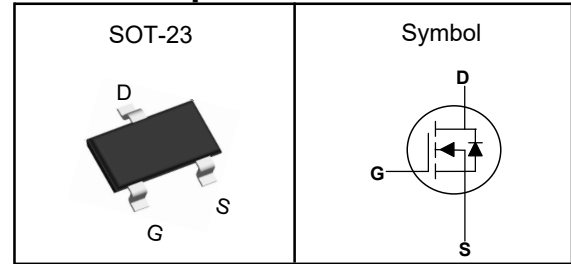


# N-Channel Enhancement Mode MOSFET

## Features

- Low  $R_{ds(on)}$  for low conduction loss
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

## Pin Description



## Applications

- Power Management in Desktop Computer
- DC/DC Converters

$V_{DSS}$	30	V
$R_{DS(ON)-Typ}$	40	m $\Omega$
$I_D$	3.6	A

## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit
$V_{DSS}$	Drain-Source Voltage	30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$T_J$	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$I_{DM}^{①}$	Pulse Drain Current Tested	15	A
$I_D$	Continuous Drain Current	3.6	A
$P_D$	Maximum Power Dissipation	1.7	W

## Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	73.5	$^\circ\text{C/W}$

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

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$ .

Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.

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

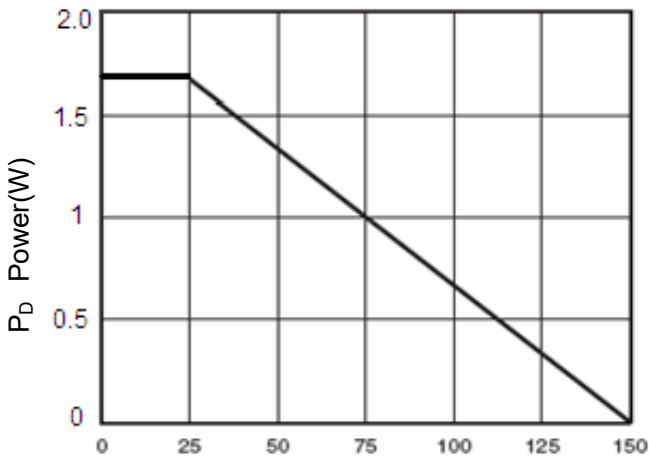
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	---	2.2	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=3.6A$	---	40	58	$m\Omega$
		$V_{GS}=4.5V, I_D=3.1A$	---	58	73	$m\Omega$
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=15V, \text{Freq.}=1\text{MHz}$	---	230	---	pF
$C_{oss}$	Output Capacitance		---	40	---	
$C_{rss}$	Reverse Transfer Capacitance		---	17	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=10V, R_G=6\Omega, V_{GS}=4.5V, I_D=3.6A$	---	10	---	nS
$T_r$	Turn-on Rise Time		---	50	---	
$T_{d(off)}$	Turn-off Delay Time		---	10	---	
$T_f$	Turn-off Fall Time		---	20	---	
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=3.6A$	---	11	---	S
$Q_g$	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V, I_D=3.6A$	---	4	---	nC
$Q_{gs}$	Gate-Source Charge		---	0.75	---	
$Q_{gd}$	Gate-Drain Charge		---	0.65	---	
<b>Source-Drain Characteristics</b> ( $T_J=25^{\circ}\text{C}$ )						
$V_{SD}$ <sup>④</sup>	Diode Forward Voltage	$I_S=2.7A, V_{GS}=0V$	---	0.8	1.2	V

Note ④ : Pulse test (pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ ).

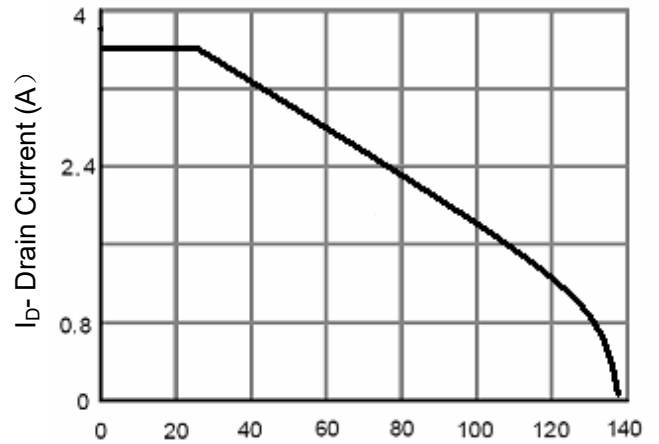
Note ⑤ : Guaranteed by design, not subject to production testing.

