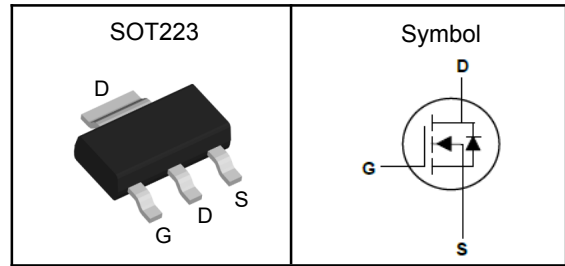# N-Channel Enhancement Mode MOSFET

Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant
- 100% UIS and Rg Tested

Applications

- Power Management in Desktop Computer
- DC/DC Converters

Pin Description

SOT223	Symbol

V_{DSS}	100	V
$R_{DS(ON)\text{-}Typ}$	38	$m\Omega$
I_D	6	A

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

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		100	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		24	A
I_D	Continuous Drain Current	T_A=25°C	6	A
P_D	Maximum Power Dissipation	T_A=25°C	1.5	W
EAS	Single Pulse Avalanche Energy		11.3	mJ
I_{AS}	Avalanche Current		15	A

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient₁ （Max）	70	℃/W

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

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

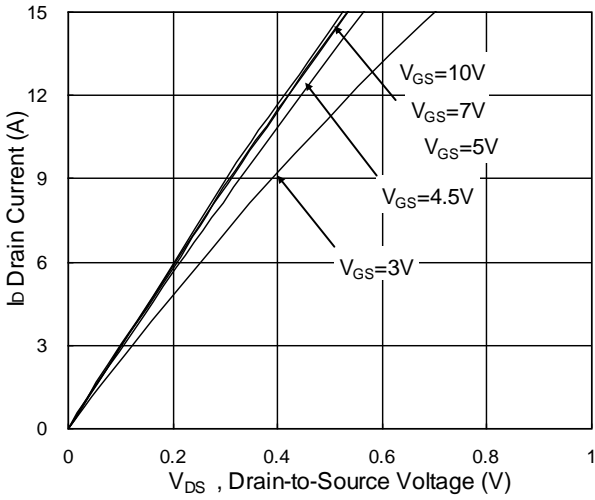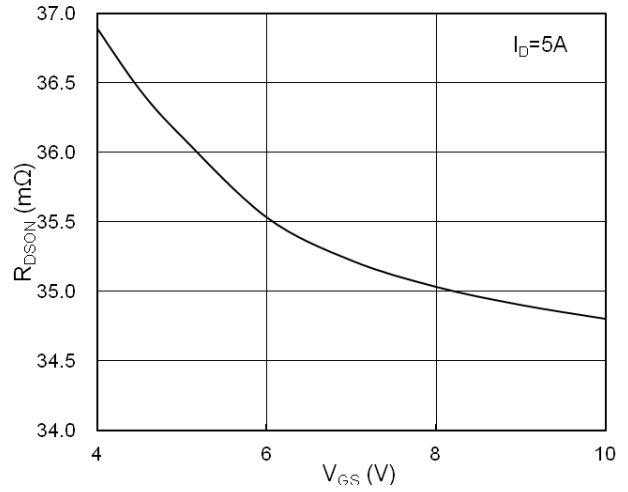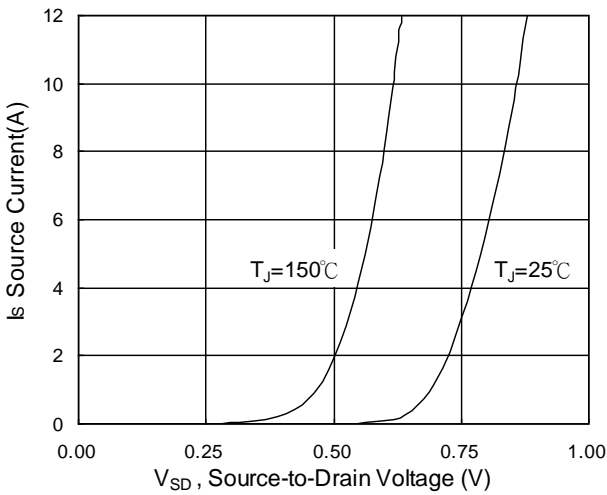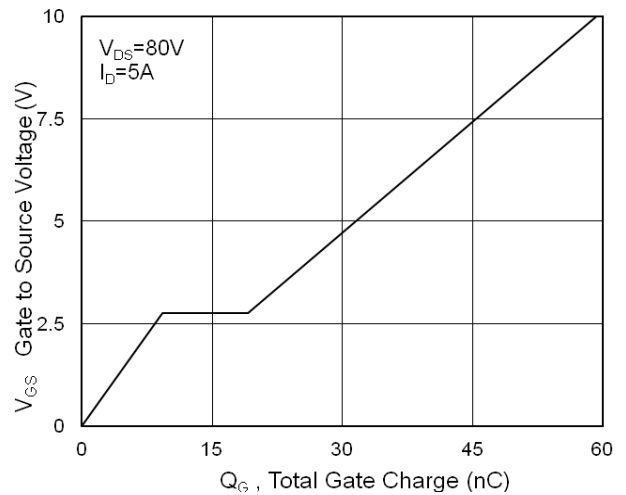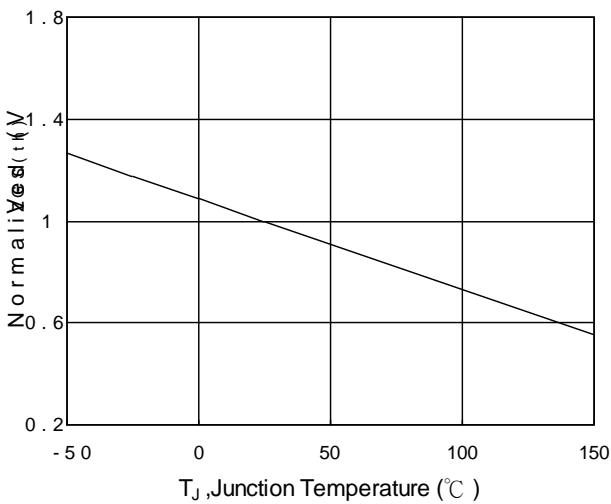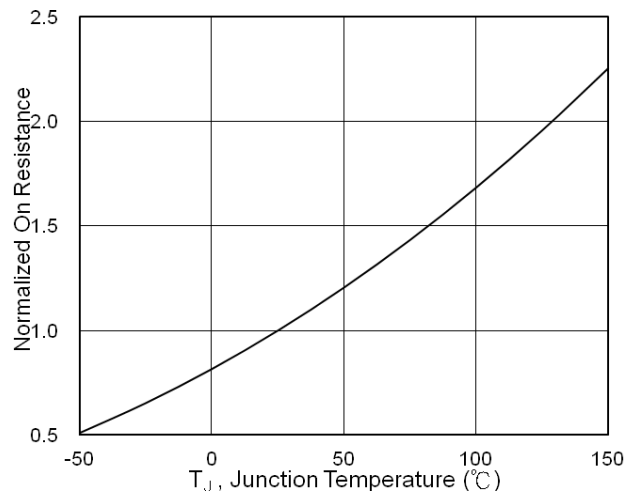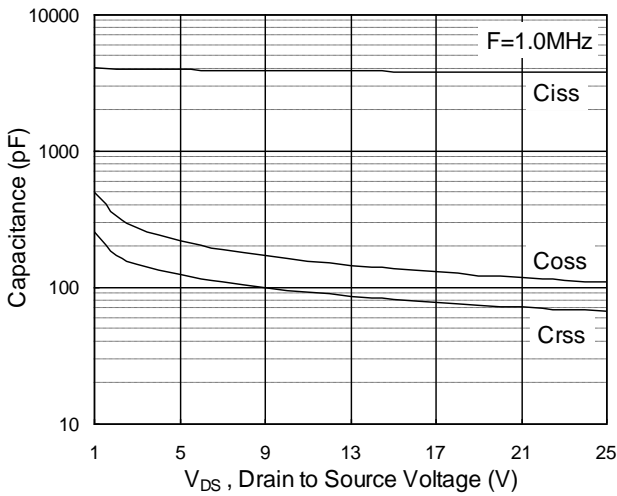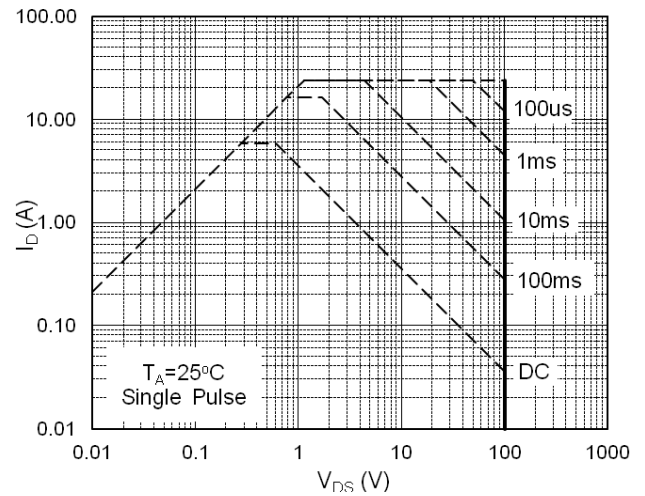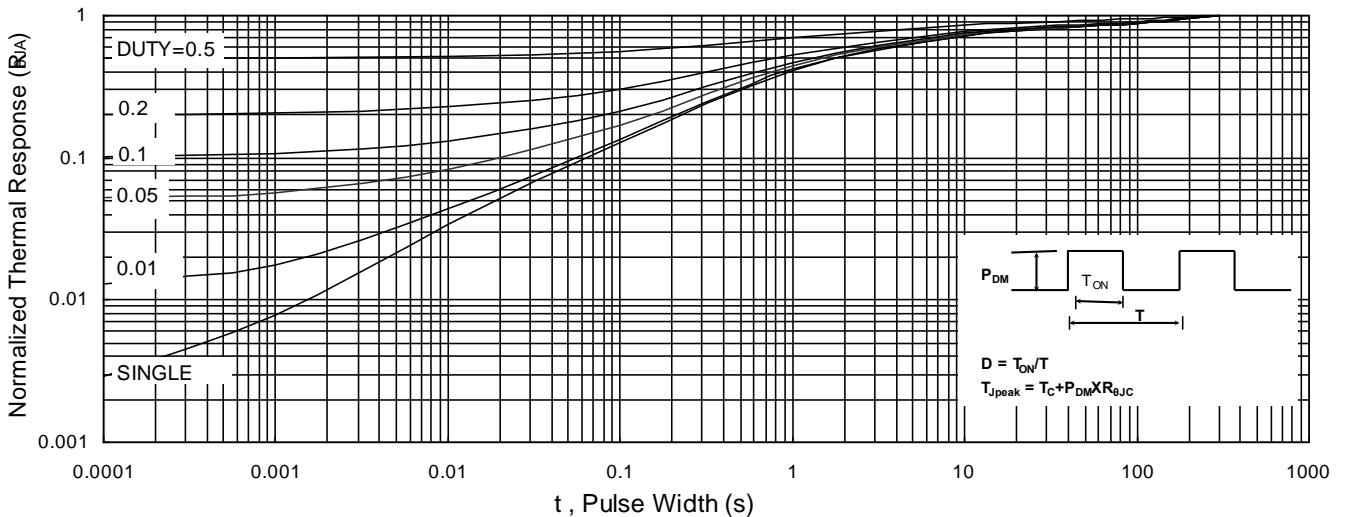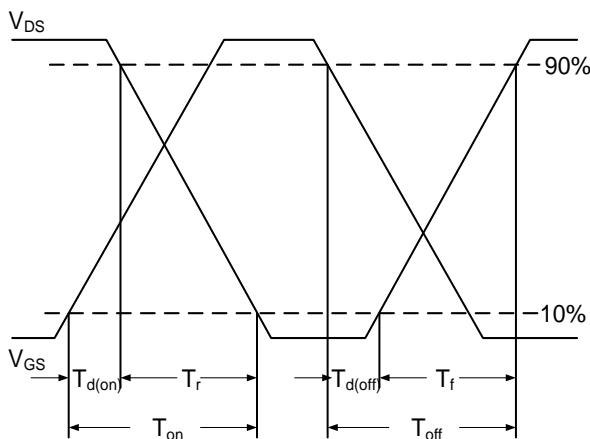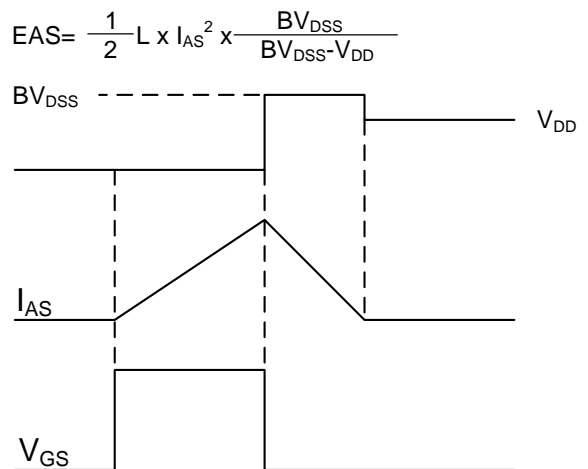Note ③ : Surface Mounted on 1in^2 FR-4 board with 1oz.

