

N-Channel Enhancement Mode MOSFET

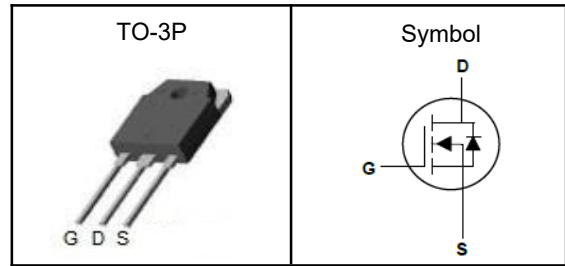
Features

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

Applications

- Power Management in Desktop Computer
- DC/DC Converters

Pin Description



V_{DSS}	500	V
$R_{DS(ON)-Typ}$	90	m Ω
I_D	40	A

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

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-Source Voltage	500	V
V_{GSS}	Gate-Source Voltage	± 30	V
T_J	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
E_{AS}	Single Pulse Avalanche Energy ^③	5000	mJ
$I_{DM}^{①}$	Pulse Drain Current Tested	160	A
I_D	Continuous Drain Current	$T_c=25^\circ\text{C}$	A
P_D	Maximum Power Dissipation	$T_c=25^\circ\text{C}$	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ^①	50	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ^①	0.27	$^\circ\text{C}/\text{W}$

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^2 FR-4 board with 1oz.



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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	500	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=500V, V_{GS}=0V$	---	---	5	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	---	4	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=23A$	---	90	110	$m\Omega$
g_{fs}	Forward Transconductance	$V_{DS}=25V, I_{BS}=23A$	---	31.5	---	S
Dynamic Characteristics ^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Freq.=1MHz	---	8.76	---	nF
C_{oss}	Output Capacitance		---	0.7	---	
C_{rss}	Reverse Transfer Capacitance		---	0.1	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=250V, R_G=10\Omega,$ $I_D=23A, V_{GS}=10V$	---	48	---	nS
T_r	Turn-on Rise Time		---	64	---	
$T_{d(off)}$	Turn-off Delay Time		---	274	---	
T_f	Turn-off Fall Time		---	100	---	
Q_g	Total Gate Charge	$V_{DD}=250V,$ $V_{GS}=10V, I_D=23A$	---	165.3	---	nC
Q_{gs}	Gate-Source Charge		---	42	---	
Q_{gd}	Gate-Drain Charge		---	34.8	---	
Source-Drain Characteristics ($T_J=25^{\circ}\text{C}$)						
V_{SD}	Diode Forward Voltage _z	$V_{GS}=0V, I_S=40A, T_J=25^{\circ}\text{C}$	---	---	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=40A, V_{GS}=0V$ $di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	338	---	nS
Q_{rr}	Reverse Recovery Charge		---	3.4	---	nC

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

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

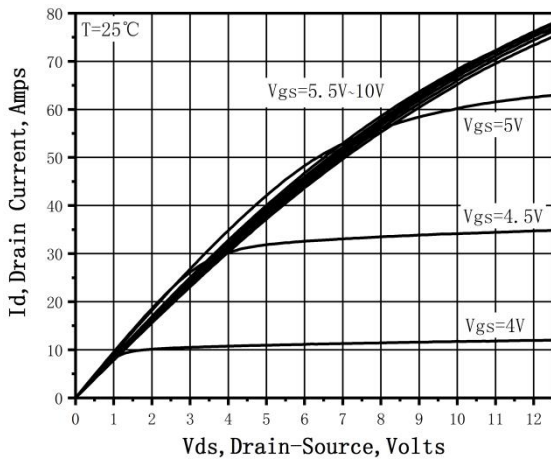
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Typical Characteristics


