

N-Channel Enhancement Mode MOSFET

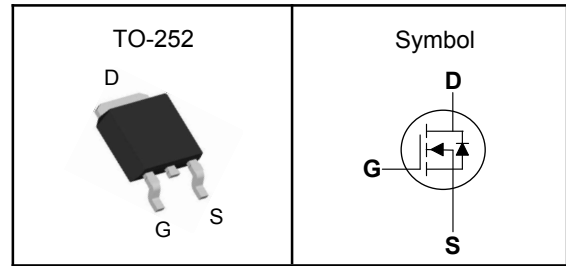
Features

- 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
$R_{DS(ON)-Typ}$	13	m Ω
I_D	49	A

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

Symbol	Parameter	N-Channel	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=0.1mH)	26	mJ	
$I_{DM}^{①}$	300 μs Pulse Drain Current Tested	$T_C=25^\circ\text{C}$	90	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	49	A
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$	12.7	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	41.7	W
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	2.8	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ₁ (Steady State)	45	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ₁ (Steady State)	3	$^\circ\text{C}/\text{W}$

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.



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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	$V_{GS}=0V, I_D=250mA$	40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=32V, V_{GS}=0V$	---	---	1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.5	---	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	$V_{GS}=10V, I_D=30A$	---	13	16	$m\Omega$
		$V_{GS}=4.5V, I_D=15A$	---	16	19	$m\Omega$
gfs	Forward Transconductance	$V_{DS}=5V, I_{DS}=15A$	---	30	---	S
Dynamic Characteristics ^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=20V, \text{Freq.}=1MHz$	---	1120	---	pF
C_{oss}	Output Capacitance		---	132	---	
C_{rss}	Reverse Transfer Capacitance		---	75	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{GS}=20V, R_L=20\Omega, I_{DS}=1A, V_{GEN}=10V, R_G=1\Omega$	---	12.8	---	nS
T_r	Turn-on Rise Time		---	10.4	---	
$T_{d(off)}$	Turn-off Delay Time		---	24	---	
T_f	Turn-off Fall Time		---	5.6	---	
Q_g	Total Gate Charge	$V_{DS}=20V, V_{GS}=10V, I_{DS}=30A$	---	20	---	nC
Q_{gs}	Gate-Source Charge		---	3.1	---	
Q_{gd}	Gate-Drain Charge		---	5	---	
Source-Drain Characteristics ($T_J=25^{\circ}\text{C}$)						
V_{SD}	Diode Forward Voltage _z	$V_{GS}=0V, I_S=10A, T_J=25^{\circ}\text{C}$	---	0.9	1.1	V
t_{rr}	Reverse Recovery Time	$I_S=10A, di/dt=500A/\mu s, T_J=25^{\circ}\text{C}$	---	13.8	---	nS
Q_{rr}	Reverse Recovery Charge		---	8	---	nC

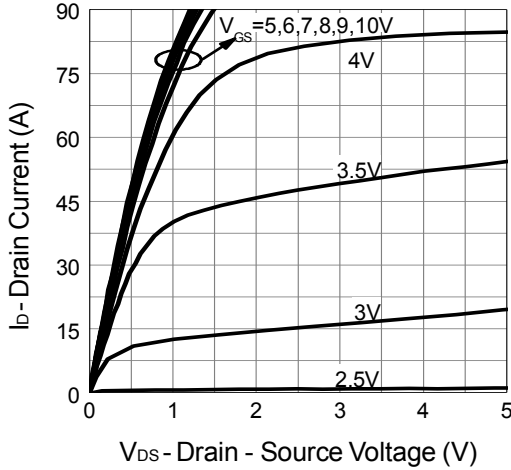
Note ④ : Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

