P-Channel Enhancement Mode MOSFET

Features

- Low Rdson for low conduction loss
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
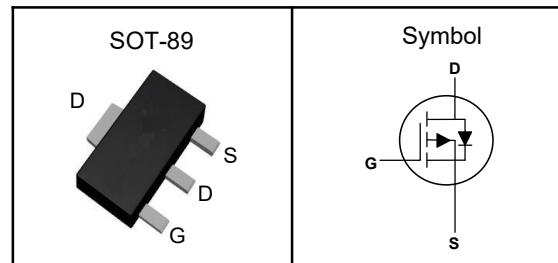
Applications

- Power Management in Desktop Computer
- DC/DC Converters

Pin Description

SOT-89	Symbol

V_{DSS}	-60	V
$R_{DS(ON)-Typ}$	65	mΩ
I_D	-4	A

Absolute Maximum Ratings (T$_A$=25℃, Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-Source Voltage	-60	V
V_{GSS}	Gate-Source Voltage	±20	V
T_J	Maximum Junction Temperature	-55 to 150	℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
I_{DM}[①]	Pulse Drain Current Tested	-12	A
I_D	Continuous Drain Current	-4	A
P_D	Maximum Power Dissipation	1.6	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{θJA}$	Thermal Resistance-Junction to Ambient	80	℃/W

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150℃.

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

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Electrical Characteristics (T_J=25℃, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
		Static Electrical Characteristics				
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	-60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V	---	---	-1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=-250uA	-1.2	---	-3.0	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	---	---	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=-10V, I_D=-4A	---	65	72	mΩ
		V_{GS}=-4.5V, I_D=-2A	---	87	98	mΩ
		Dynamic Characteristics[5]				
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, Freq.=1MHz	---	648	---	pF
C_{oss}	Output Capacitance		---	76	---	
C_{rss}	Reverse Transfer Capacitance		---	66	---	
$T_{d(on)}$	Turn-on Delay Time	V_{GS}=-10V,V_{DS}=-15V, I_D=-1A,R_G=6Ω	---	8	---	nS
T_r	Turn-on Rise Time		---	13	---	
$T_{d(off)}$	Turn-off Delay Time		---	26	---	
T_f	Turn-off Fall Time		---	7	---	
Q_g	Total Gate Charge	V_{GS}=-10V,V_{DS}=-15V, I_D=-4.4A	---	13	---	nC
Q_{gs}	Gate-Source Charge		---	1.3	---	
Q_{gd}	Gate-Drain Charge		---	3	---	
		Source-Drain Characteristics				
V_{SD}[4]	Diode Forward Voltage	I_S=-2A, V_{GS}=0V	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	I_F=4.4A, dI$_F$/dt=100A/us	---	13	---	nS
Q_{rr}	Reverse Recovery Charge		---	7	---	nC

