



## N-Channel Enhancement Mode Field Effect Transistor

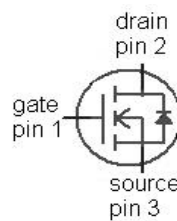
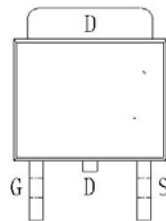
### ● Features

- N-channel, normal level
- Excellent gate charge x  $R_{DS(on)}$  product (FOM)
- Very low on-resistance  $R_{DS(on)}$
- 175 °C operating temperature
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC for target application
- Ideal for high-frequency switching and synchronous rectification

### ● Product Summary

$V_{DS}$	200	V
$R_{DS(on),max}$ (TO252)	180	mΩ
$(I_{DM})^b$	20	A

### ● Pin Configurations(TO252)



### ● Absolute Maximum Ratings $T_A=25^{\circ}C$ unless otherwise noted

Parameter		Symbol	Maximum	Units	
Drain-Source Voltage		$V_{DS}$	200	V	
Gate-Source Voltage		$V_{GS}$	±30		
Continuous Drain Current( $T_J=150^{\circ}C$ ) <sup>a</sup>	$T_A=25^{\circ}C$	$I_D$	20	A	
	$T_A=100^{\circ}C$		12		
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	60		
Avalanche Current <sup>b</sup>	L=0.1mH	$I_{AS}$	65		
Avalanche energy		$E_{AS}$	17	mJ	
Power Dissipation <sup>a</sup>	$T_A=25^{\circ}C$	$P_D$	65	W	
	$T_A=70^{\circ}C$		50		
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	°C	
<b>Thermal Characteristics</b>					
Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 5s$	$R_{\theta JA}$	78	100	°C/W
	Steady-State		120	150	
Maximum Junction-to-Lead		$R_{\theta JL}$	40	50	

Notes

a. Surface Mounted on 1x1FR4 Board.

b. Pulse width limited maximum junction temperature Pulse test: PW≤300 us duty cycle ≤2%



● Electrical Characteristics ( $T_A=25^\circ\text{C}$  unless otherwise noted)

