

P-Channel Enhancement Mode MOSFET

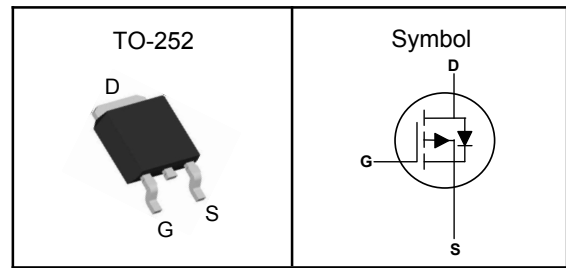
Features

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

Applications

- Power Management in Desktop Computer
- DC/DC Converters

Pin Description



V_{DSS}	-40	V
$R_{DS(ON)-Typ}$	10.5	m Ω
I_D	-52	A

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

Symbol	Parameter	P-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	$^\circ\text{C}$
$I_{DM}^{①}$	Pulse Drain Current Tested	-105	A
I_D	Continuous Drain Current	-52	A
P_D	Maximum Power Dissipation	52.1	W
E_{AS}	Single Pulse Avalanche Energy	146	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ₁	2.4	$^\circ\text{C}/\text{W}$

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.



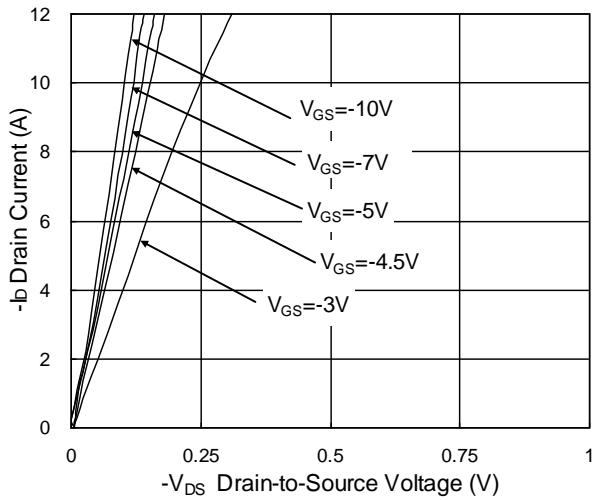
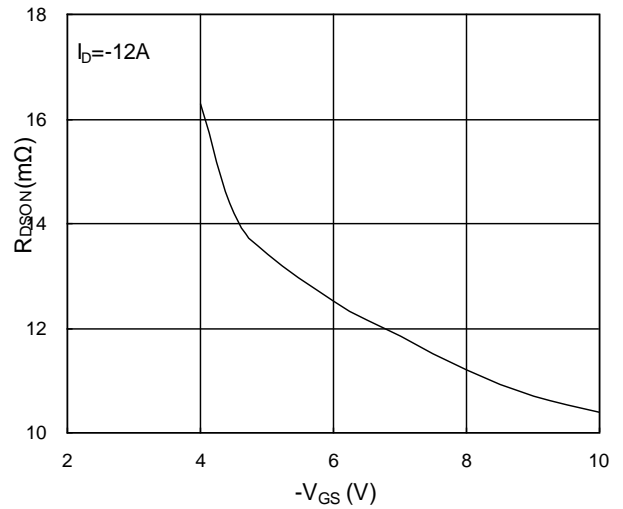
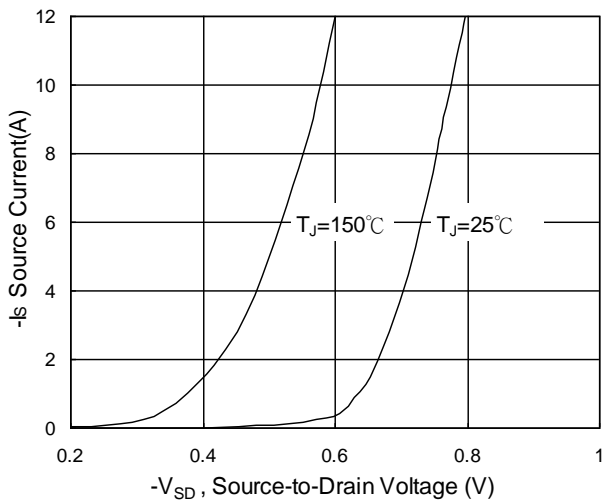
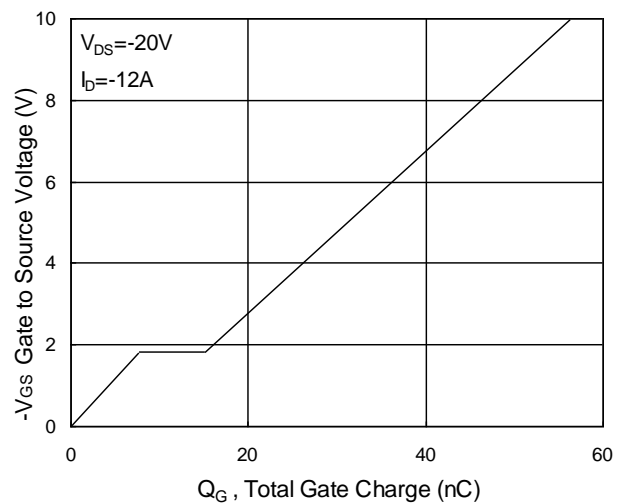
