

N-Channel Enhancement Mode MOSFET

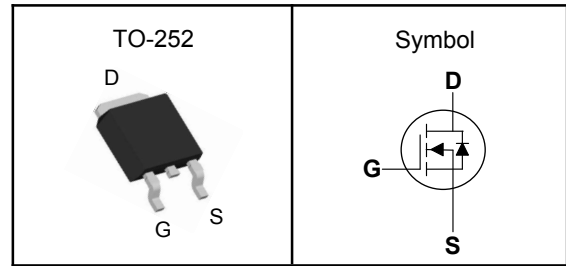
Features

- 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}	40	V
$R_{DS(ON)-Typ}$	2.5	m Ω
I_D	130	A

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

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	± 20	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 (L=0.5mH)	570	mJ
$I_{DM}^{①}$	300 μs Pulse Drain Current Tested	$T_C=25^\circ\text{C}$	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	A
I_S	Diode Continuous Forward Current	130	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 (Steady State)	50	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ₁	1.2	$^\circ\text{C}/\text{W}$

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

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

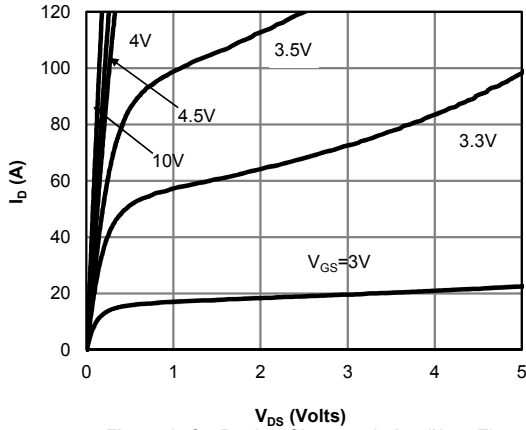
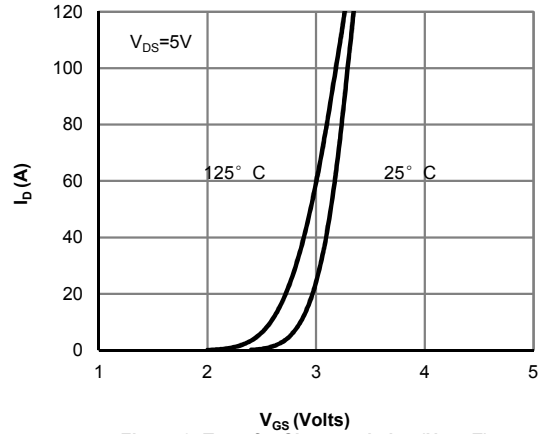
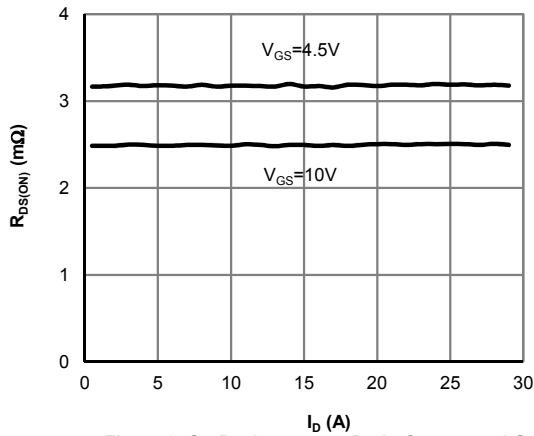
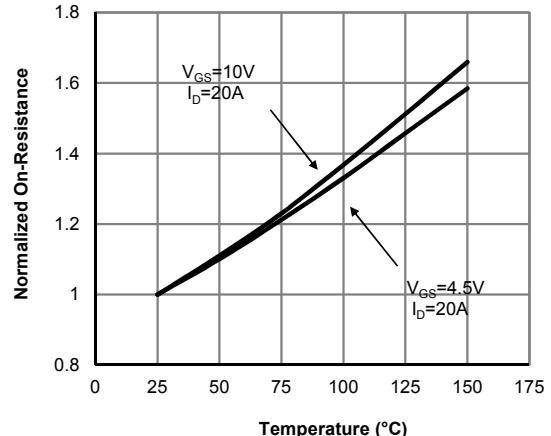
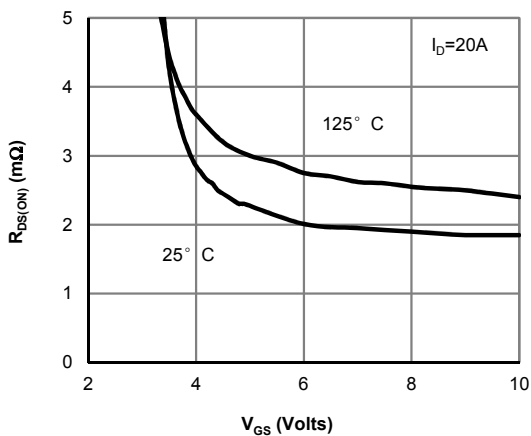
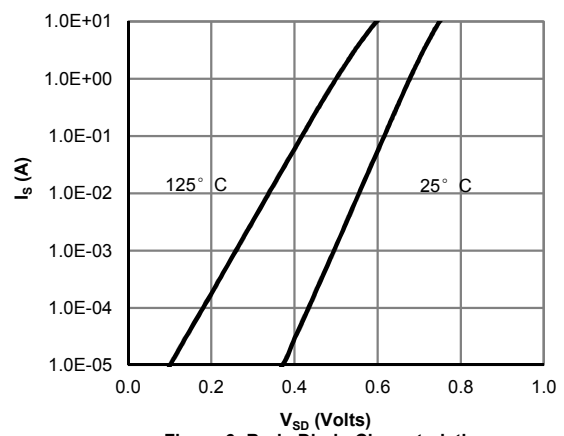
Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