Figure 1. On-Region Characteristics

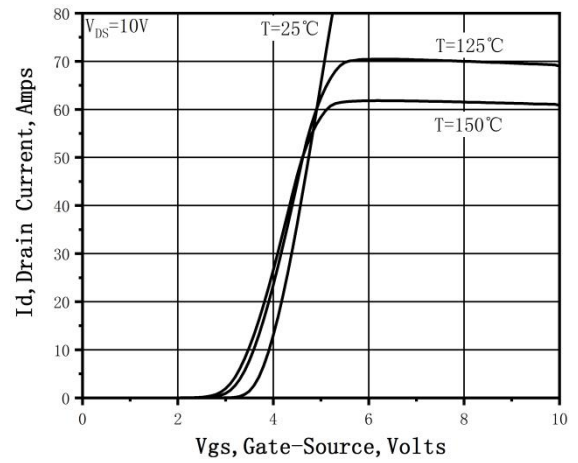


Figure 2. Transfer Characteristics

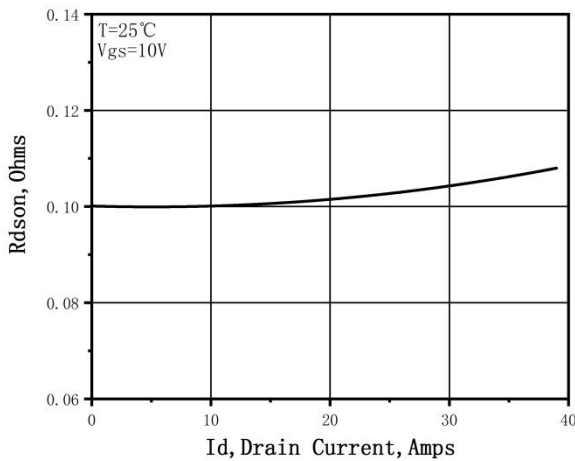


Figure 3. Static Drain-Source On Resistance

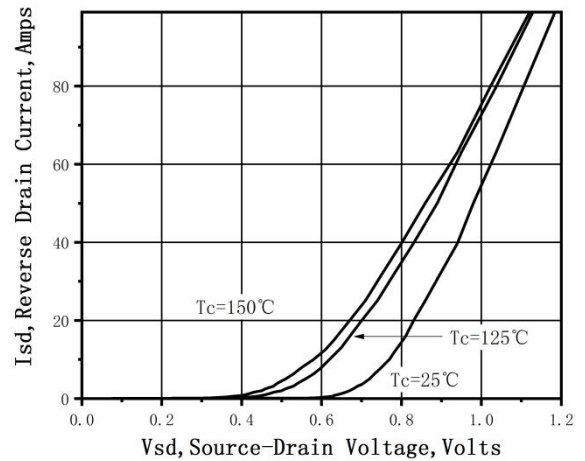
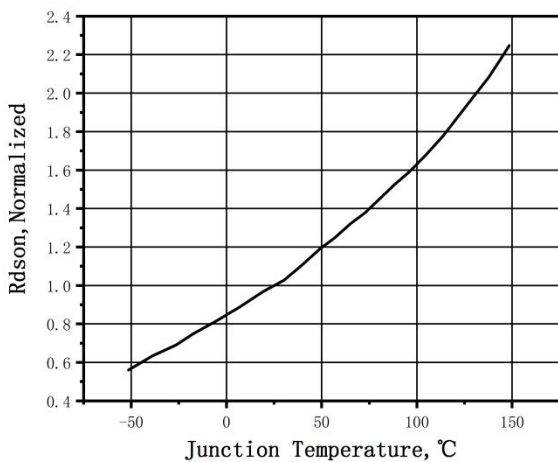
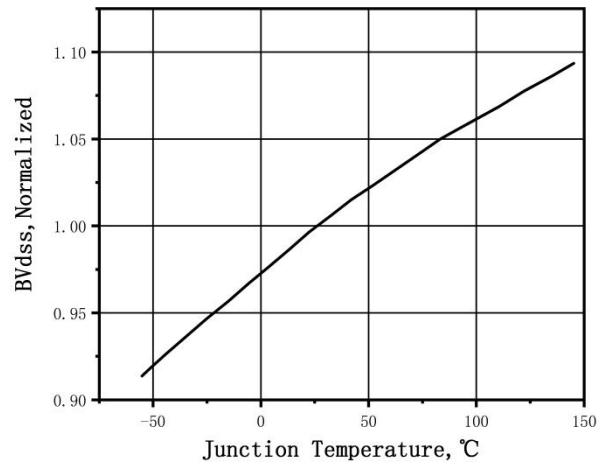


Figure 4. Typical Body Diode Transfer Characteristics


 Figure 5. Normalized $R_{DS(on)}$ vs. Temperature

 Figure 6. Normalized BV_{DSS} vs. Temperature

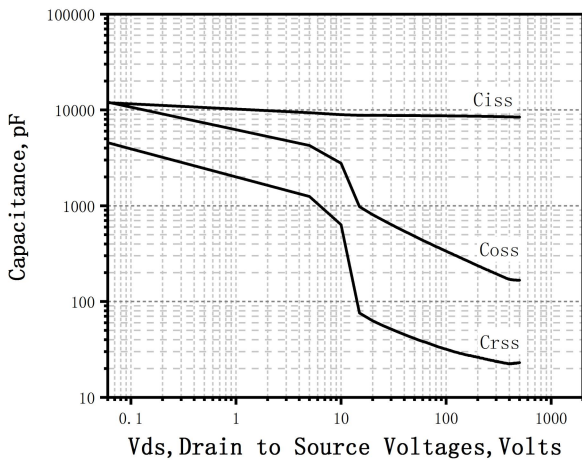
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Figure 7. Capacitance Characteristics