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

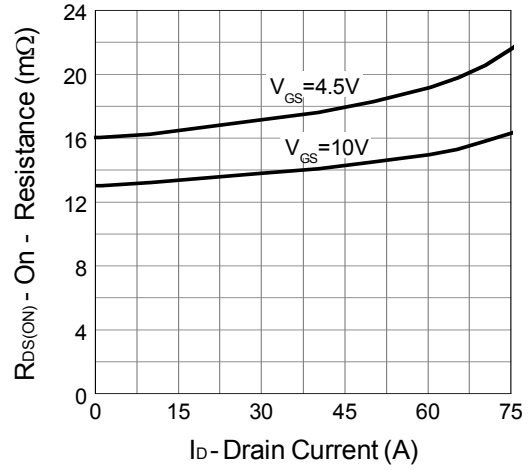
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Typical Characteristics

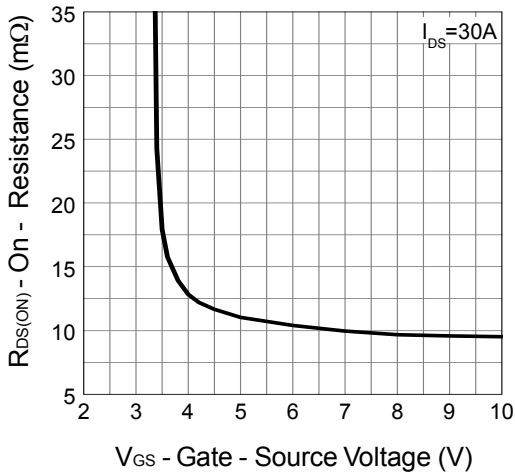
Output Characteristics



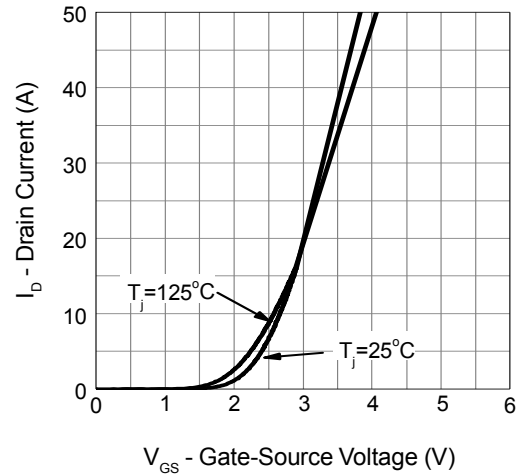
Drain-Source On Resistance



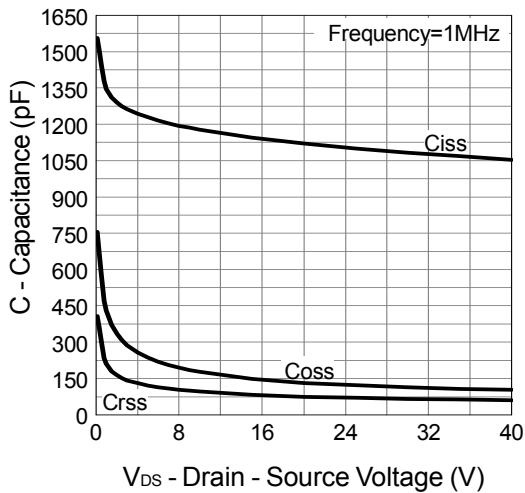