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

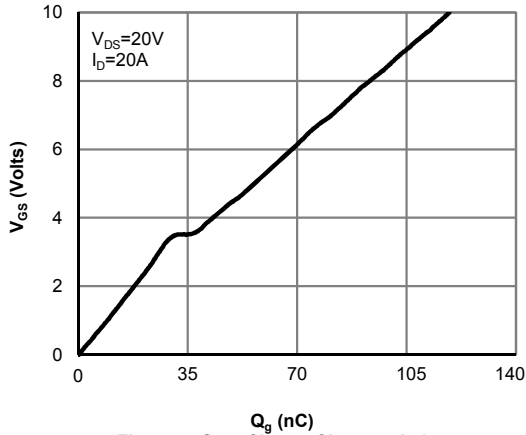
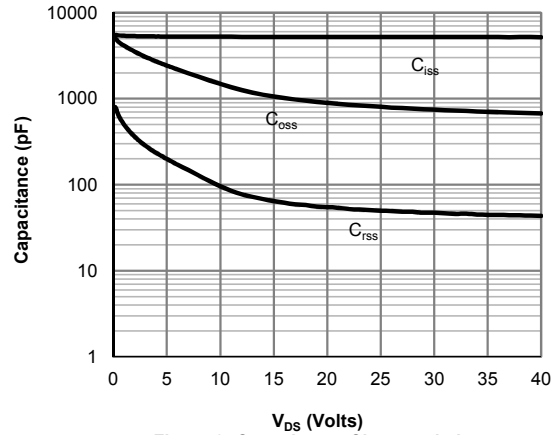
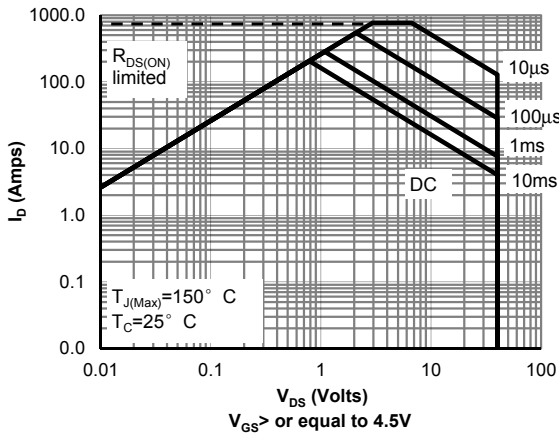
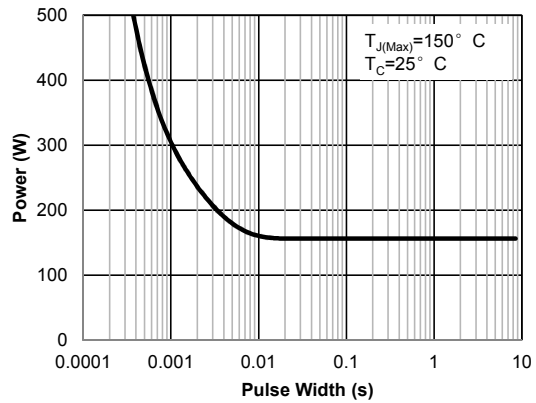
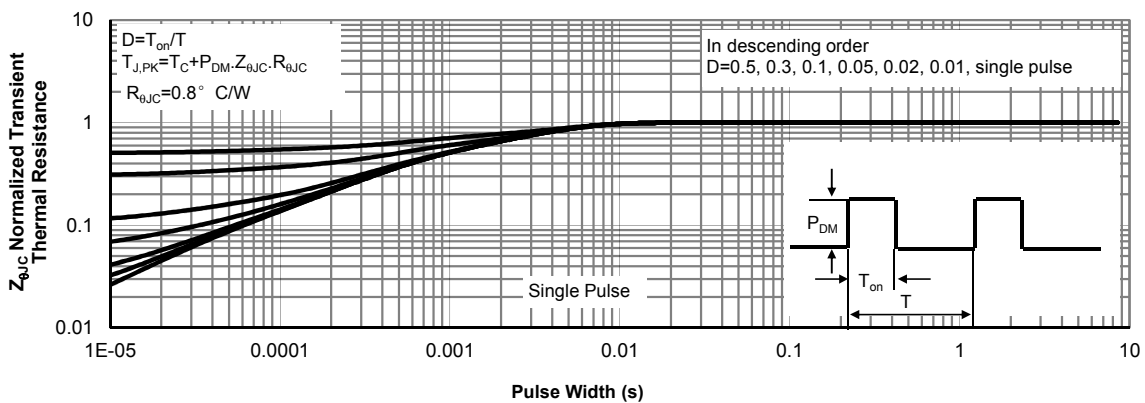
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250mA$	40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V$	---	---	1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	---	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=20A$	---	2.5	3.5	$m\Omega$
		$V_{GS}=4.5V, I_D=20A$	---	3.5	5.0	$m\Omega$
gfs	Forward Transconductance	$V_{DS}=5V, I_{DS}=20A$	---	100	---	S
Dynamic Characteristics ^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=20V,$ Freq.=1MHz	---	5225	---	pF
C_{oss}	Output Capacitance		---	895	---	
C_{rss}	Reverse Transfer Capacitance		---	55	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{GS}=10V, R_L=1\Omega,$ $V_{DS}=20V, R_G=3\Omega$	---	12.5	---	nS
T_r	Turn-on Rise Time		---	9.5	---	
$T_{d(off)}$	Turn-off Delay Time		---	57.5	---	
T_f	Turn-off Fall Time		---	10.5	---	
Q_g	Total Gate Charge	$V_{DS}=20V,$ $V_{GS}=10V, I_{DS}=20A$	---	120	---	nC
Q_{gs}	Gate-Source Charge		---	16.5	---	
Q_{gd}	Gate-Drain Charge		---	4.5	---	
Source-Drain Characteristics ($T_J=25^{\circ}\text{C}$)						
V_{SD}	Diode Forward Voltage _z	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	0.7	1.1	V
t_{rr}	Reverse Recovery Time	$I_S=20A,$ $di/dt=500A/\mu s, T_J=25^{\circ}\text{C}$	---	20	---	nS
Q_{rr}	Reverse Recovery Charge		---	60	---	nC