**N-Channel Enhancement Mode MOSFET**

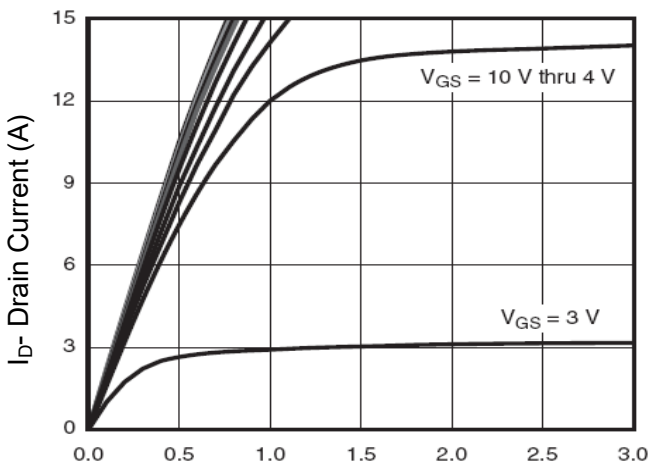
**Typical Characteristics**



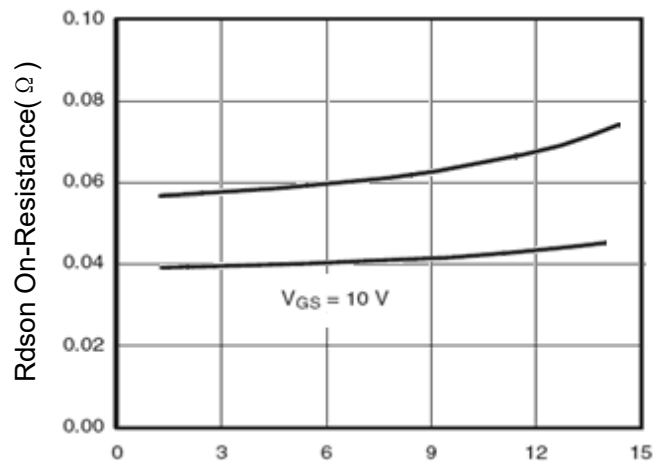
$T_J$ -Junction Temperature(°C)  
**Figure 1 Power Dissipation**



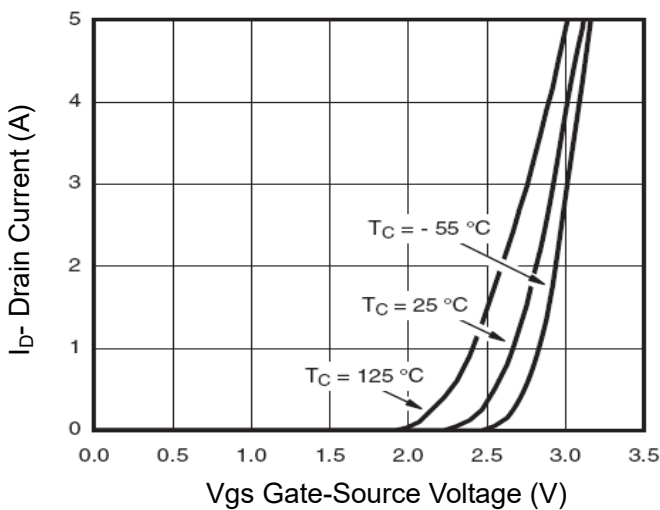
$T_J$ -Junction Temperature(°C)  
**Figure 2 Drain Current**



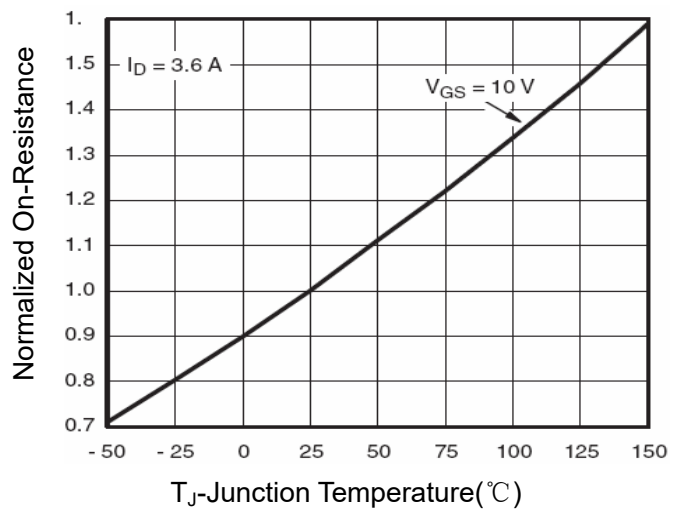
$V_{DS}$  Drain-Source Voltage (V)  
**Figure 3 Output Characteristics**