Note ④： Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

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Typical Characteristics

Power Dissipation

$T_A = 25^{\circ}C$

Drain Current

$T_A = 25^{\circ}C, V_G = -10V$

Output Characteristics

$V_{GS} = -4, -5, -6, -7, -8, -9, -10V$
-3V
-2.5V
-2V

Drain-Source On Resistance

$V_{GS} = -4.5V$
$V_{GS} = -10V$

Gate-Source On Resistance

$I_{DS} = -4.4A$

Gate Threshold Voltage

$I_{DS} = -250\mu A$
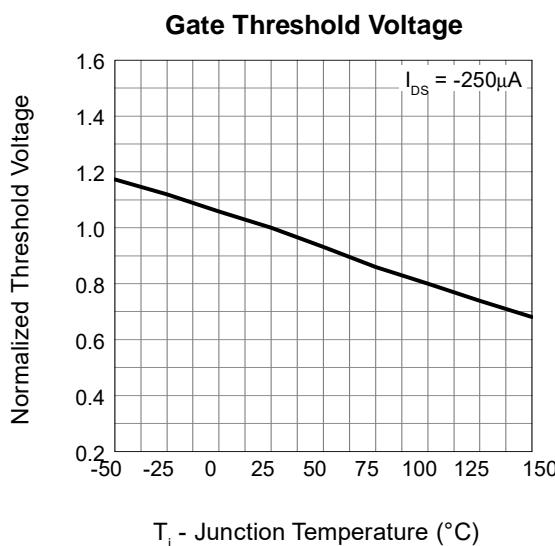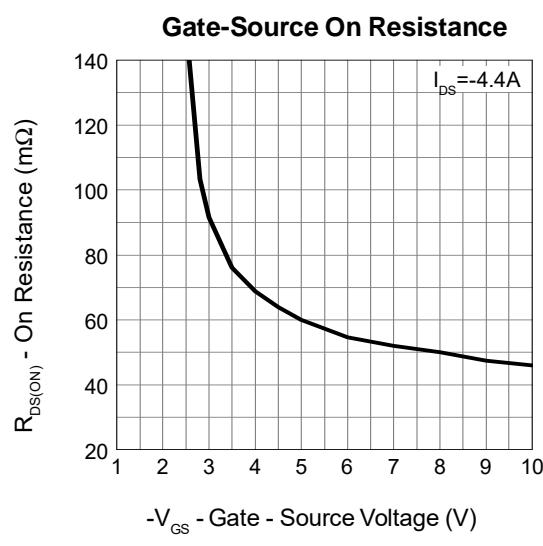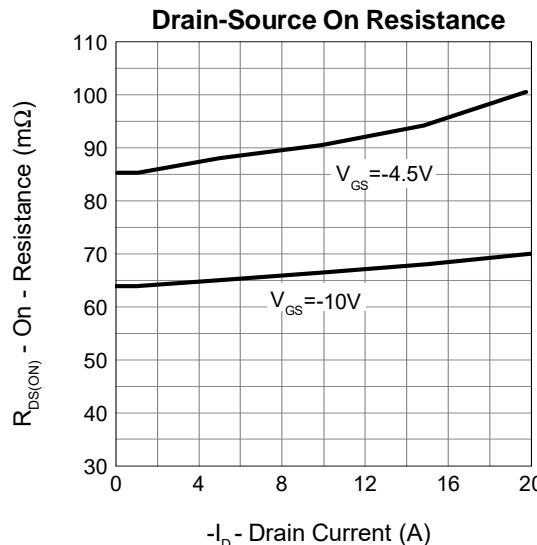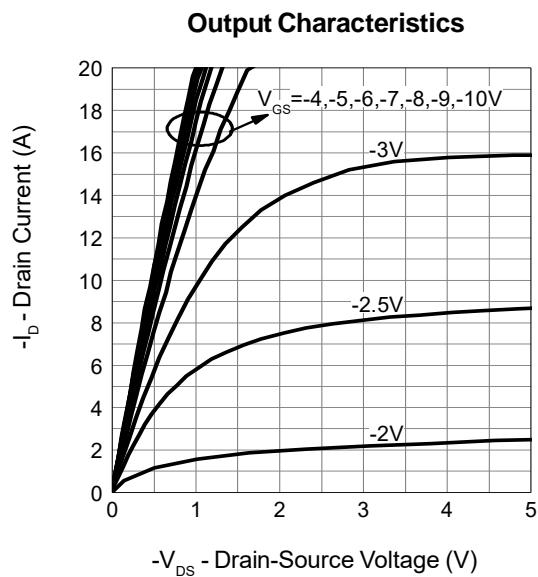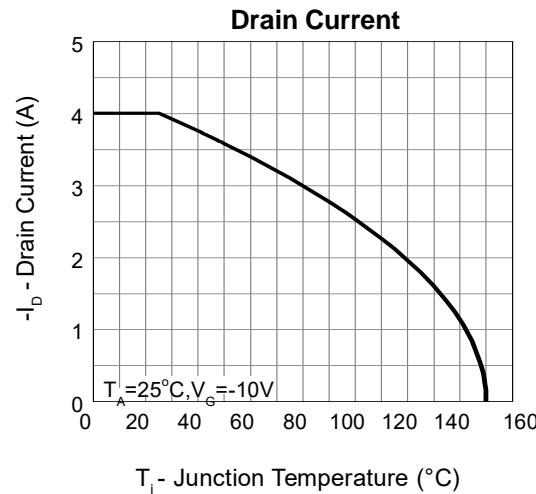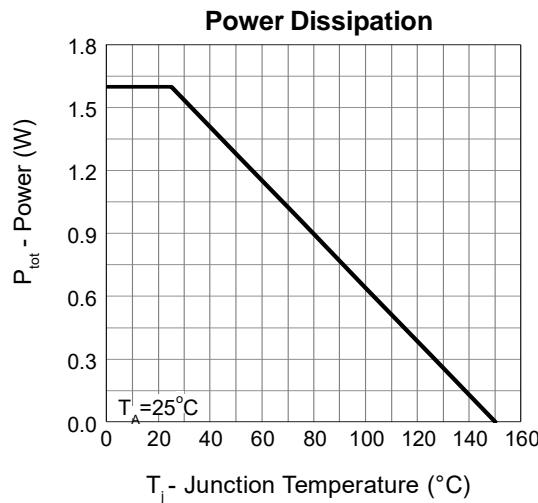
P-Channel Enhancement Mode MOSFET