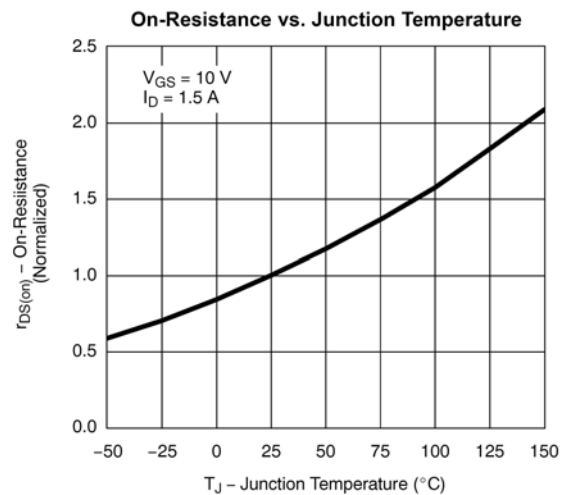
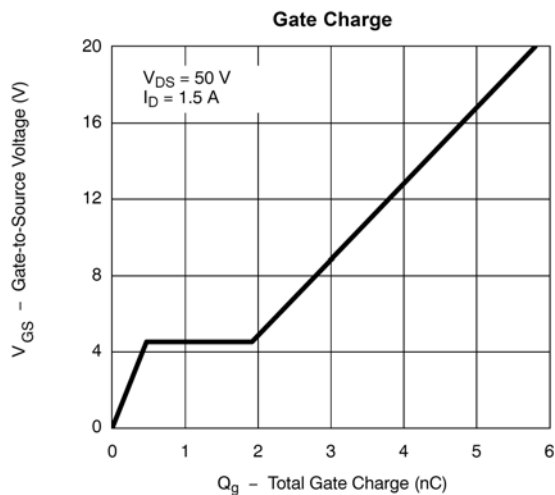
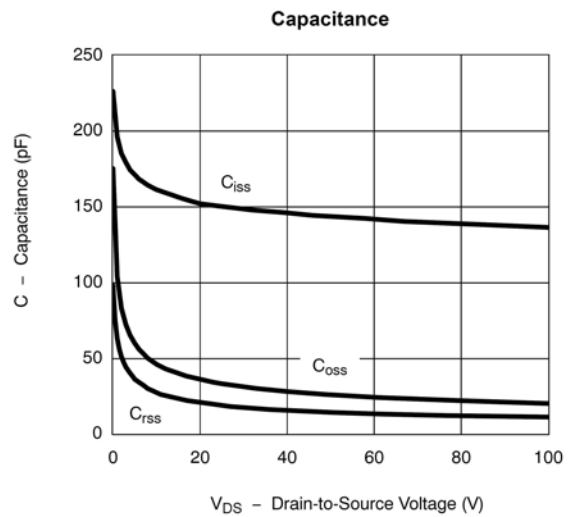
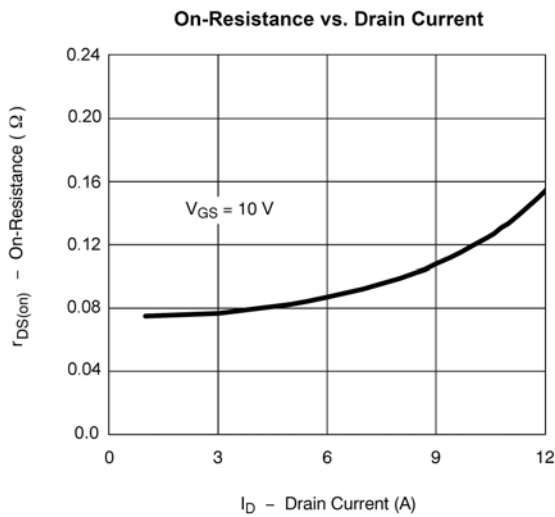
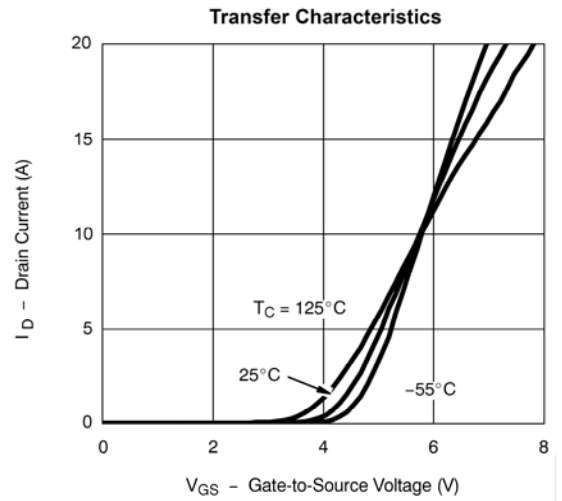
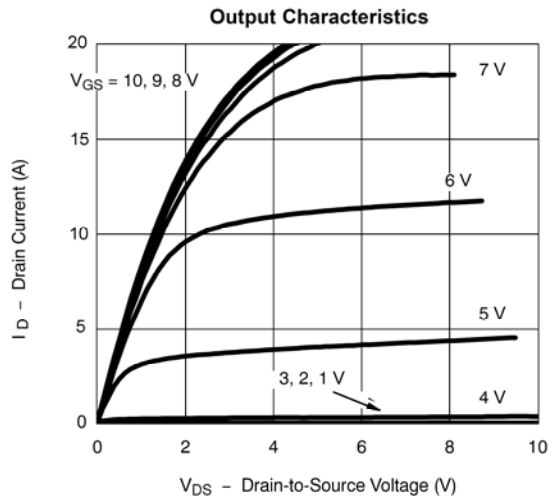
Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=1\text{mA}, V_{GS}=0\text{V}$	200			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=200\text{V}, V_{GS}=0$			10	uA
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 30\text{V}$			$\pm 0.1$	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2		4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>a</sup>	$V_{GS}=10\text{V}, I_D=10\text{A}$		140	180	mΩ
$g_{FS}$	Forward Trans conductance <sup>a</sup>	$V_{DS}=15\text{V}, I_D=10\text{A}$	7	13		S
$V_{SD}$	Diode Forward Voltage	$I_S=13\text{A}, V_{GS}=0\text{V}$	0.3		1.2	V
$I_S$	Maximum Body-Diode Continuous Current				3	A
<b>Dynamic<sup>b</sup></b>						
$C_{iss}$	Input capacitance	$V_{GS}=0\text{V}, V_{DS}=50\text{V}, f=1\text{MHz}$		830	1080	pF
$C_{oss}$	Output capacitance			200	260	
$C_{rss}$	Reverse transfer capacitance			25	33	
$Q_g$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=160\text{V}, I_D=13\text{A}, R_G=2.4\ \Omega$		20	26	nC
$Q_{gs}$	Gate - Source Charge			5.3		
$Q_{gd}$	Gate - Drain Charge			10		
$R_g$	Gate resistance		0.5		2.5	
<b>Switching</b>						
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=160\text{V}, R_L=30\ \Omega, R_{GEN}=2.4\ \Omega, I_D=13\text{A}$		9	13	ns
$t_r$	Turn-On Rise Time			4	6	
$t_{D(off)}$	Turn-Off Delay Time			13	18	
$t_f$	Turn-Off Fall Time			3	4	
$t_{rr}$	Body Diode Reverse Recovery Time		$I_r=3\text{A}, dI/dt=100\text{A}/\mu\text{s}$		67	