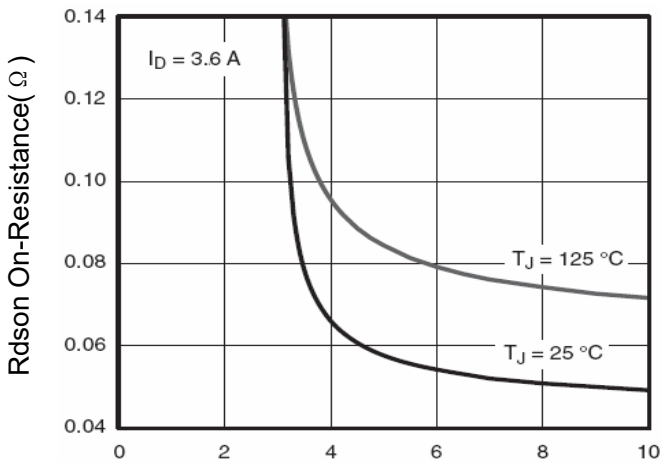
$I_D$ - Drain Current (A)  
**Figure 4 Drain-Source On-Resistance**



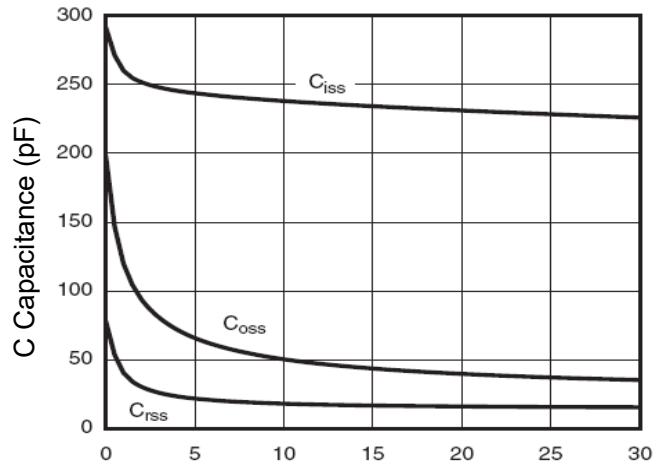
**Figure 5 Transfer Characteristics**



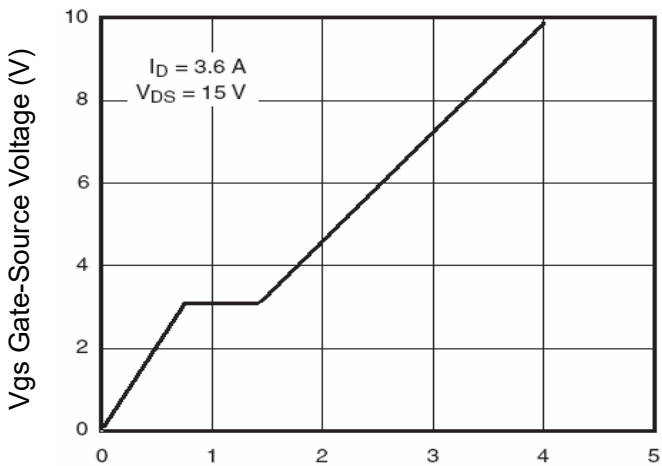
**Figure 6 Drain-Source On-Resistance**

**N-Channel Enhancement Mode MOSFET**


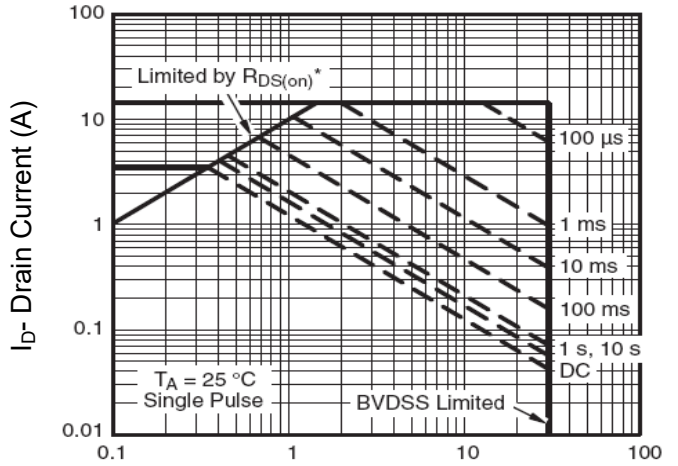
Vgs Gate-Source Voltage (V)  
**Figure 7 Rdson vs Vgs**