Drain-Source On Resistance

V_{GS} = -10V
I_{DS} = -4.4A

R_{ON}@T_j=25°C: 46mΩ

Normalized On Resistance

T_j- Junction Temperature (°C)
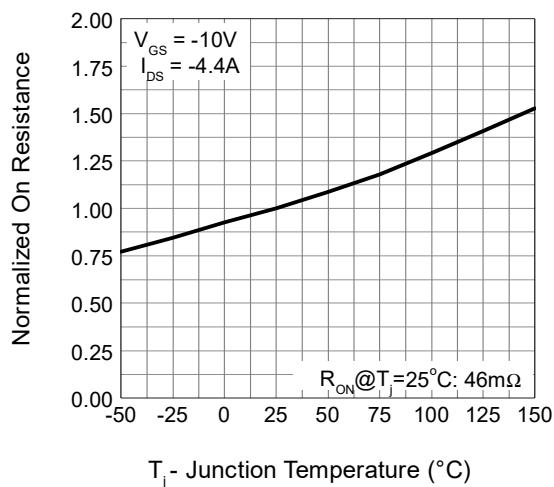
Source-Drain Diode Forward

T_j=150°C

T_j=25°C

-I^S - Source Current (A)

-V_{SD} - Source - Drain Voltage (V)

Capacitance

Frequency=1MHz

Ciss

Crss

Coss

C - Capacitance (pF)

-V_{DS} - Drain - Source Voltage (V)

Gate Charge

V_{DS} = -10V
I_{DS} = -4.4A

-V_{GS} - Gate - source Voltage (V)

Q_G - Gate Charge (nC)

Safe Operation Area

Rds(on) Limit

300μs
1ms
10ms
100ms
1s
DC

T_A=25°C

-I_D - Drain Current (A)

