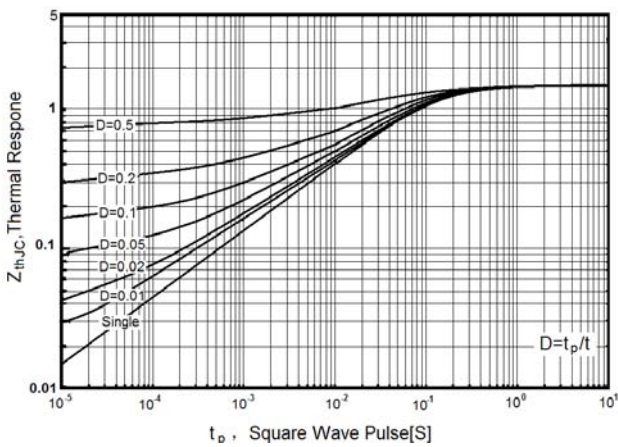
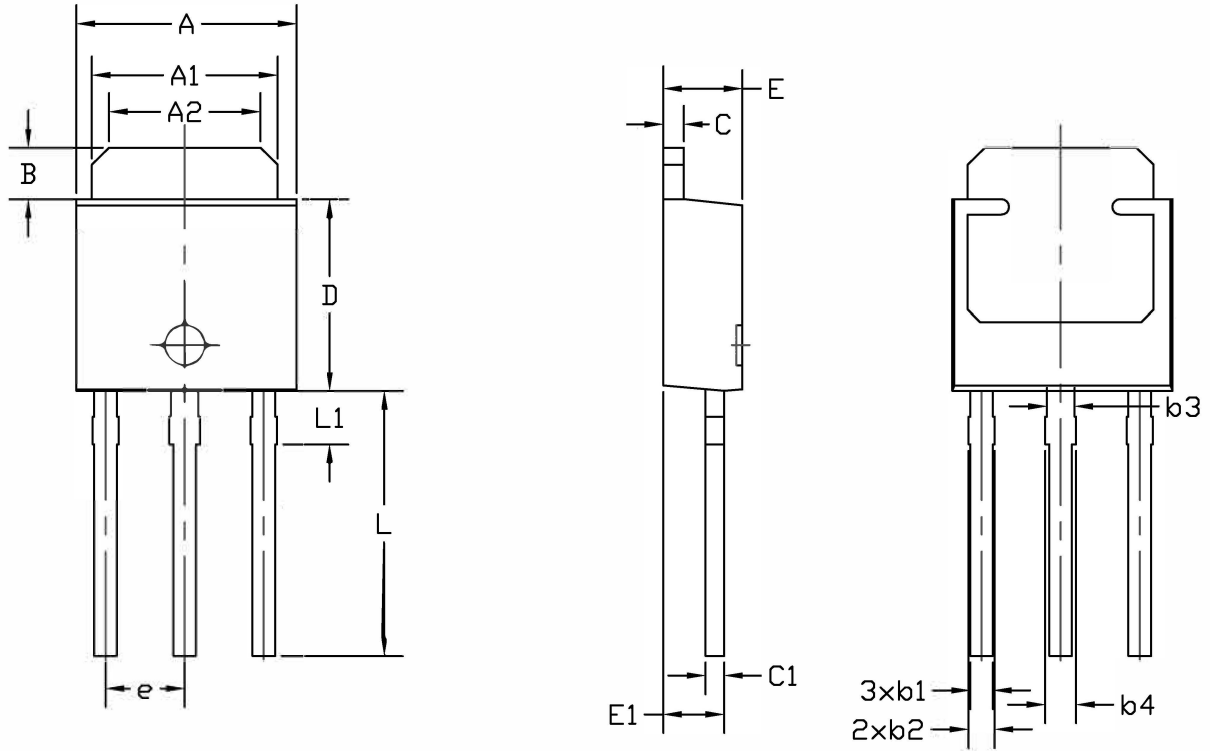


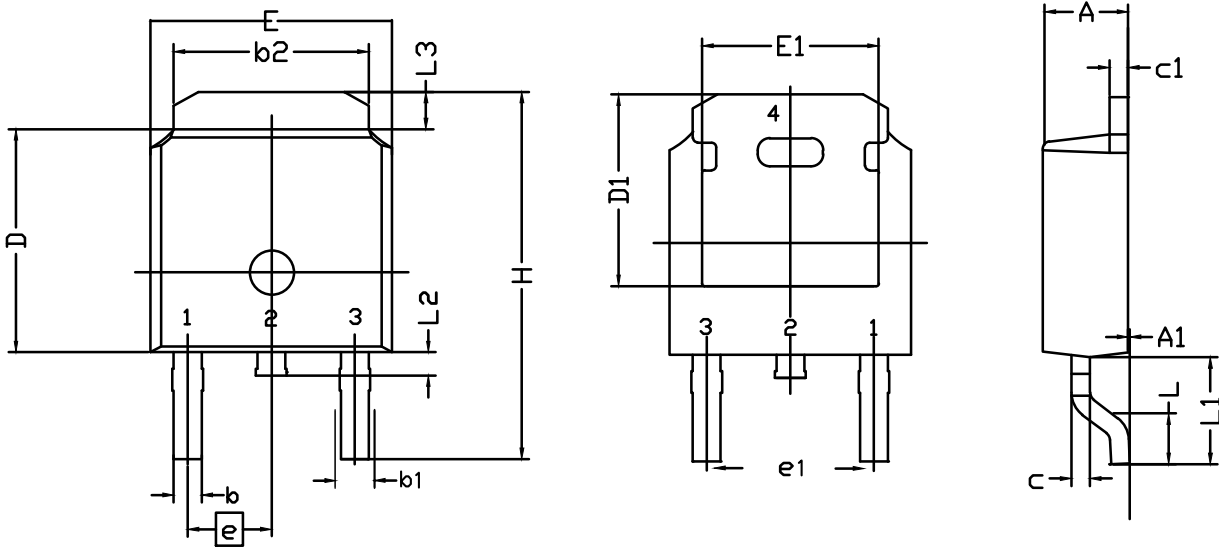
Figure11. Transient Thermal Impedance

TO-251A Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	6.35	6.55	6.65	C	0.45	0.55	0.65
A1	5.20	5.35	5.50	C1	0.45	0.55	0.65
A2	4.20	4.35	4.50	D	5.40	5.55	5.70
B	1.35	1.50	1.65	E	2.20	2.30	2.40
b1	0.55	0.65	0.75	e	2.30 REF		
b2	0.60	0.70	0.85	E1	1.70	1.77	1.82
b3	0.80 REF			L	7.40	7.70	8.00
b4	0.90 REF			L1	1.55 REF		

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 ₁	0.00	0.10	0.20	E ₁	4.40	--	--
b	0.64	0.76	0.89	e	2.286 BSC		
b ₁	0.77	0.85	1.14	e ₁	4.572 BSC		
b ₂	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 ₁	0.458	0.508	0.620	L ₁	--	2.743	--
D	5.98	6.10	6.223	L ₂	0.60	0.80	1.01
D ₁	5.20	5.25	5.38	L ₃	0.90	1.06	1.25