AT06500C

60V N-Channel MOSFET

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
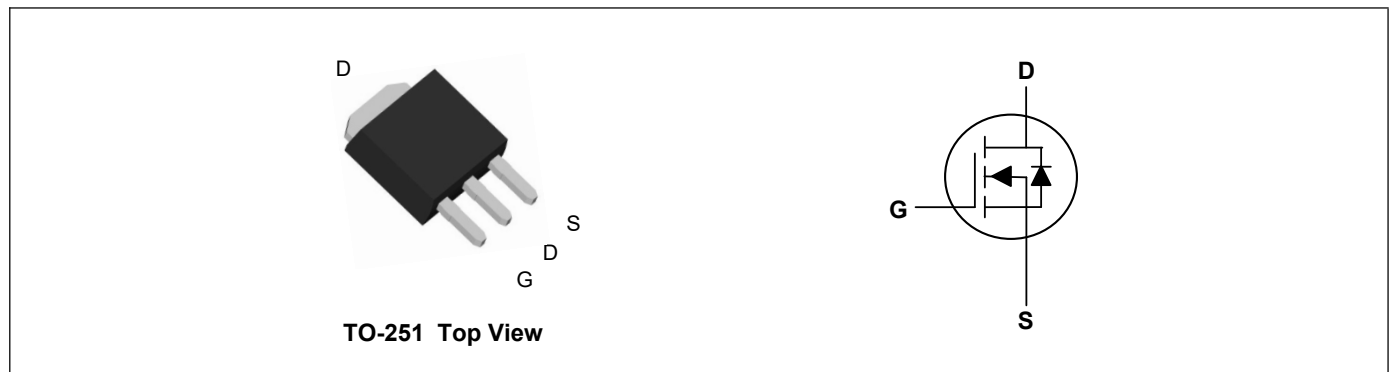- 100% EAS Guaranteed
- Green Device Available

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

Product Summary

V_{DS}	60	V
I_D	50	A
$R_{DS(ON)}$ (at V_{GS}=10V)	20	mΩ

RoHS

TO-251 Top View

Absolute Maximum Ratings(T_C=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D@T_C=25℃	50	A
Continuous Drain Current	I_D@T_C=100℃	35.4	A
Pulsed Drain Current	I_{DM}	200	A
Single Pulse Avalanche Energy[3]	EAS	300	mJ
Total Power Dissipation	P_D@T_C=25℃	85	W
Derating factor		0.56	W/℃
Storage Temperature Range	T_{STG}	-55 to 175	℃
Operating Junction Temperature Range	T_J	-55 to 175	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Case[1]	$R_{θJC}$	---	1.8	℃/W

Electrical Characteristics (T$_J$=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV$_{DSS}$	V$_{GS}$=0V , I$_D$=250uA	60	---	---	V
Static Drain-Source On-Resistance	R$_{DS(ON)}$	V$_{GS}$=10V , I$_D$=20A	---	13	20	mΩ
Gate Threshold Voltage	V$_{GS(th)}$	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	1.4	1.8	2.5	V
Drain-Source Leakage Current	I$_{DSS}$	V$_{DS}$=60V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
Gate-Source Leakage Current	I$_{GSS}$	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA
Forward Transconductance	gfs	V$_{DS}$=5V , I$_D$=20A	18	---	---	S
Total Gate Charge	Q$_g$	V$_{DS}$=30V , V$_{GS}$=10V , I$_D$=20A	---	50	---	nC
Gate-Source Charge	Q$_{gs}$		---	6	---	
Gate-Drain Charge	Q$_{gd}$		---	15	---	
Turn-On Delay Time	T$_{d(on)}$	V$_{DD}$=30V , V$_{GS}$=10V , R$_G$=3Ω, R$_L$=6.7Ω	---	7.4	---	ns
Rise Time	T$_r$		---	5.1	---	
Turn-Off Delay Time	T$_{d(off)}$		---	28.2	---	
Fall Time	T$_f$		---	5.5	---	
Input Capacitance	C$_{iss}$	V$_{DS}$=30V , V$_{GS}$=0V , f=1MHz	---	2050	---	pF
Output Capacitance	C$_{oss}$		---	158	---	
Reverse Transfer Capacitance	C$_{rss}$		---	120	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[1]	I$_S$		---	---	50	A
Diode Forward Voltage[2]	V$_{SD}$	V$_{GS}$=0V , I$_S$=20A , T$_J$=25℃	---	---	1.2	V
Reverse Recovery Time	t$_{rr}$	I$_F$=20A ,di/dt=100A/μs, T$_J$=25℃	---	28	---	nS
Reverse Recovery Charge	Q$_{rr}$		---	40	---	nC
Forward Turn-On Time	t$_{on}$	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Note:

