

Features

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

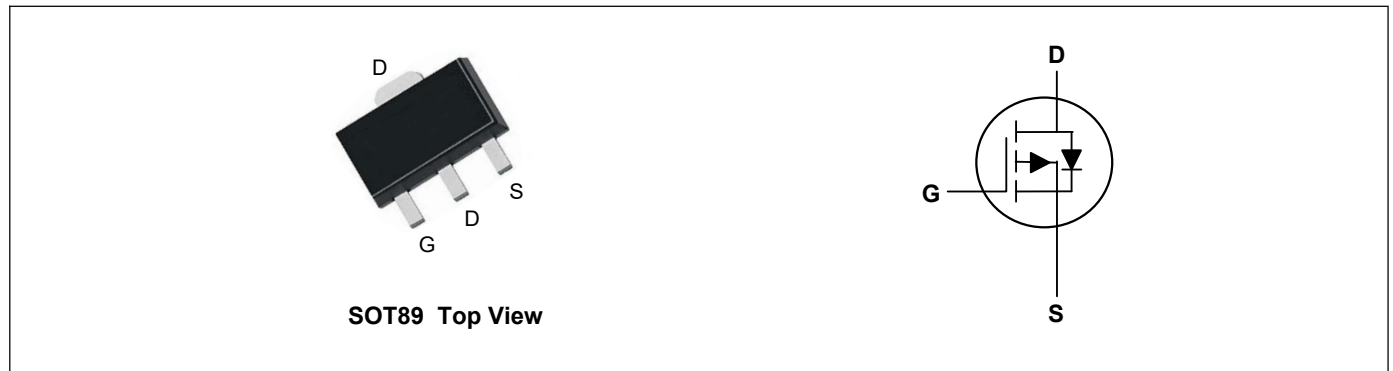
Product Summary



V_{DS}	-30	V
I_D	-4	A
$R_{DS(ON)}$ (at $V_{GS}=-10V$)	52	m Ω
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	90	m Ω

Applications

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



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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹	$I_D@T_A=25^{\circ}C$	-4	A
Continuous Drain Current ¹	$I_D@T_A=70^{\circ}C$	-3	A
Pulsed Drain Current ²	I_{DM}	-20	A
Total Power Dissipation ³	$P_D@T_A=25^{\circ}C$	1.32	W
Total Power Dissipation ³	$P_D@T_A=70^{\circ}C$	0.84	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 ¹ (Steady State)	$R_{\theta JA}$	---	95	$^{\circ}C/W$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	---	30	$^{\circ}C/W$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-30	---	---	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =-1mA	---	-0.023	---	V/°C
Static Drain-Source On-Resistance ²	R _{DS(ON)}	V _{GS} =-10V, I _D =-4A	---	---	52	mΩ
		V _{GS} =-4.5V, I _D =-2A	---	---	90	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250uA	-1.2	---	-2.5	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		---	4	---	mV/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =55°C	---	---	-5	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
Forward Transconductance	g _{fs}	V _{DS} =-5V, I _D =-4A	---	11	---	S
Total Gate Charge	Q _g	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-4A	---	6.4	---	nC
Gate-Source Charge	Q _{gs}		---	2.3	---	
Gate-Drain Charge	Q _{gd}		---	1.9	---	
Turn-On Delay Time	T _{d(on)}	V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω, I _D =-4A	---	2.8	---	ns
Rise Time	T _r		---	8.4	---	
Turn-Off Delay Time	T _{d(off)}		---	39	---	
Fall Time	T _f		---	6	---	
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	583	---	pF
Output Capacitance	C _{oss}		---	100	---	
Reverse Transfer Capacitance	C _{rss}		---	80	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current ^{1,4}	I _S	V _G =V _D =0V, Force Current	---	---	-4.5	A
Pulsed Source Current ^{2,4}	I _{SM}		---	---	-23	A
Diode Forward Voltage ²	V _{SD}	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V
Reverse Recovery Time	t _{rr}	I _F =-4A, di/dt=100A/μs, T _J =25°C	---	7.8	---	nS
Reverse Recovery Charge	Q _{rr}		---	2.5	---	nC

