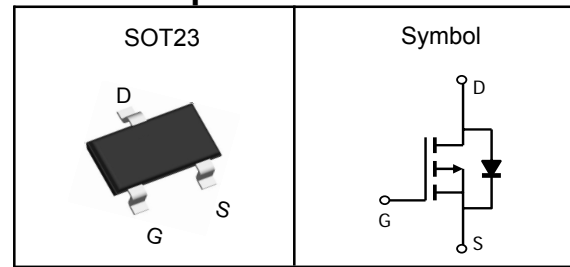


## P-Channel Enhancement Mode MOSFET

### Features

- Low R<sub>ds(on)</sub> for low conduction loss
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

### Pin Description



### Applications

- Power Management in Desktop Computer
- DC/DC Converters

V <sub>bss</sub>	-20	V
R <sub>ds(ON)-Typ</sub>	34	mΩ
I <sub>d</sub>	-4.1	A

### Absolute Maximum Ratings (T<sub>J</sub>=25°C, Unless Otherwise Noted)

Symbol	Parameter	P-Channel	Unit
V <sub>bss</sub>	Drain-Source Voltage	-20	V
V <sub>GSS</sub>	Gate-Source Voltage	±12	V
T <sub>J</sub>	Maximum Junction Temperature	-55 to 150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
I <sub>DM</sub> <sup>①</sup>	Pulse Drain Current Tested	-15	A
I <sub>d</sub>	Continuous Drain Current	-4.1	A
P <sub>D</sub>	Maximum Power Dissipation	1.7	W

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
R <sub>θJA</sub> <sup>③</sup>	Thermal Resistance-Junction to Ambient	74	°C/W

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

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

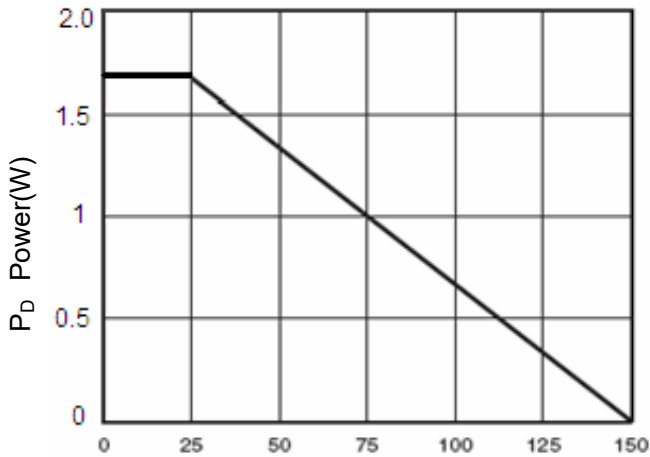
Note ③ : Surface Mounted on 1in<sup>2</sup> FR-4 board with 1oz.

**P-Channel Enhancement Mode MOSFET**
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

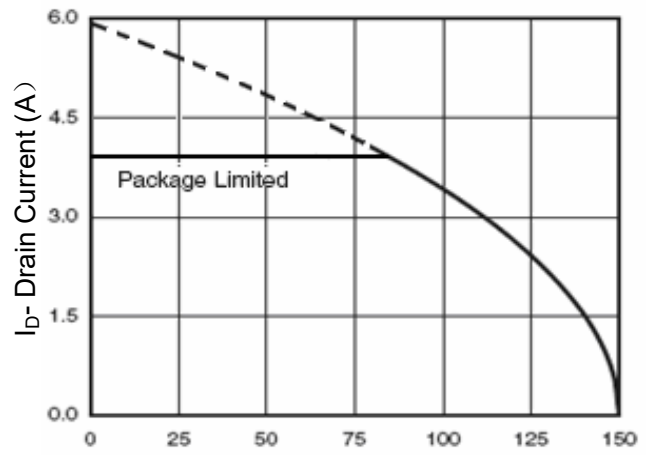
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V$	---	---	-1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	---	-1.0	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=-4.5V, I_D=-4.1A$	---	34	45	m $\Omega$
		$V_{GS}=-2.5V, I_D=-3A$	---	44	60	
$g_{fs}$	Forward Transconductance	$V_{DS}=-5V, I_D=-4.1A$	---	6	---	S
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-4V,$ Freq.=1MHz	---	740	---	pF
$C_{oss}$	Output Capacitance		---	290	---	
$C_{rss}$	Reverse Transfer Capacitance		---	190	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=-4V, R_L=1.2\Omega,$ $V_{GS}=-4.5V, R_G=1\Omega$	---	12	---	nS
$T_r$	Turn-on Rise Time		---	35	---	
$T_{d(off)}$	Turn-off Delay Time		---	30	---	
$T_f$	Turn-off Fall Time		---	10	---	
$Q_g$	Total Gate Charge	$V_{GS}=-4V, V_{DS}=-4.5V,$ $I_D=-4.1A$	---	7.8	---	nC
$Q_{gs}$	Gate-Source Charge		---	1.2	---	
$Q_{gd}$	Gate-Drain Charge		---	1.6	---	
<b>Source-Drain Characteristics</b>						
$V_{SD}$ <sup>④</sup>	Diode Forward Voltage	$I_S=-4.1A, V_{GS}=0V$	---	---	-1.2	V