1.The data tested by surface mounted on a 1 inch^2 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$_{DD}$=30V,V$_{GS}$=10V,L=0.5mH,R$_G$=25Ω

4.The power dissipation is limited by 175℃ junction temperature
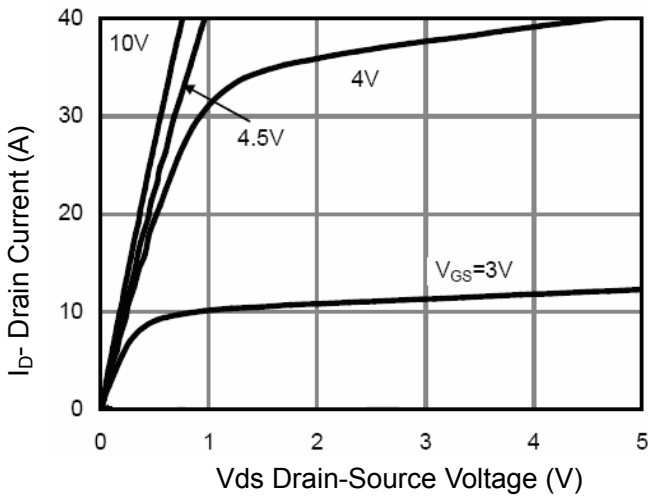
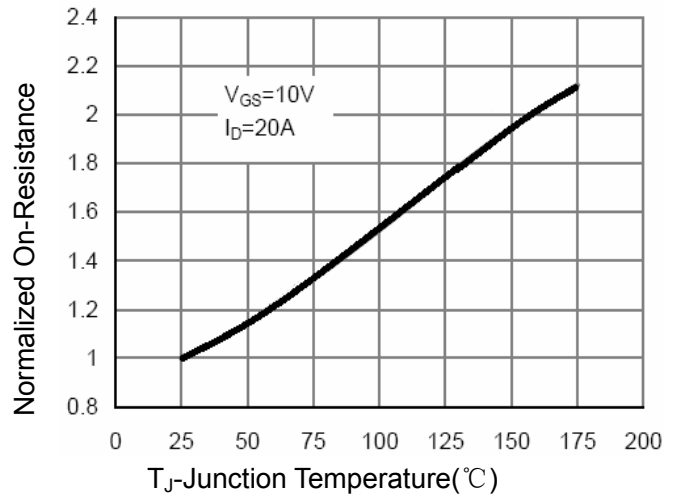## Typical Characteristics