Note:

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

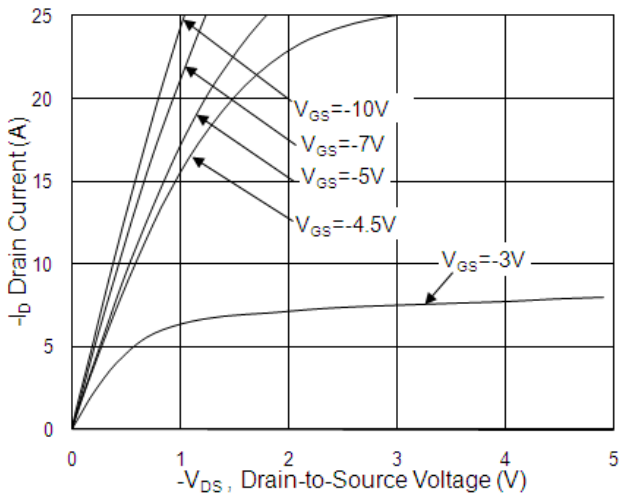


Fig.1 Typical Output Characteristics

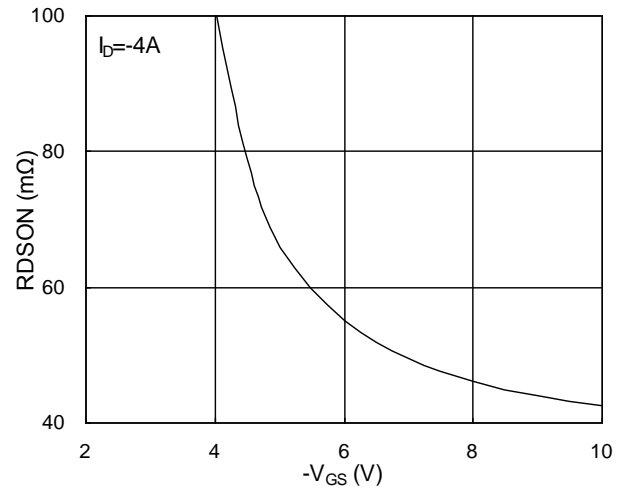


Fig.2 On-Resistance vs. Gate-Source

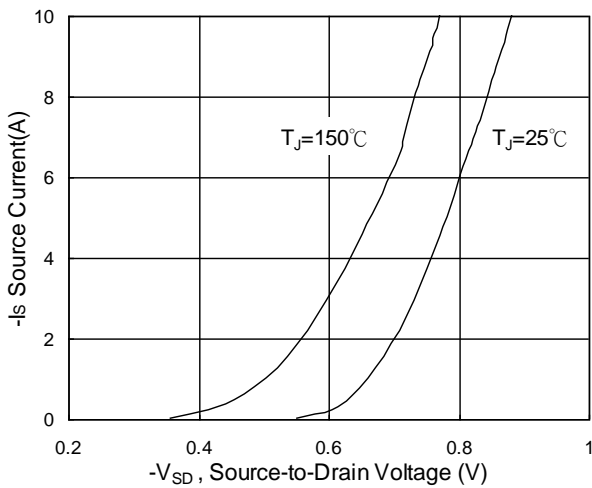


Fig.3 Forward Characteristics of Reverse