Gate-Source On Resistance



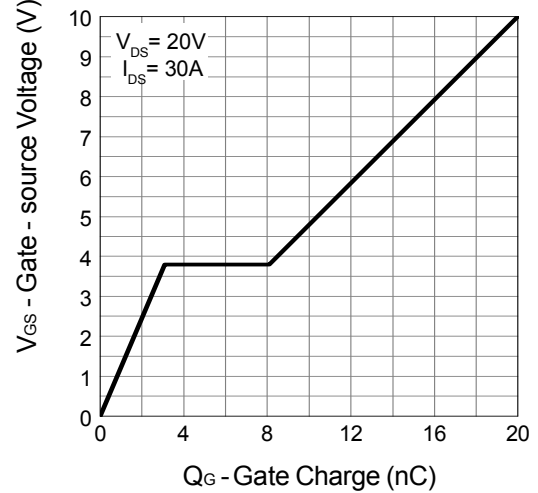
Transfer Characteristics

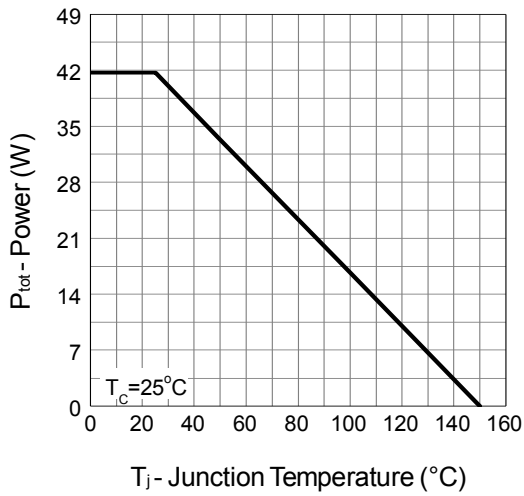
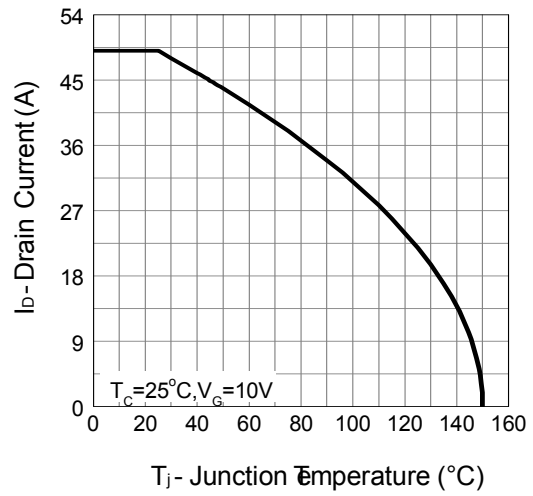
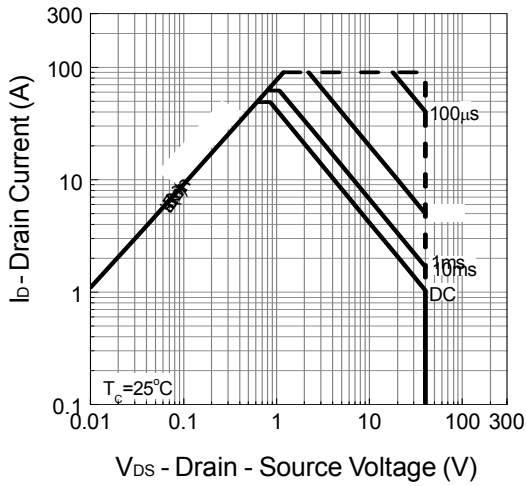
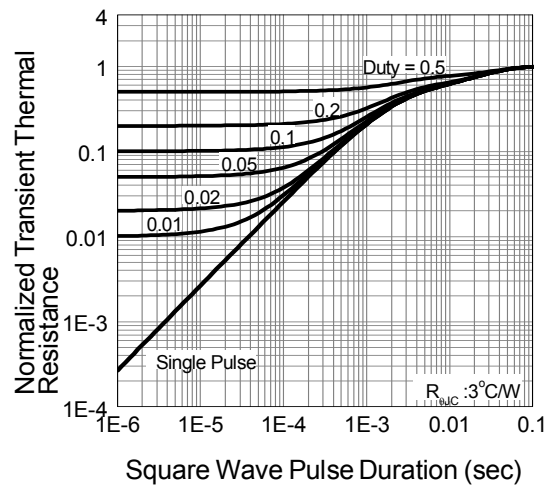
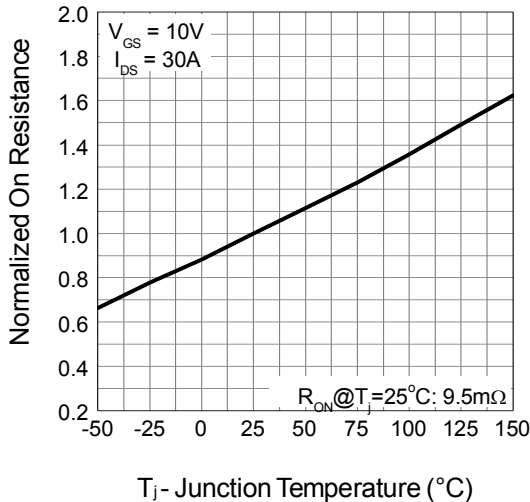
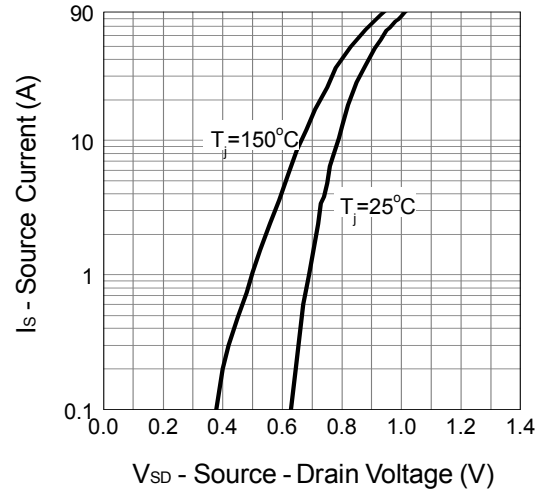