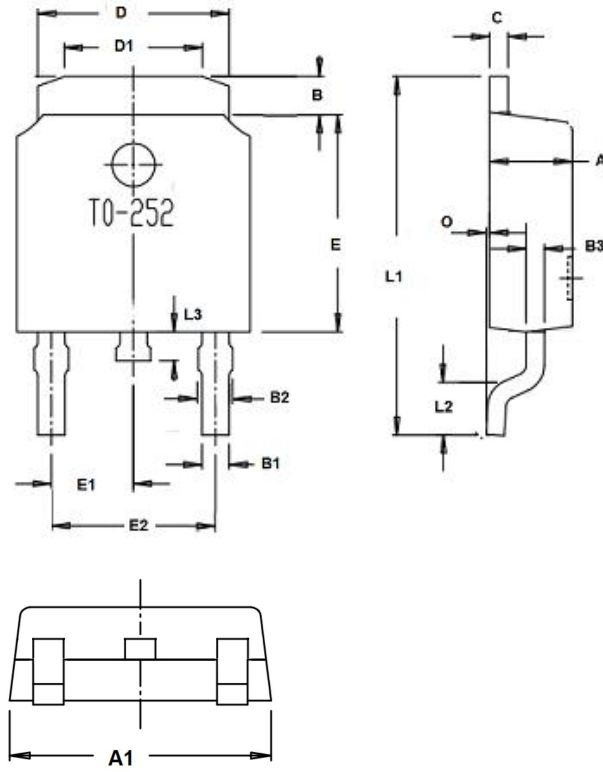
Note ④ : Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

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

N-Channel Enhancement Mode MOSFET
Typical Characteristics

Figure 1: On-Region Characteristics (Note E)

Figure 2: Transfer Characteristics (Note E)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

Figure 4: On-Resistance vs. Junction Temperature (Note E)

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

Figure 6: Body-Diode Characteristics (Note E)

N-Channel Enhancement Mode MOSFET


Figure 7: Gate-Charge Characteristics

Figure 8: Capacitance Characteristics

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

N-Channel Enhancement Mode MOSFET
TO-252 Package Outline Dimensions


Dim.	Min.	Max.
A	2.1	2.5
A1	6.3	6.9
B	0.96	1.42
B1	0.74	0.86
B2	0.74	0.94
C	Typ0.5	
D	5.33	5.53
D1	3.65	4.05
E	6.0	6.2
E1	Typ2.29	
E2	Typ4.58	
O	0	0.15
L1	9.9	10.5
L2	Typ1.65	
L3	0.6	1.0
All Dimensions in millimeter		