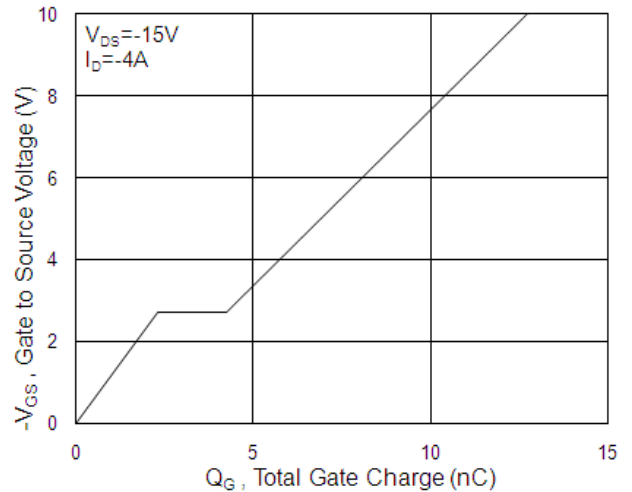


Fig.4 Gate-Charge Characteristics

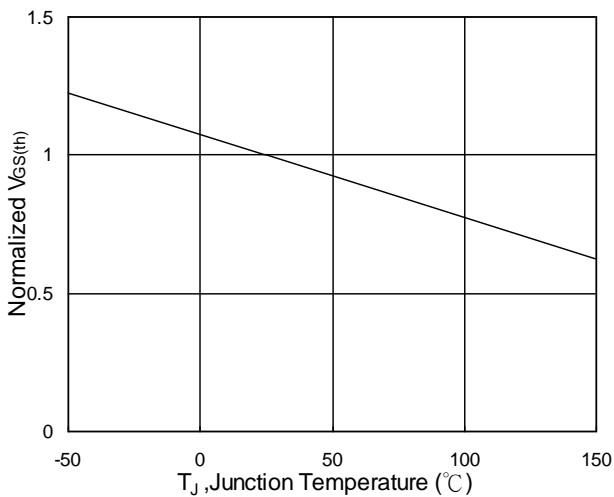


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

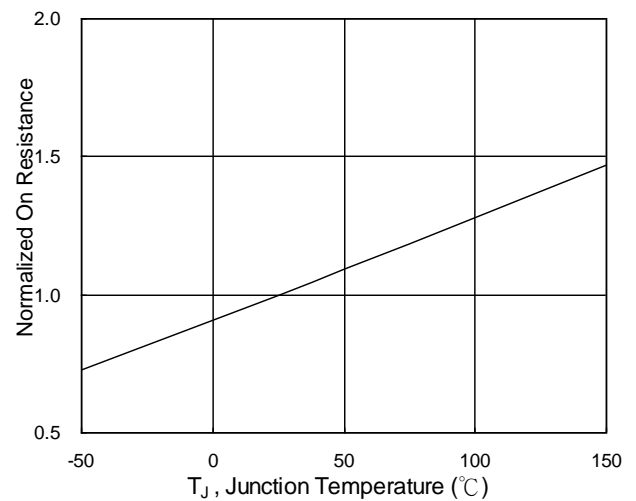


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

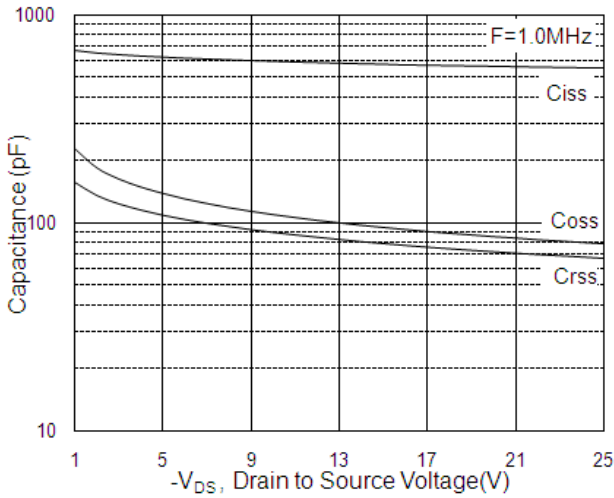


