

Features

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

Product Summary



V_{DS}	40	V
I_D	6	A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	40	m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	55	m Ω

Applications

- High Frequency Point-of-Load, Synchronous Buck Converter
- 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}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, V_{GS} @ 10V ¹	$I_D@T_A=25^\circ C$	6	A
Continuous Drain Current, V_{GS} @ 10V ¹	$I_D@T_A=70^\circ C$	4.8	A
Pulsed Drain Current ²	I_{DM}	24	A
Total Power Dissipation ³	$P_D@T_A=25^\circ C$	1.47	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	$R_{\theta JA}$	---	85	$^\circ C/W$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	---	48	$^\circ C/W$

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	40	---	---	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1mA	---	0.032	---	V/°C
Static Drain-Source On-Resistance ²	R _{DS(ON)}	V _{GS} =10V, I _D =4A	---	30	40	mΩ
		V _{GS} =4.5V, I _D =3A	---	40	55	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250uA	1.0	---	2.5	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		---	-4.5	---	mV/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =32V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =32V, V _{GS} =0V, T _J =55°C	---	---	5	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
Forward Transconductance	g _{fs}	V _{DS} =5V, I _D =4A	---	8	---	S
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.4	4.8	Ω
Total Gate Charge	Q _g	V _{DS} =15V, V _{GS} =4.5V, I _D =3A	---	5	---	nC
Gate-Source Charge	Q _{gs}		---	1.54	---	
Gate-Drain Charge	Q _{gd}		---	1.84	---	
Turn-On Delay Time	T _{d(on)}	V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =1A	---	7.8	---	ns
Rise Time	T _r		---	2.1	---	
Turn-Off Delay Time	T _{d(off)}		---	29	---	
Fall Time	T _f		---	2.1	---	
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	452	---	pF
Output Capacitance	C _{oss}		---	51	---	
Reverse Transfer Capacitance	C _{rss}		---	38	---	

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	---	---	6	A
Pulsed Source Current ^{2,4}	I _{SM}		---	---	24	A
Diode Forward Voltage ²	V _{SD}	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V

Note:

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

Typical Characteristics

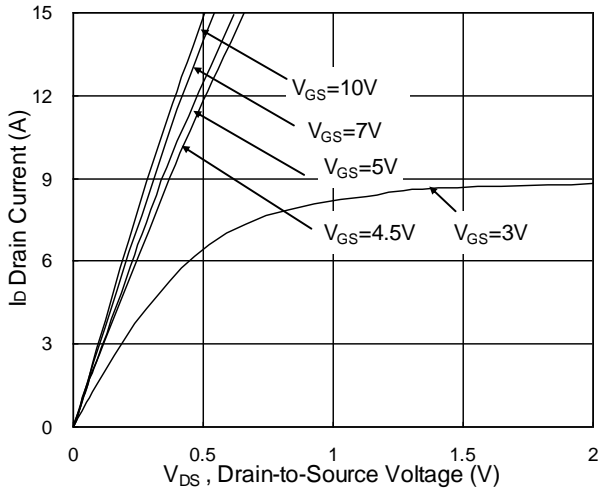


Fig.1 Typical Output Characteristics

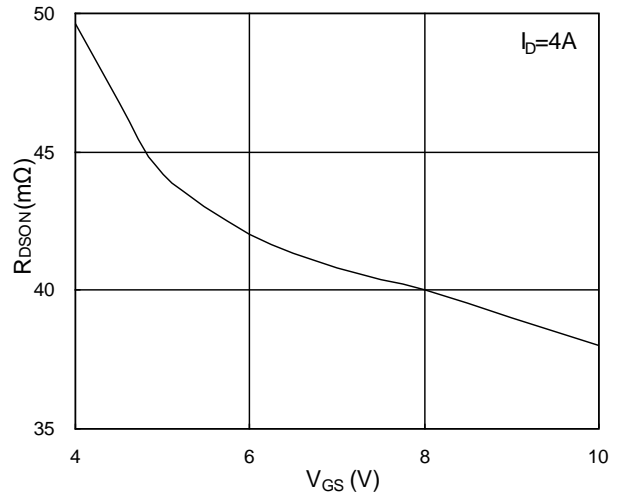


Fig.2 On-Resistance vs. Gate-Source

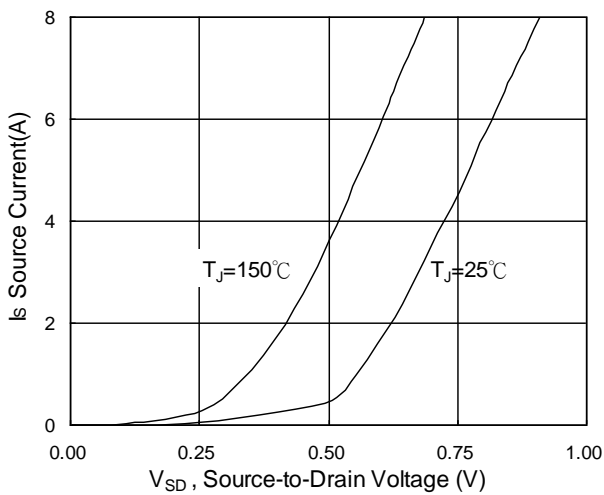


Fig.3 Forward Characteristics Of Reverse

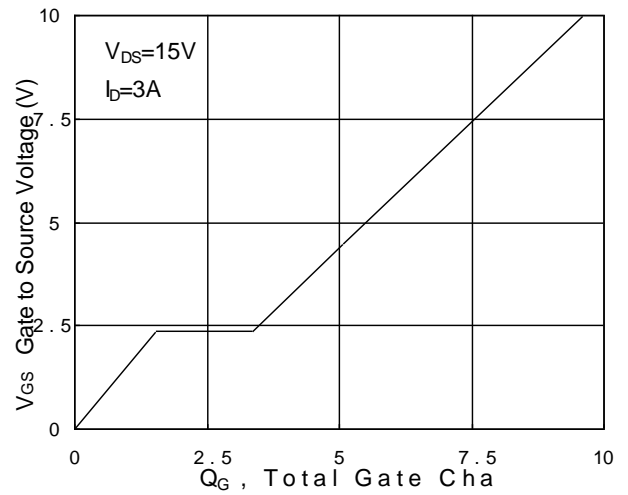