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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	100	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=80V, V$_{GS}$=0V	---	---	1	uA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250uA	1.2	---	2.5	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$_D$=5A	---	38	47	mΩ
		V$_{GS}$=4.5V , I$_D$=5A	---	40	50	
Dynamic Characteristics⑤						
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=15V, Freq.=1MHz	---	3848	---	pF
C$_{oss}$	Output Capacitance		---	137	---	
C$_{rss}$	Reverse Transfer Capacitance		---	82	---	
T$_{d(on)}$	Turn-on Delay Time	V$_{DD}$=50V , V$_{GS}$=10V , R$_G$=3.3Ω, I$_D$=3A	---	10.8	---	nS
T$_r$	Turn-on Rise Time		---	27	---	
T$_{d(off)}$	Turn-off Delay Time		---	56	---	
T$_f$	Turn-off Fall Time		---	24	---	
Q$_g$	Total Gate Charge	V$_{DS}$=80V , V$_{GS}$=10V , I$_D$=5A	---	60	---	nC
Q$_{gs}$	Gate-Source Charge		---	9.2	---	
Q$_{gd}$	Gate-Drain Charge		---	9.9	---	
Source-Drain Characteristics （T$_J$=25℃）						
V$_{SD}$	Diode Forward Voltage2	V$_{GS}$=0V , I$_S$=1A ,T$_J$=25℃	---	---	1.2	V
t$_{rr}$	Reverse Recovery Time	I$_F$=5A，di/dt=100A/μs，T$_J$=25℃	---	25	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	29	---	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

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_{DSON} vs. T_J

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Fig.7 Capacitance

Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance

$$EAS= \frac{1}{2}L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

Fig.10 Switching Time Waveform

Fig.11 Unclamped Inductive Switching Waveform

SOT223 Package Outline Data

VIEW A

Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	1.50	1.65	1.80	A1	0.02	0.06	0.10
A2	1.50	1.60	1.70	b	0.66	0.72	0.80
b2	2.90	3.00	3.10	c	0.23	0.30	0.35
D	6.30	6.50	6.70	E	6.70	7.00	7.30
E1	3.30	3.50	3.70	e	2.30 REF		
e1	4.60 REF			L	0.75	--	1.15
θ	0°	--	10°				

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Rev:A3
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