Fig.7 Capacitance

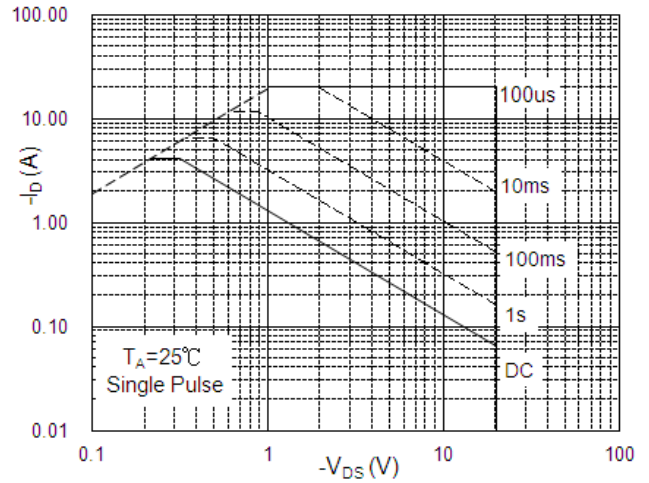


Fig.8 Safe Operating Area

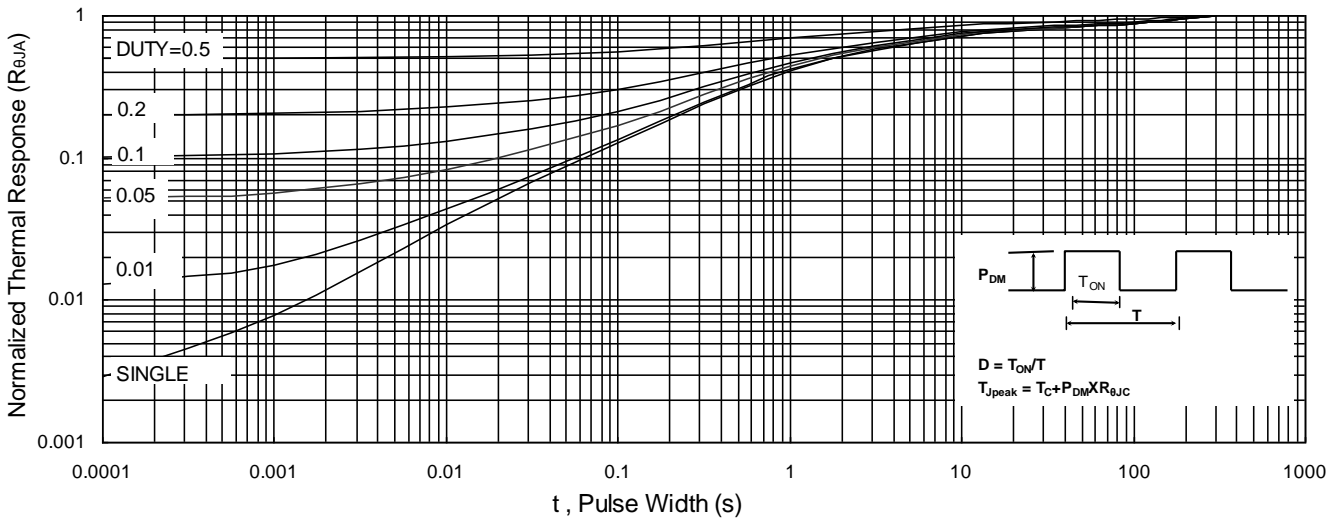


Fig.9 Normalized Maximum Transient Thermal Impedance

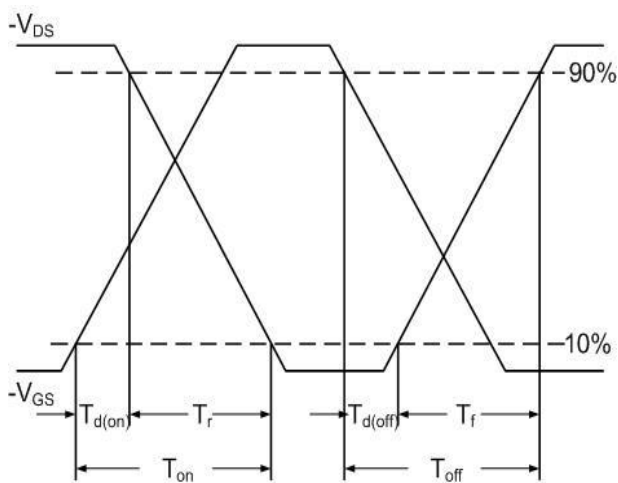


Fig.10 Switching Time Waveform

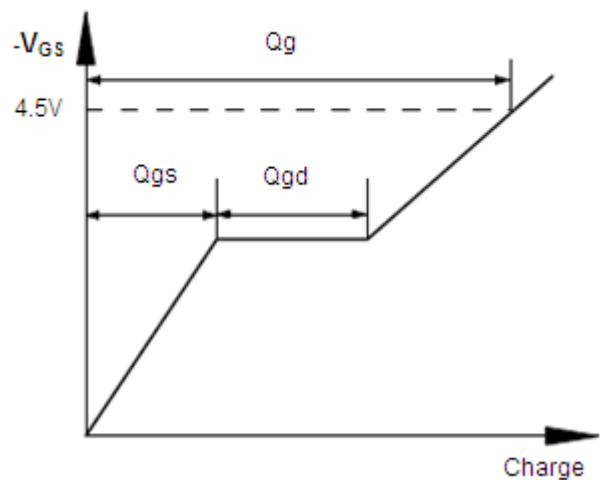