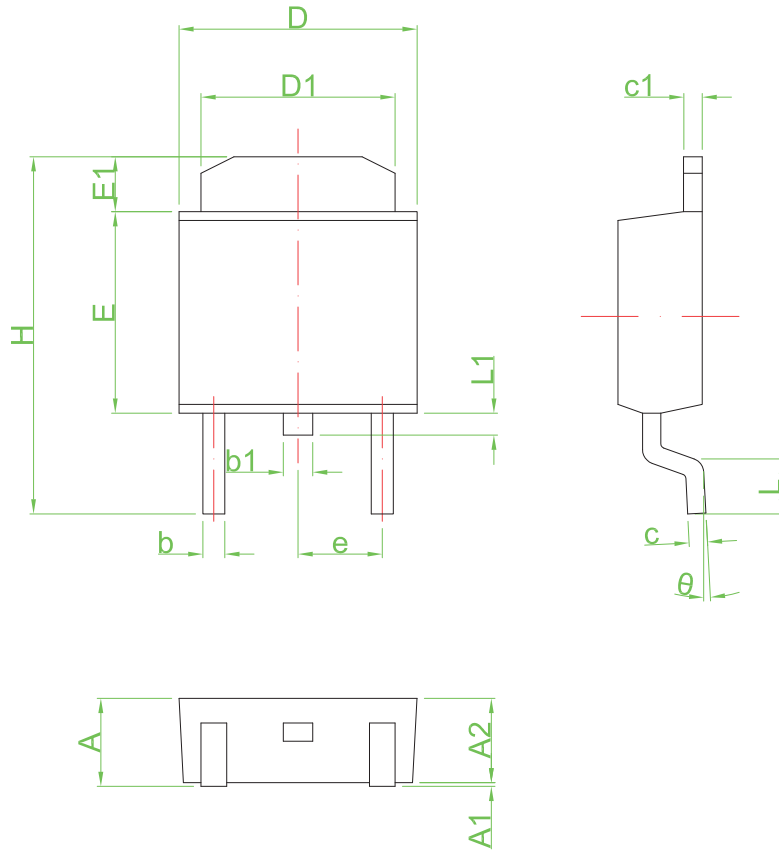
Capacitance



Gate Charge



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Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance

Drain-Source On Resistance

Source-Drain Diode Forward


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TO-252 Package Outline Dimensions


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	2.25	2.65	0.089	0.104
A1	0.00	0.15	0.000	0.006
A2	2.20	2.40	0.087	0.094
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.46	0.66	0.018	0.026
c1	0.46	0.66	0.018	0.026
D	6.30	6.70	0.248	0.264
D1	5.20	5.40	0.205	0.213
E	5.30	5.70	0.209	0.224
E1	1.40	1.60	0.055	0.063
H	9.40	9.90	0.370	0.390
e	2.30 TYP		0.09 TYP	
L	1.40	1.77	0.055	0.070
L1	0.50	0.70	0.020	0.028
θ	0°	8°	0°	8°