Fig.4 Gate-Charge Characteristics

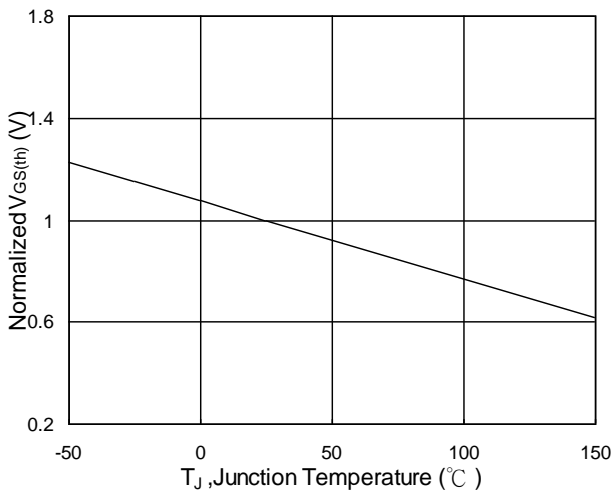


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

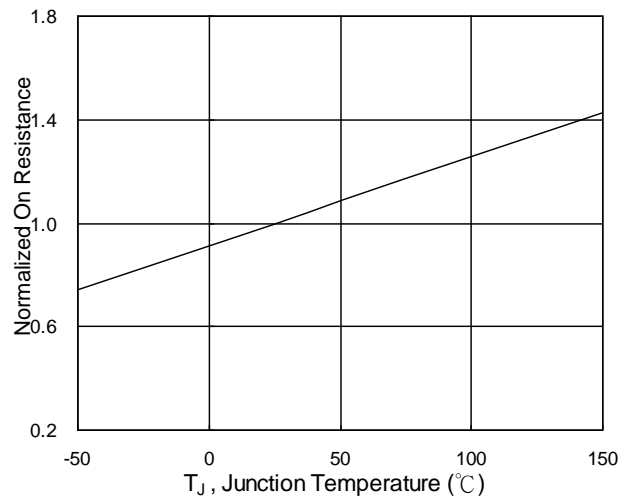


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

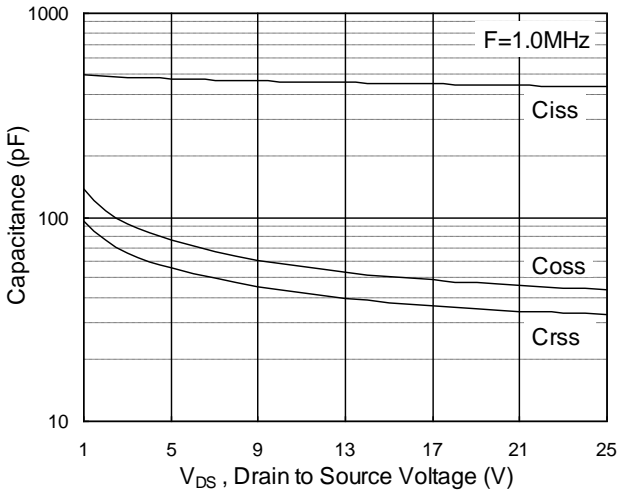


Fig.7 Capacitance

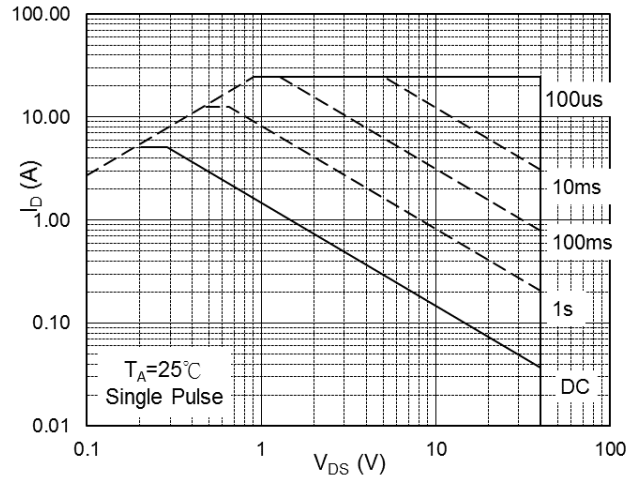