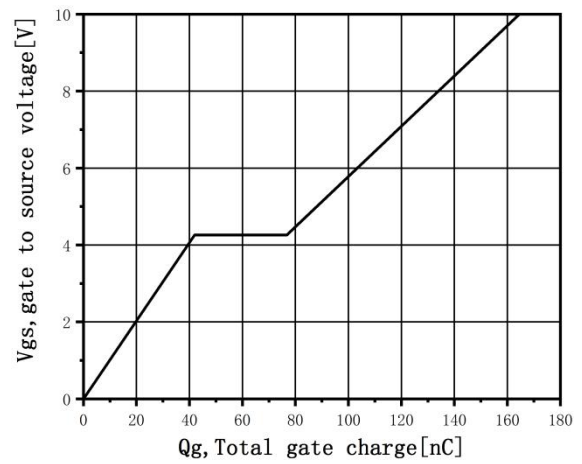


Figure 8. Gate Charge Characteristics

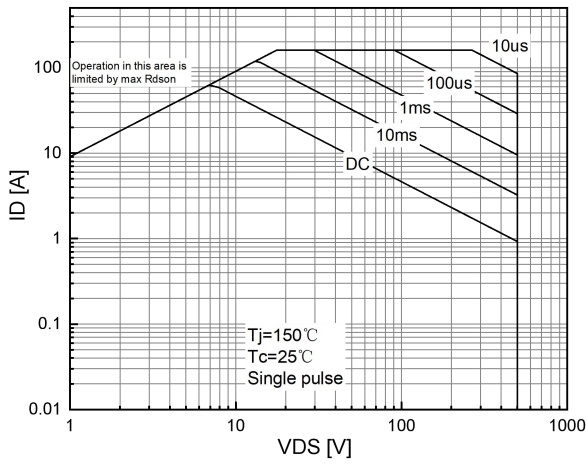


Figure 9. Maximum Safe Operating Area

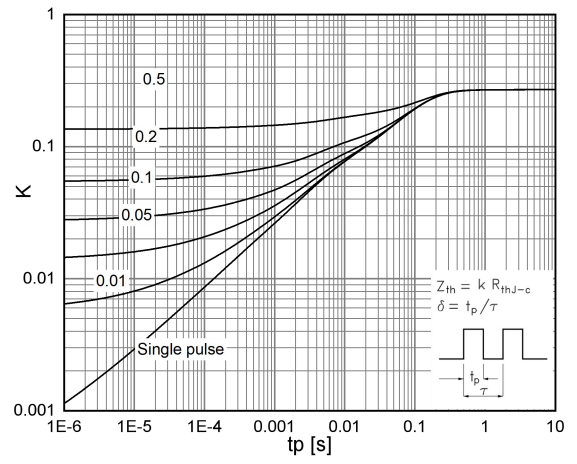
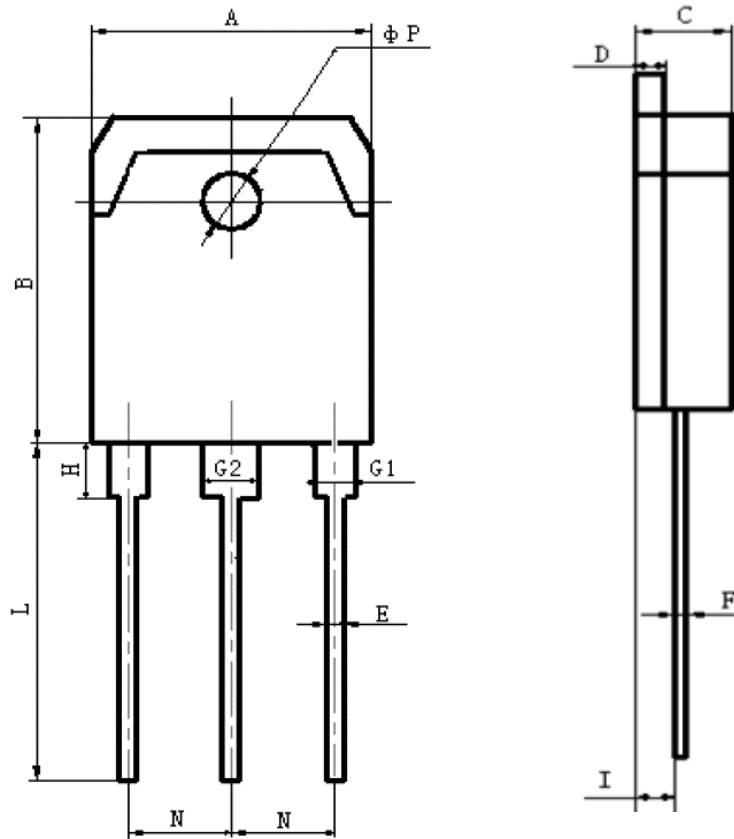


Figure 10. Transient Thermal Response Curve

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TO-3P Package Outline Data


SYMBOLS	MILLIMETERS	
	MIN	MAX
A	15.40	15.80
B	19.70	20.10
C	4.60	5.00
D	1.45	1.65
E	0.80	1.20
F	0.55	0.75
G1	1.80	2.20
G2	2.80	3.20
H	3.30	3.70
I	1.20	1.60
L	19.70	20.30
N	5.25	5.65
ΦP	3.00	3.40