Figure 1 Output Characteristics
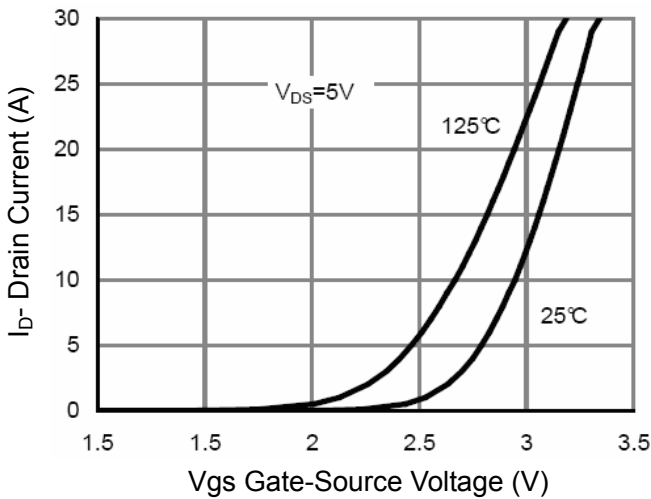

Figure 4 Rdson-Junction Temperature
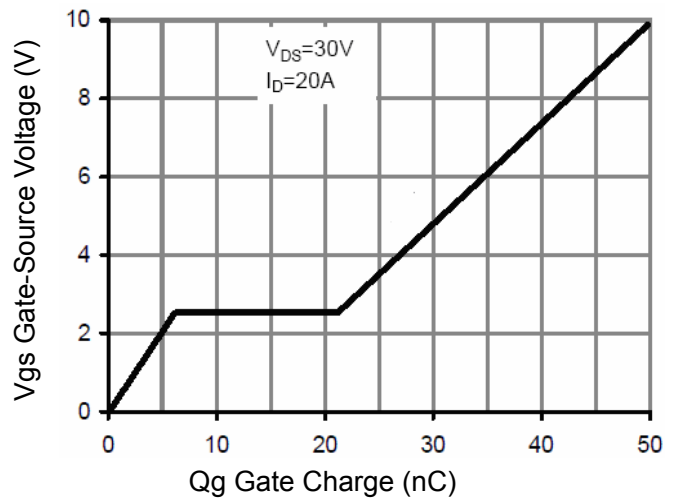

Figure 2 Transfer Characteristics

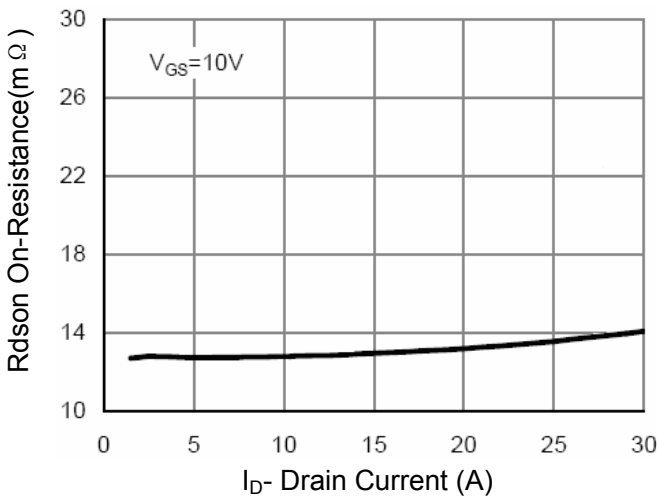**Figure 5 Gate Charge**

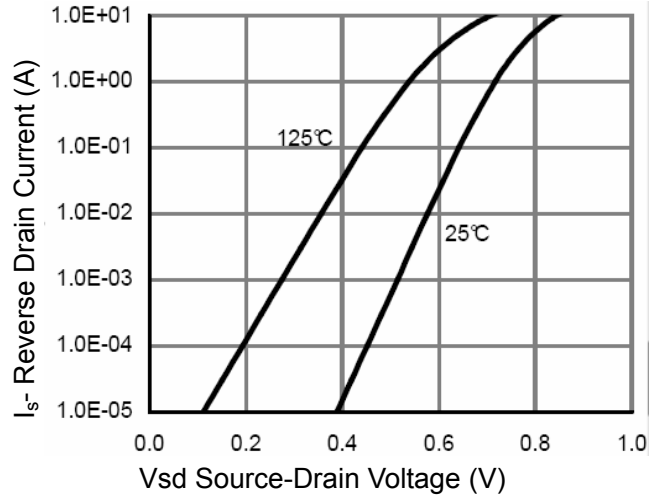**Figure 3 Rdson- Drain Current**