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

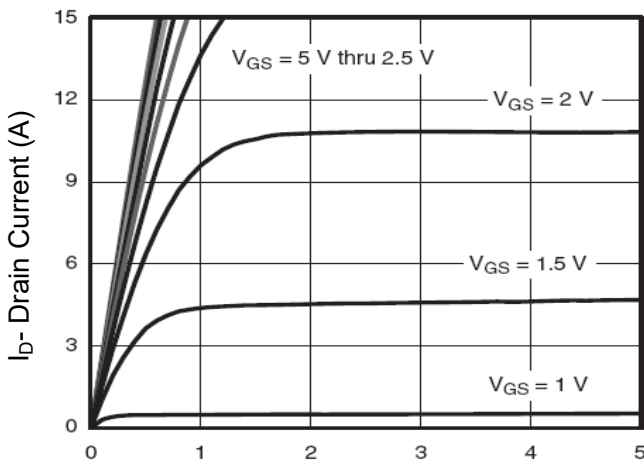
Note ⑤: Guaranteed by design, not subject to production testing.

**P-Channel Enhancement Mode MOSFET**
**Typical Characteristics**


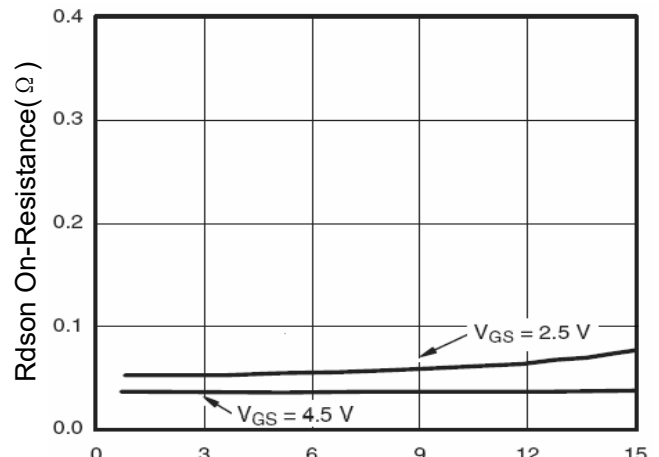
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 1 Power Dissipation**



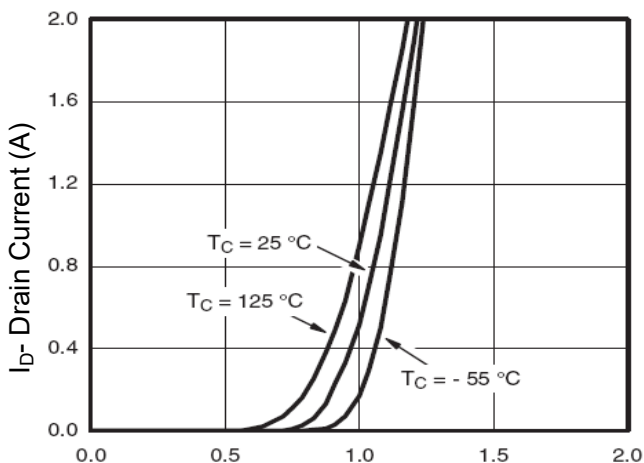
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 2 Drain Current**