Fig.8 Safe Operating Area

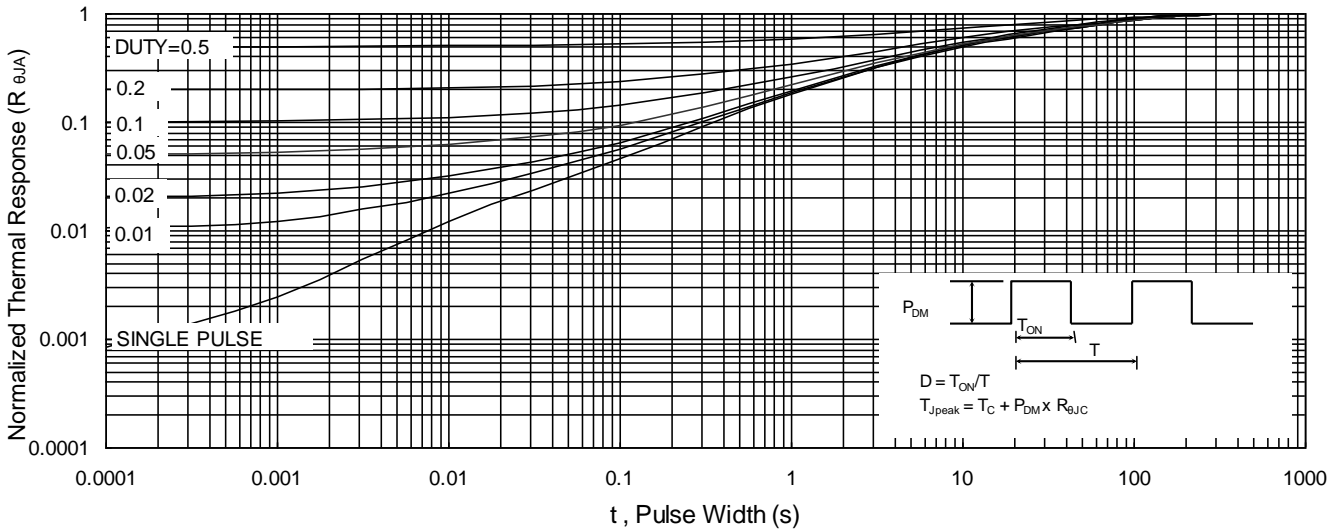


Fig.9 Normalized Maximum Transient Thermal Impedance

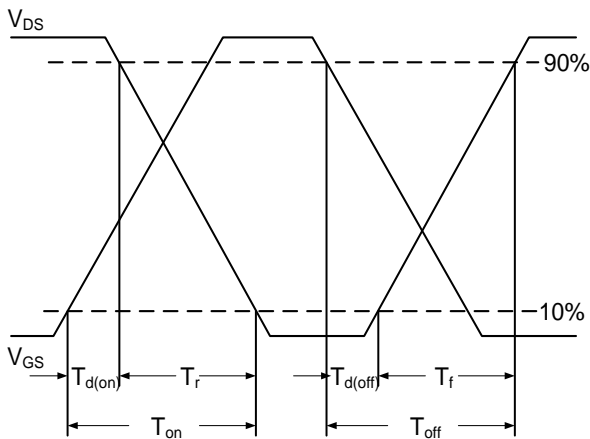


Fig.10 Switching Time Waveform

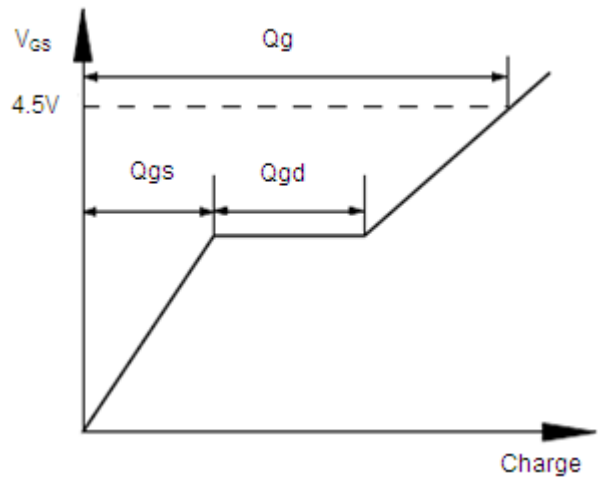
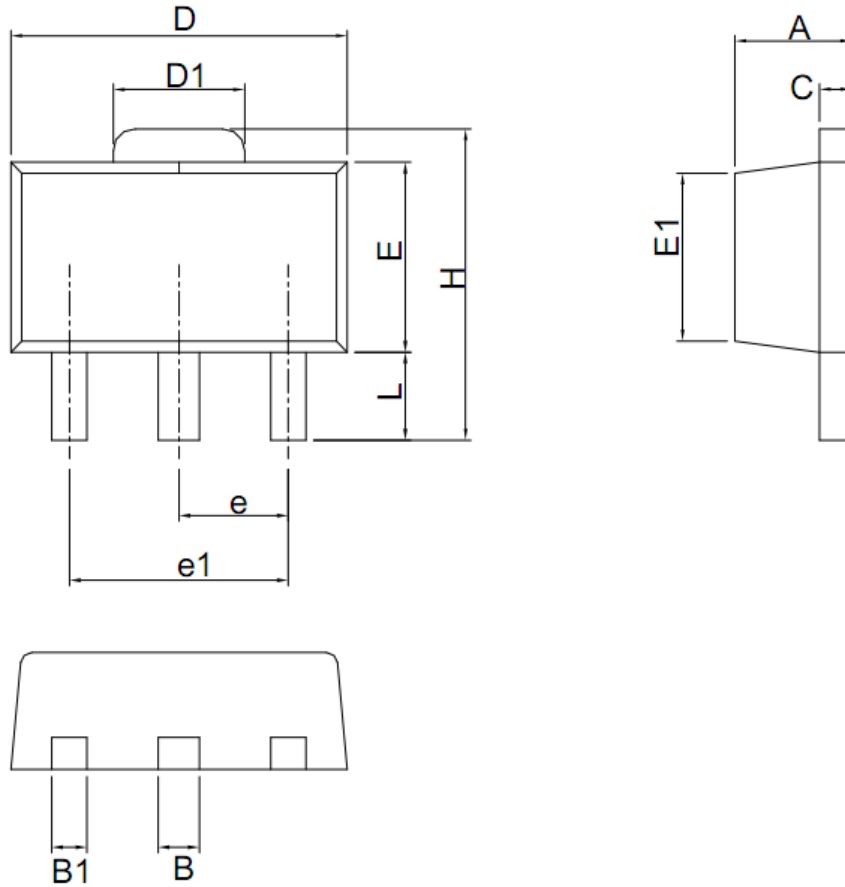


Fig.11 Gate Charge Waveform

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