Figure 6 Source- Drain Diode Forward
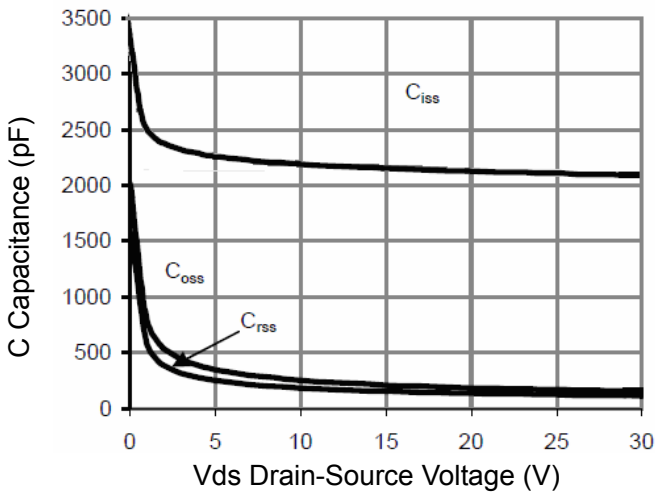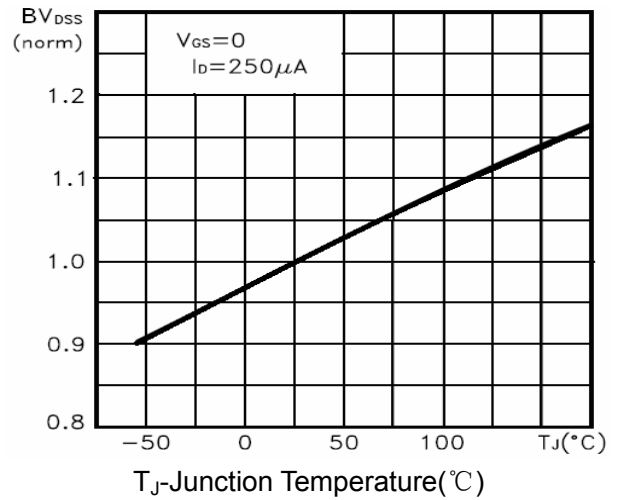
Figure 7 Capacitance vs Vds
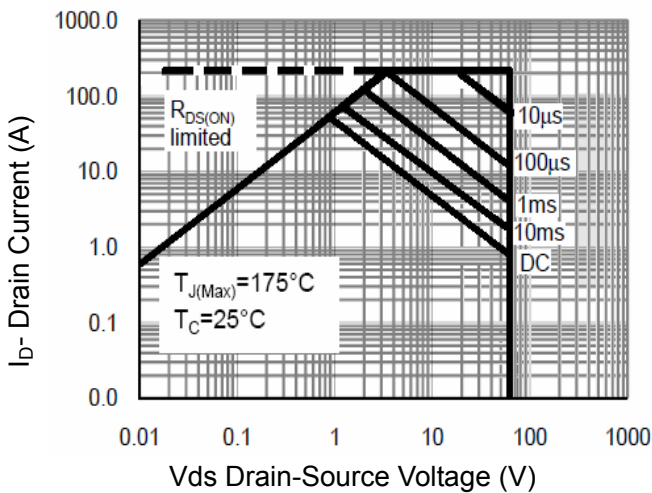

Figure 9 BV$_{DSS}$ vs Junction Temperature
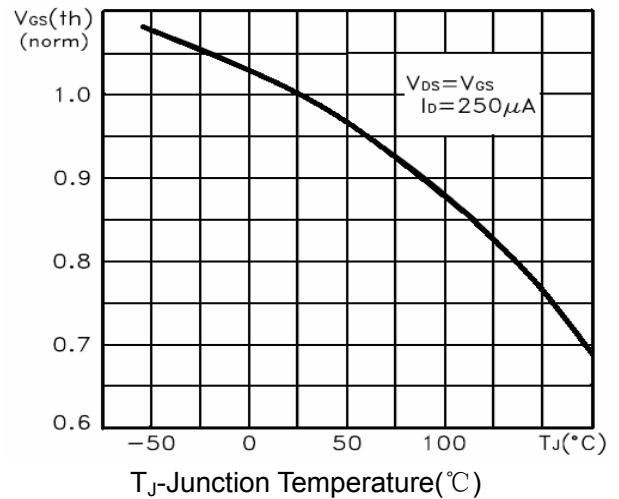