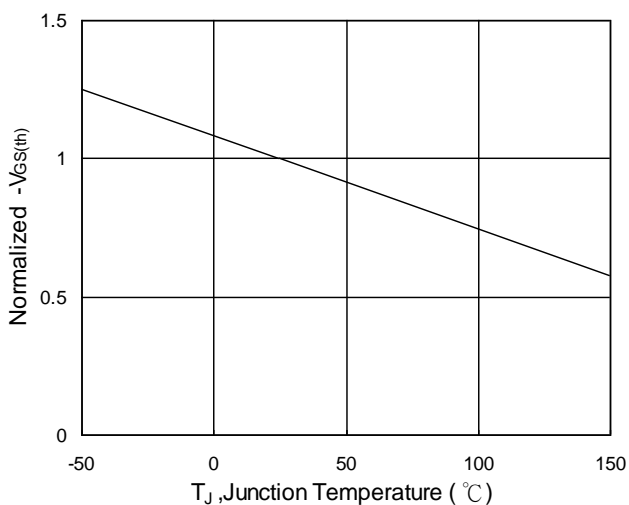
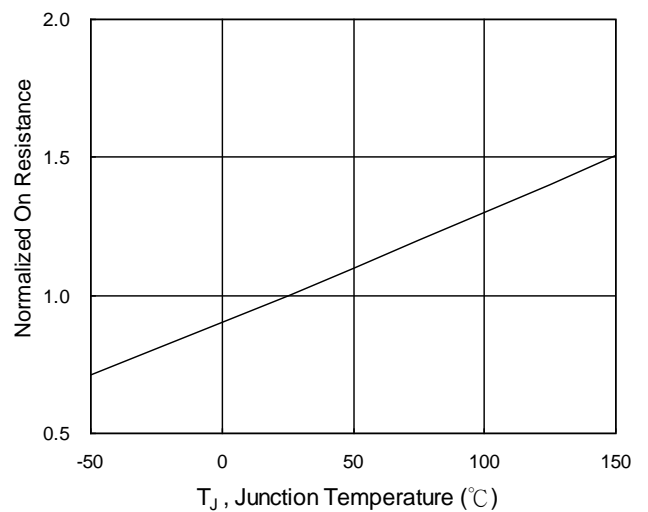
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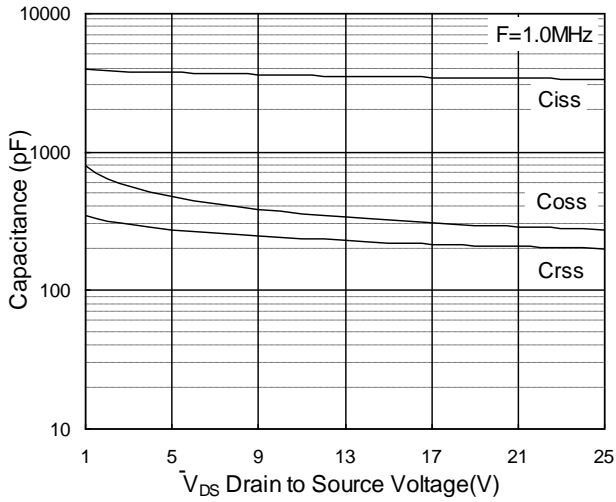
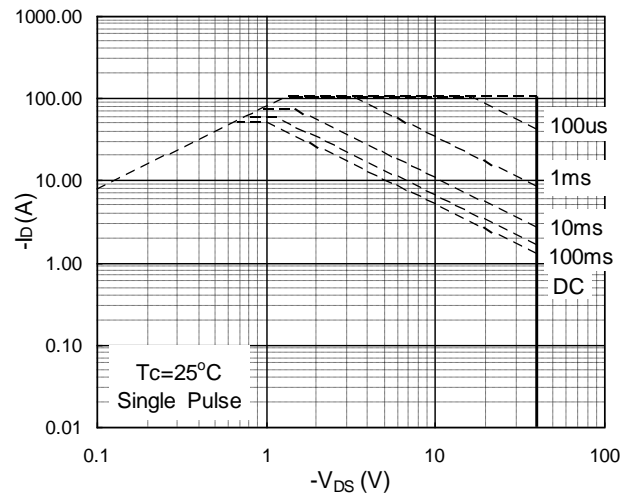
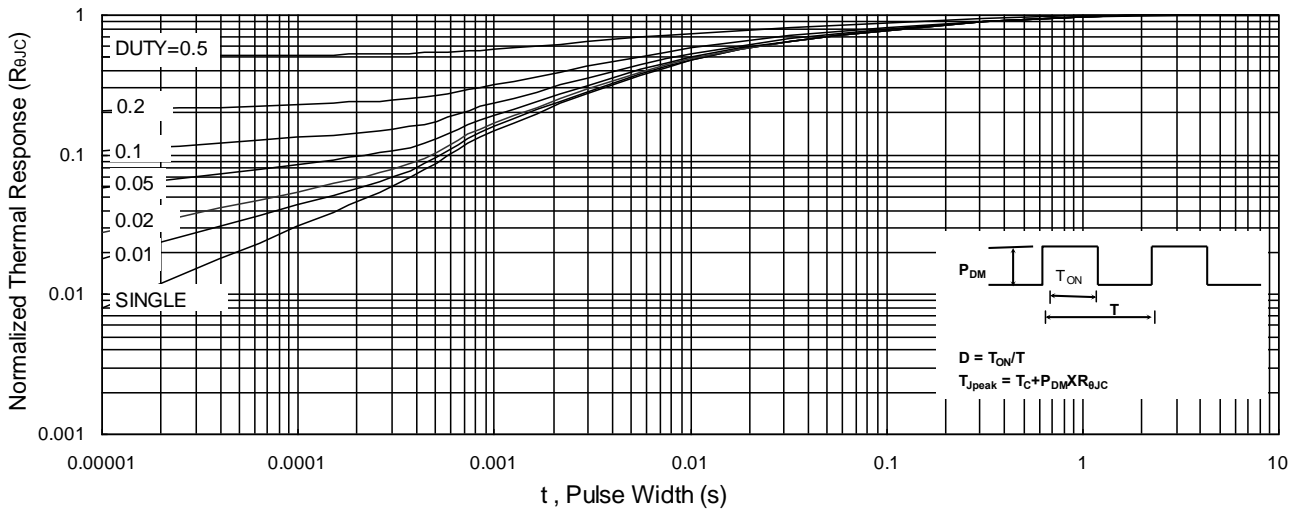
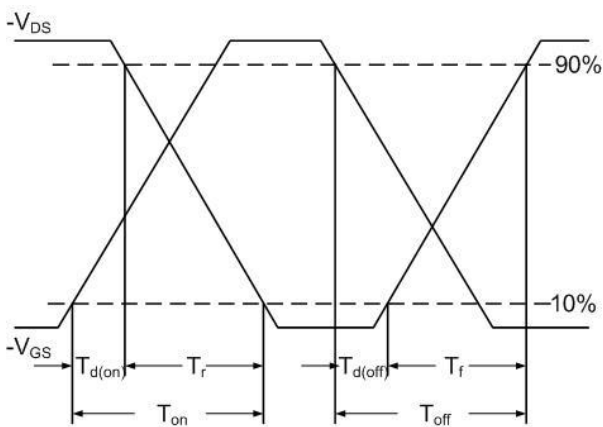
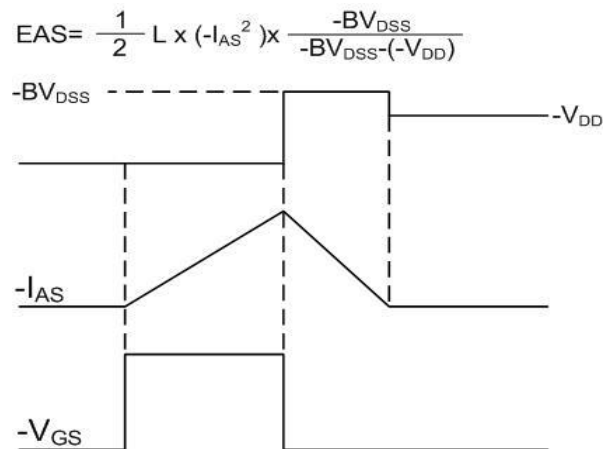
Electrical Characteristics ($T_J=25^{\circ}\text{C}$, Unless Otherwise Noted)