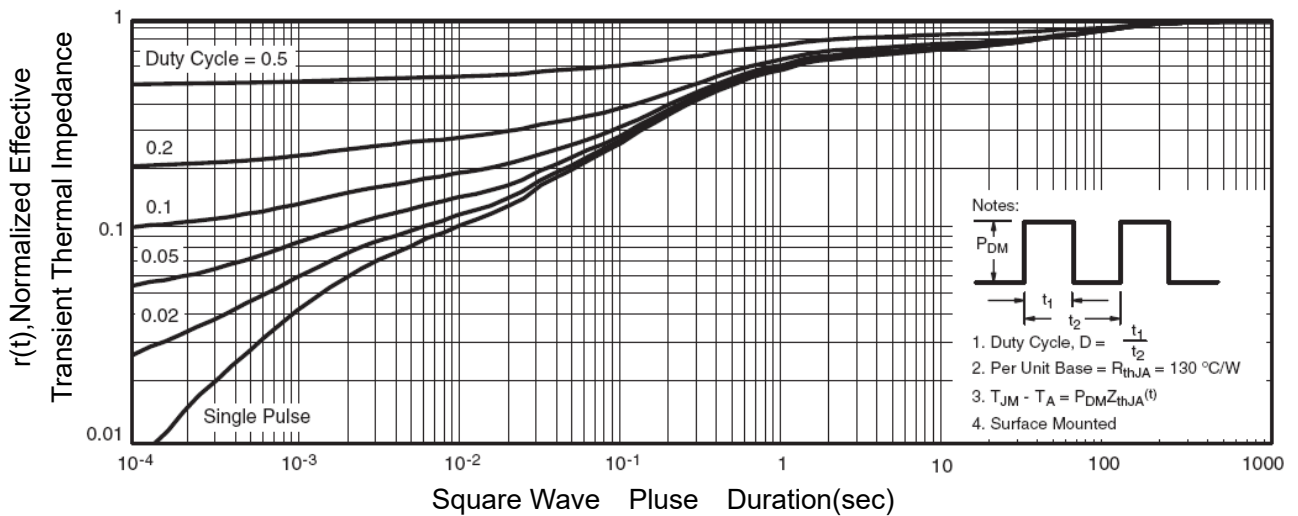
Vds Drain-Source Voltage (V)  
**Figure 8 Capacitance vs Vds**



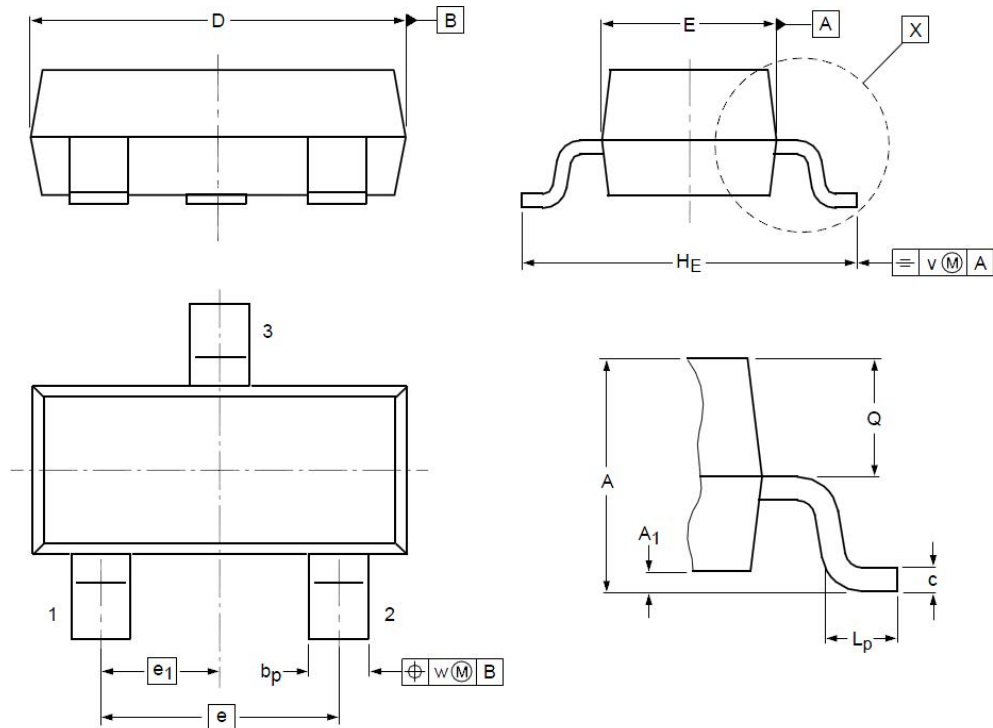
Qg Gate Charge (nC)  
**Figure 9 Gate Charge**



Vds Drain-Source Voltage (V)  
**Figure 10 Safe Operation Area**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

**N-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	--				