-V_{DS} - Drain - Source Voltage (V)
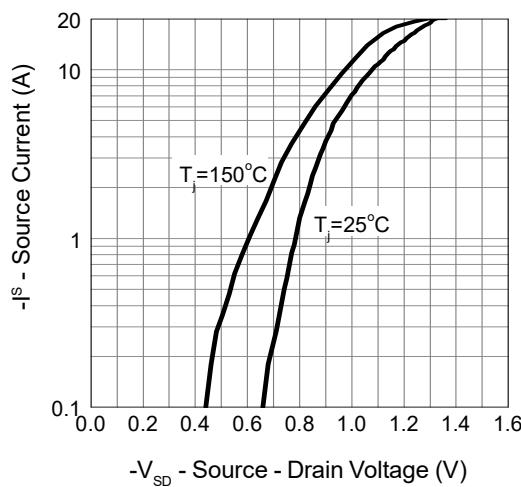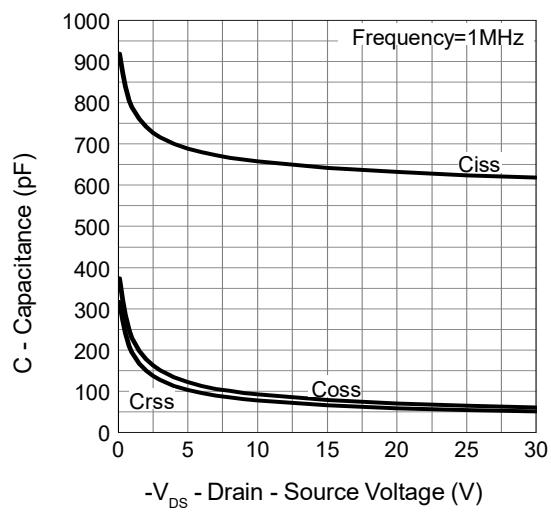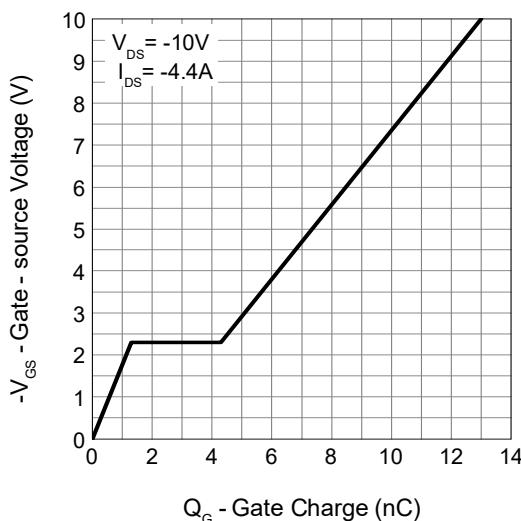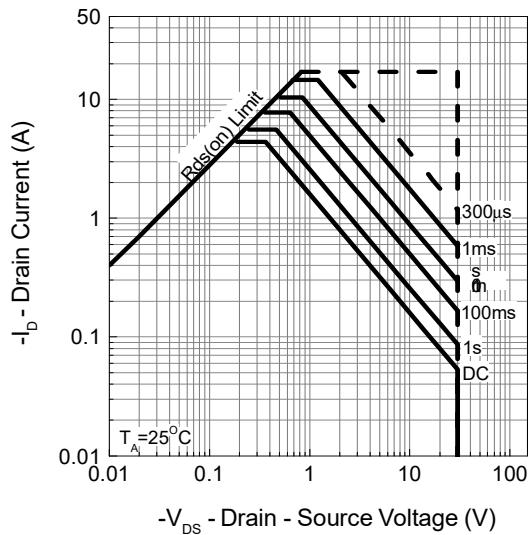
Thermal Transient Impedance

Duty = 0.5
0.2
0.1
0.05
0.02
0.01

Single Pulse

Mounted on 1in² pad
$R_{θJA}$:80°C/W

Normalized Transient Thermal Resistance

Square Wave Pulse Duration (sec)
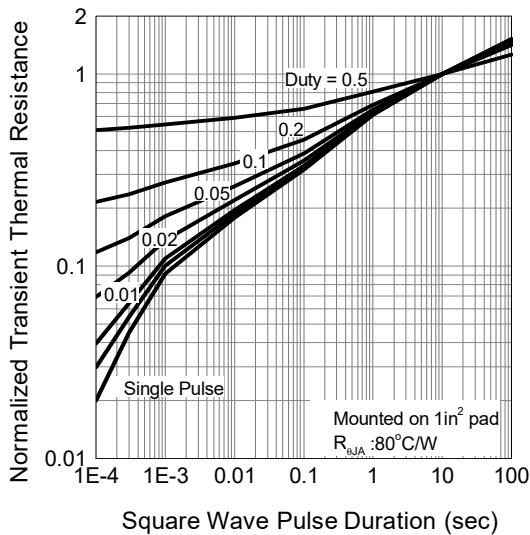
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SOT-89 Package Outline Data