Figure 8 Safe Operation Area

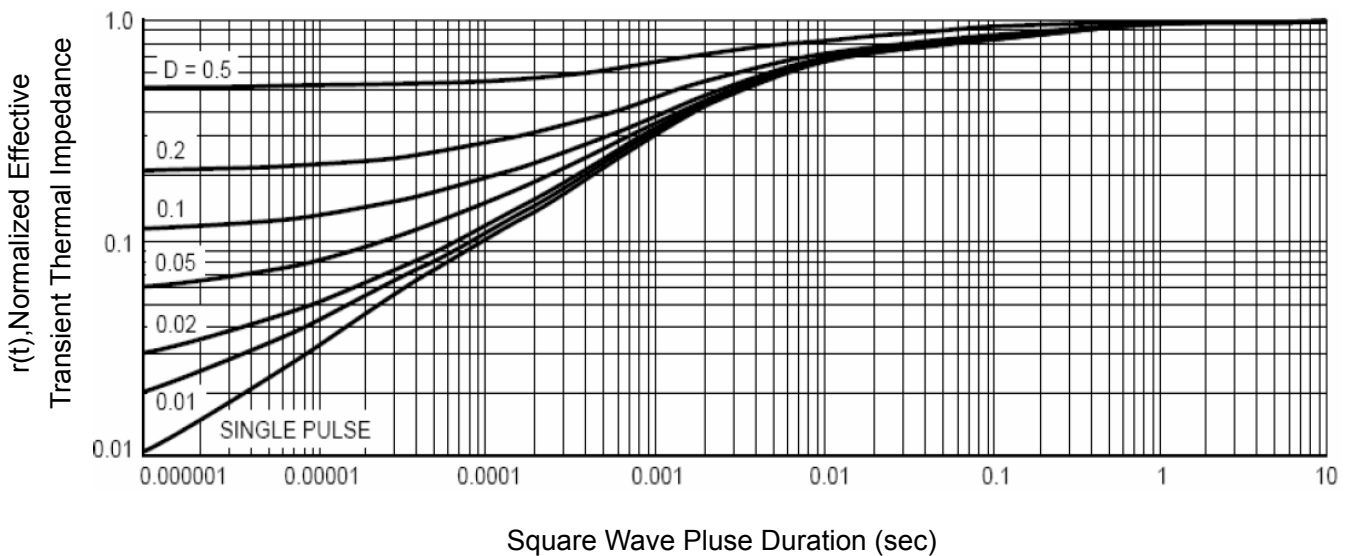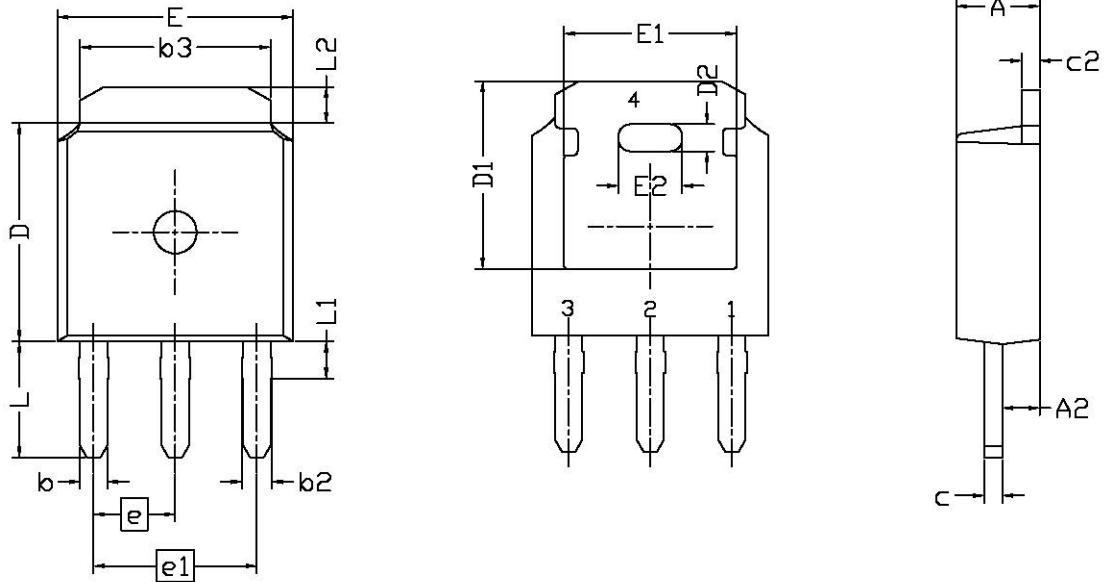**Figure 10 V$_{GS(th)}$ vs Junction Temperature**

Figure 11 Normalized Maximum Transient Thermal Impedance

TO-251 Package Outline Dimensions

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