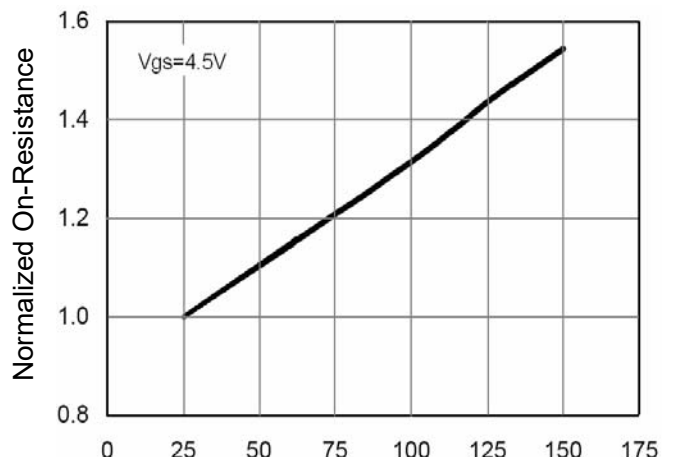
V<sub>ds</sub> Drain-Source Voltage (V)  
**Figure 3 Output Characteristics**



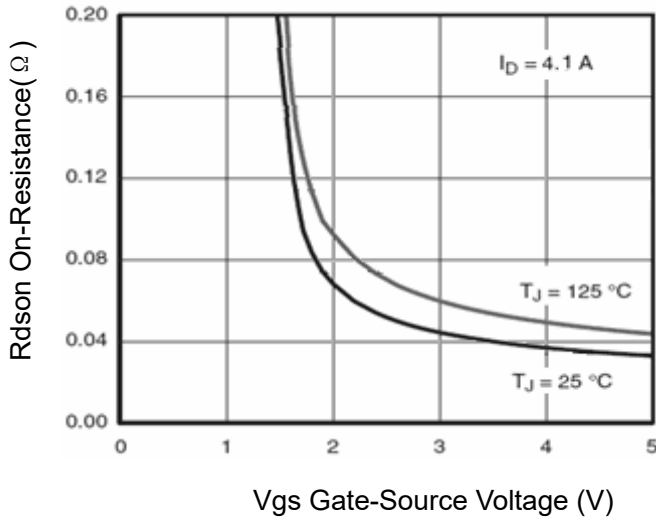
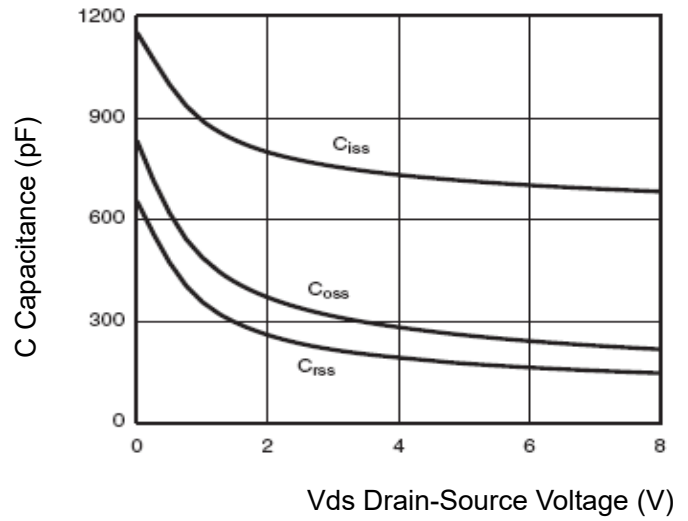
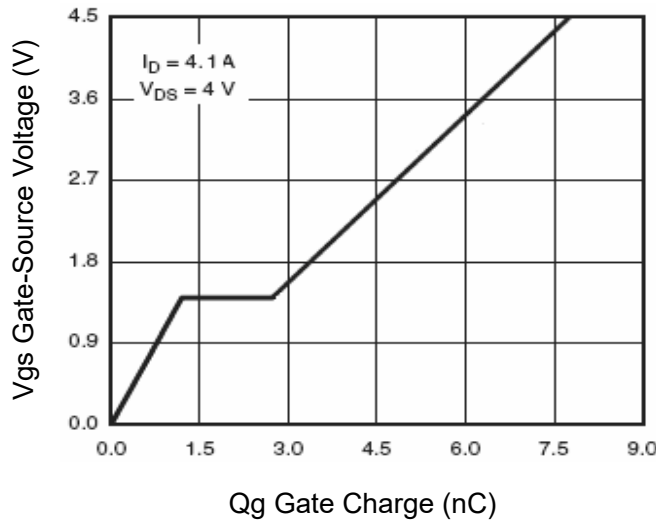
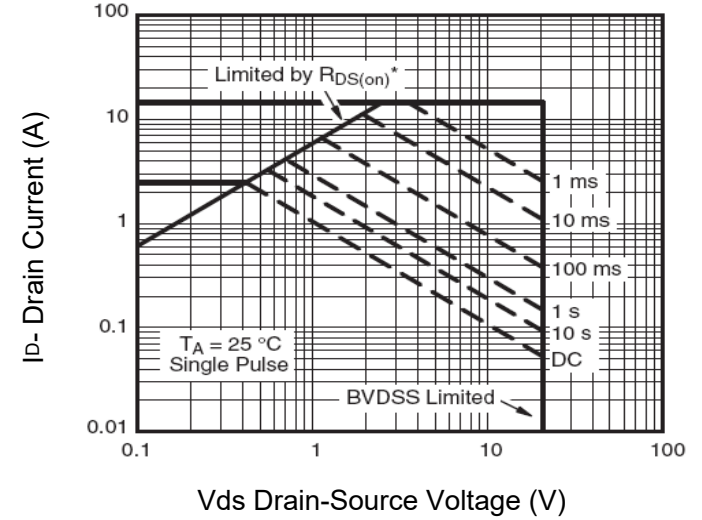
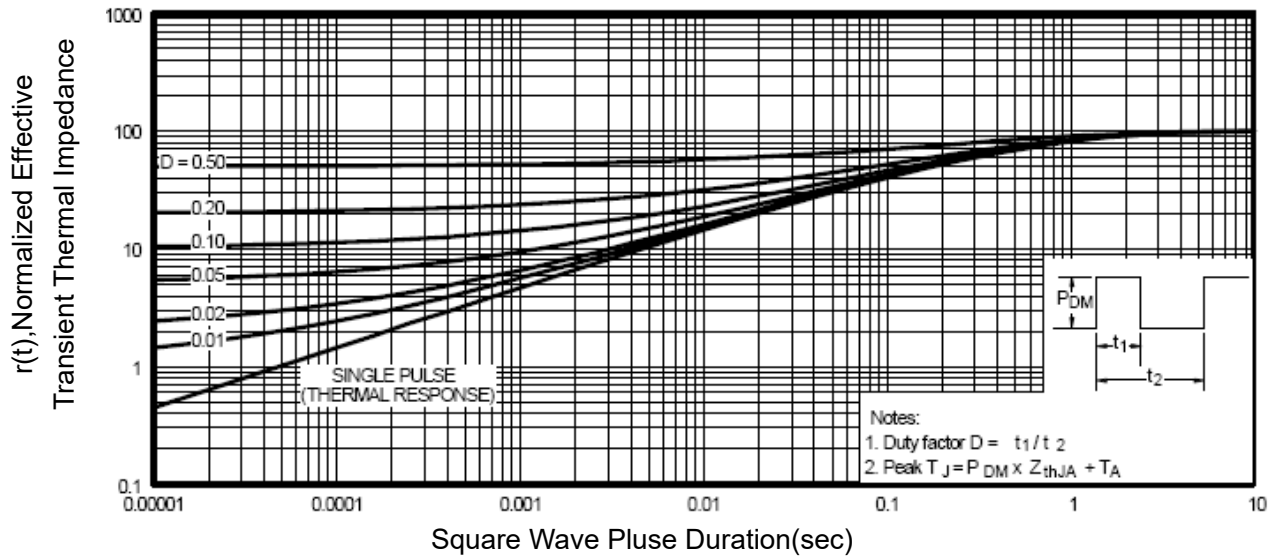
**Figure 4 Drain-Source On-Resistance**



**Figure 5 Transfer Characteristics**



**Figure 6 Drain-Source On-Resistance**

**P-Channel Enhancement Mode MOSFET**

**Figure 7 Rdson vs Vgs**

**Figure 8 Capacitance vs Vds**

**Figure 9 Gate Charge**

**Figure 10 Safe Operation Area**

**Figure 11 Normalized Maximum Transient Thermal Impedance**

**P-Channel Enhancement Mode MOSFET**
**SOT23 Package Outline Dimensions**


Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
<b>A</b>	0.90	1.05	1.20	<b>e<sub>1</sub></b>	--	0.95	--
<b>A<sub>1</sub></b>	0.01	0.05	0.10	<b>H<sub>E</sub></b>	2.10	2.40	2.50
<b>b<sub>p</sub></b>	0.38	0.42	0.48	<b>L<sub>p</sub></b>	0.40	0.50	0.60
<b>c</b>	0.09	0.13	0.15	<b>Q</b>	0.45	0.49	0.55
<b>D</b>	2.80	2.92	3.00	<b>V</b>	--	0.20	--
<b>E</b>	1.20	1.33	1.40	<b>W</b>	--	0.10	--
<b>e</b>	--	1.90	--				