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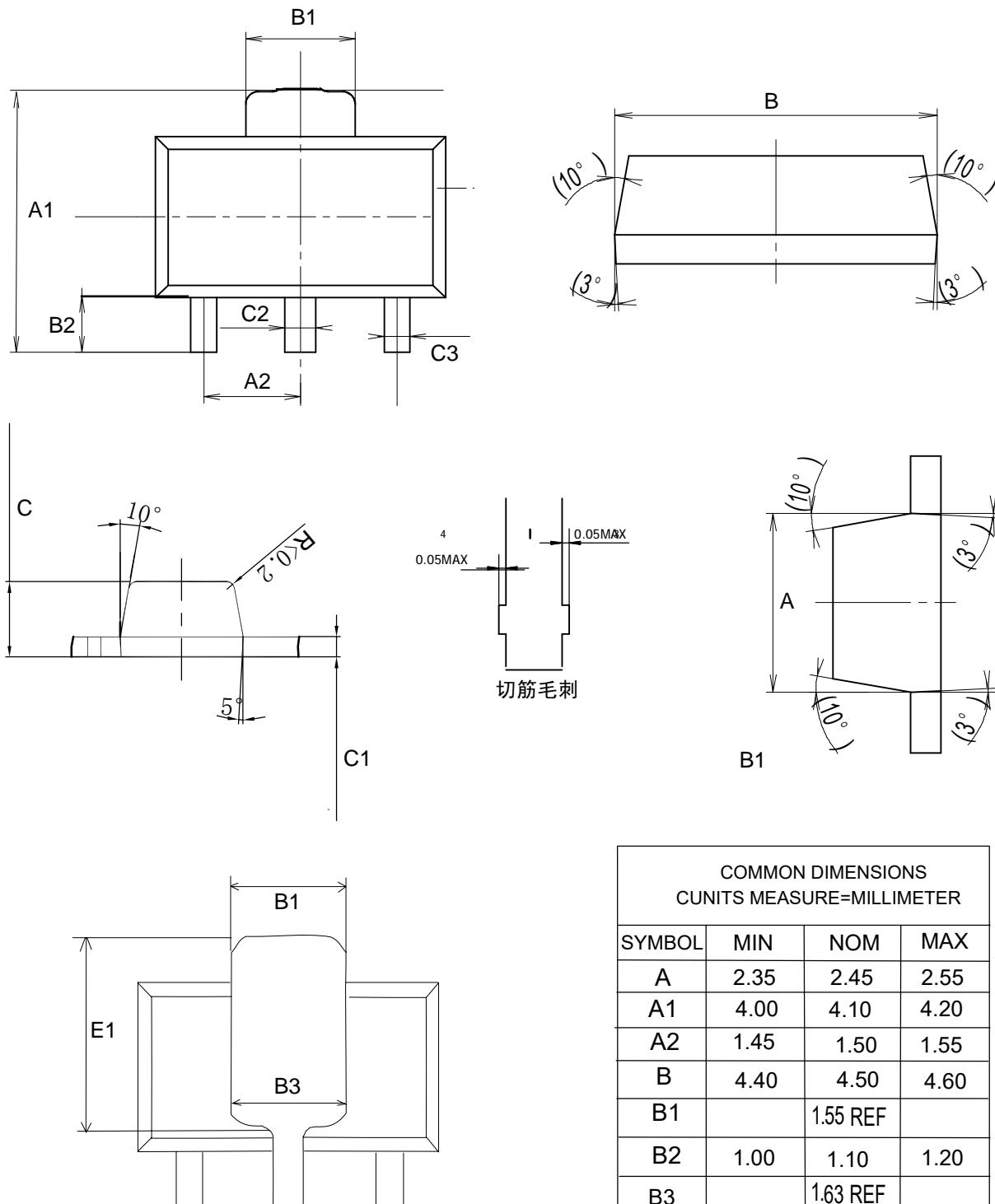
COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	2.35	2.45	2.55
A1	4.00	4.10	4.20
A2	1.45	1.50	1.55
B	4.40	4.50	4.60
B1		1.55 REF	
B2	1.00	1.10	1.20
B3		1.63 REF	
C	1.45	1.50	1.55
C1	0.39	0.40	0.41
C2	0.4	0.48	0.55
C3	0.35	0.4	0.45
E1	2.65	2.75	2.85