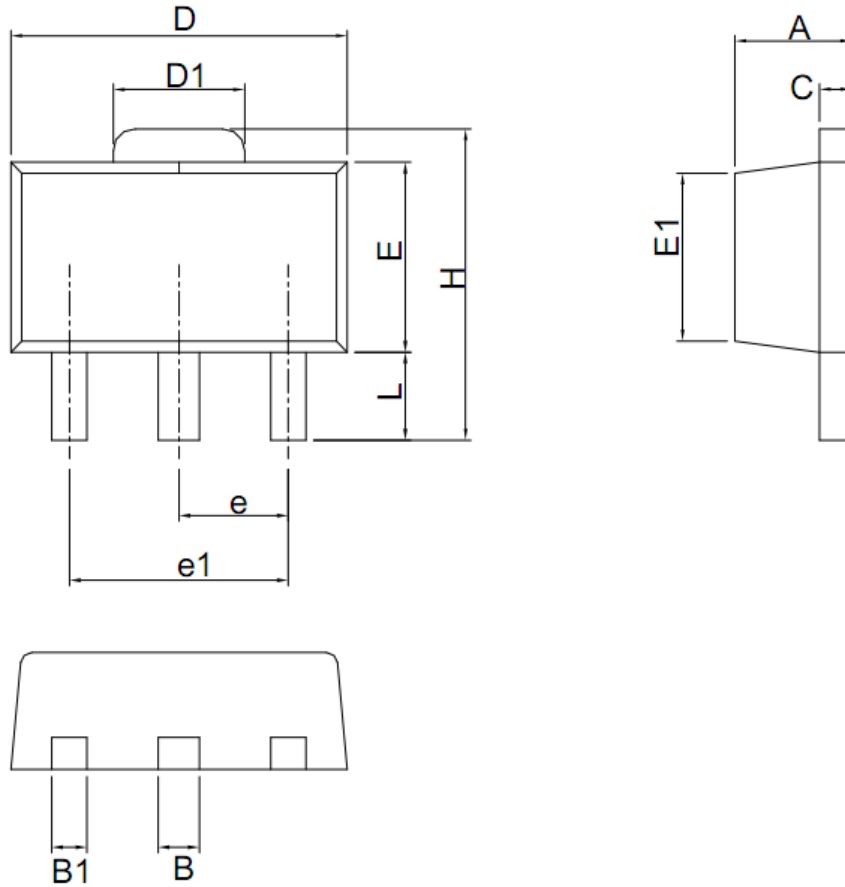


Fig.11 Gate Charge Waveform

SOT89 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	1.40	1.50	1.60	E	2.40	2.50	2.60
B	0.40	0.50	0.56	E1	2.10	2.20	2.30
B1	0.32	0.40	0.50	e	1.50 BSC		
C	0.35	0.40	0.44	e1	3.00 BSC		
D	4.40	4.50	4.60	H	3.94	4.10	4.25
D1	1.40	1.60	1.80	L	0.85	1.00	1.20