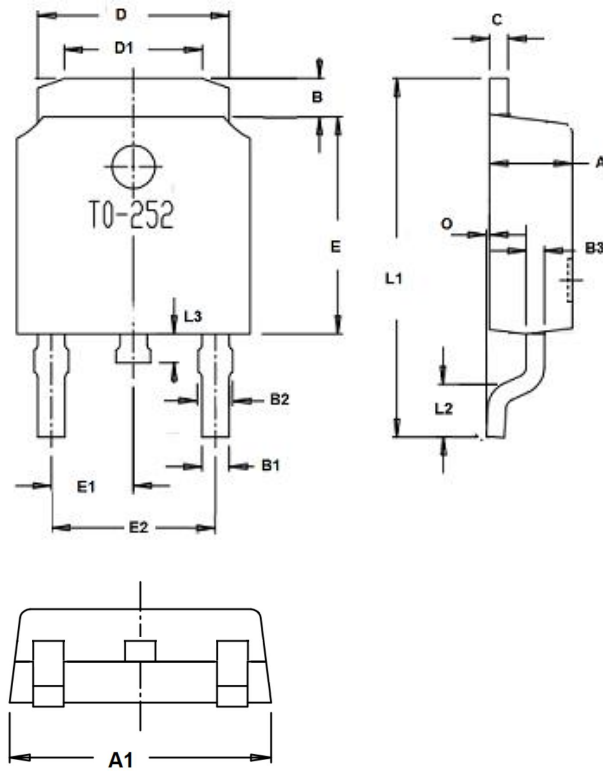
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-32V, V_{GS}=0V$	---	---	-1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	---	-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	$V_{GS}=-10V, I_D=-18A$	---	10.5	13	$m\Omega$
		$V_{GS}=-4.5V, I_D=-12A$	---	15	20	$m\Omega$
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-18A$	---	24	---	S
Dynamic Characteristics^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-15V, \text{Freq.}=1\text{MHz}$	---	3500	---	pF
C_{oss}	Output Capacitance		---	323	---	
C_{riss}	Reverse Transfer Capacitance		---	222	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-1A$	---	40	---	nS
T_r	Turn-on Rise Time		---	35.2	---	
$T_{d(off)}$	Turn-off Delay Time		---	100	---	
T_f	Turn-off Fall Time		---	9.6	---	
Q_g	Total Gate Charge	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-12A$	---	27.9	---	nC
Q_{gs}	Gate-Source Charge		---	7.7	---	
Q_{gd}	Gate-Drain Charge		---	7.5	---	
Source-Drain Characteristics						
$V_{SD}^{④}$	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^{\circ}\text{C}$	---	---	-1.0	V

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

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

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Typical Characteristics

Fig.1 Typical Output Characteristics

Fig.2 On-Resistance v.s Gate-Source

Fig.3 Forward Characteristics Of Reverse

Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ v.s T_J

Fig.6 Normalized $R_{DS(on)}$ v.s T_J

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Fig.7 Capacitance

Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform

Fig.11 Unclamped Inductive Waveform

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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		