Notes

- a. Pulse test:  $PW \leq 300\ \mu\text{s}$  duty cycle  $\leq 2\%$
- b. Guaranteed by design, not subject to production testing.

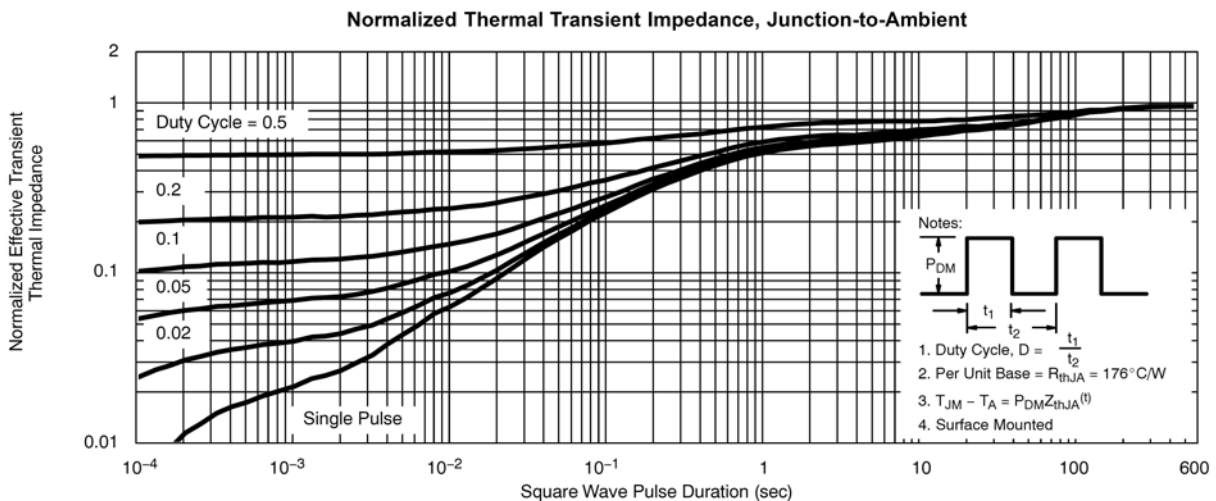
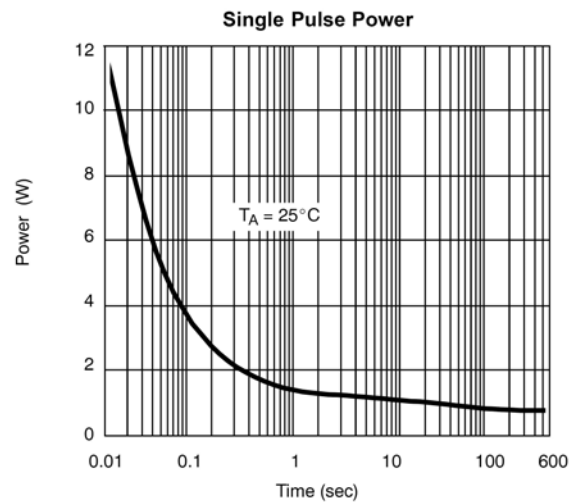
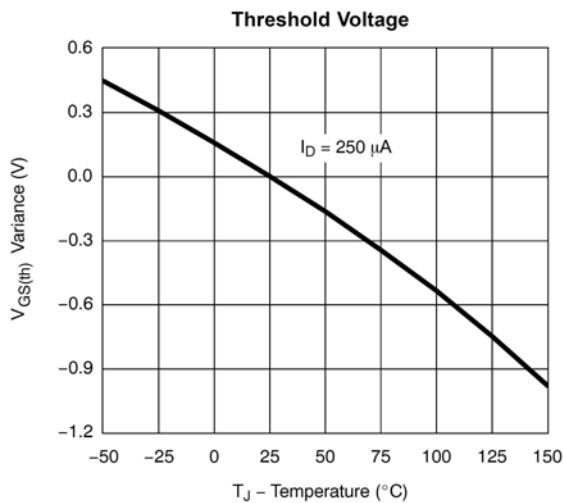
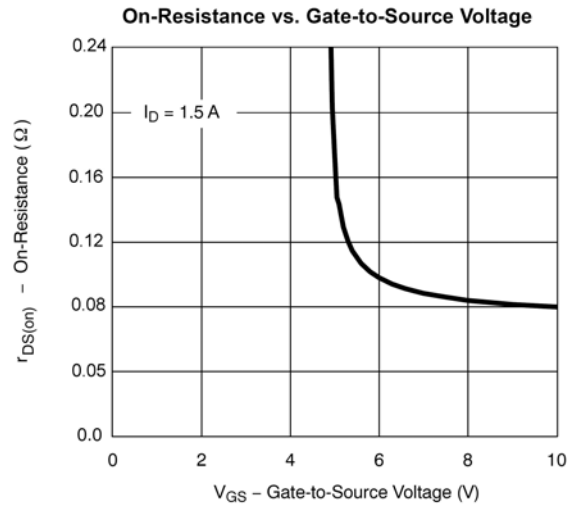
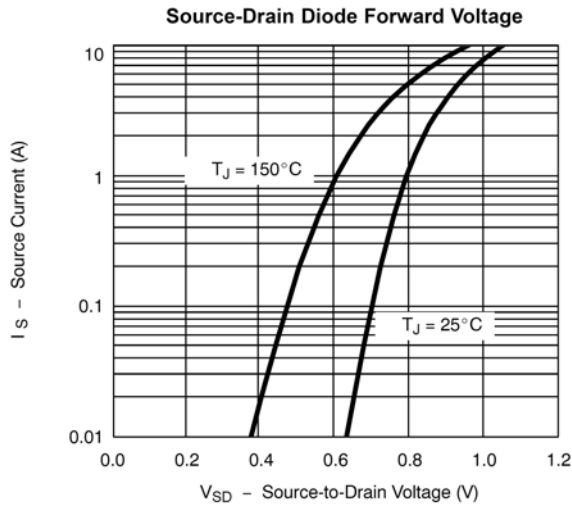


## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)





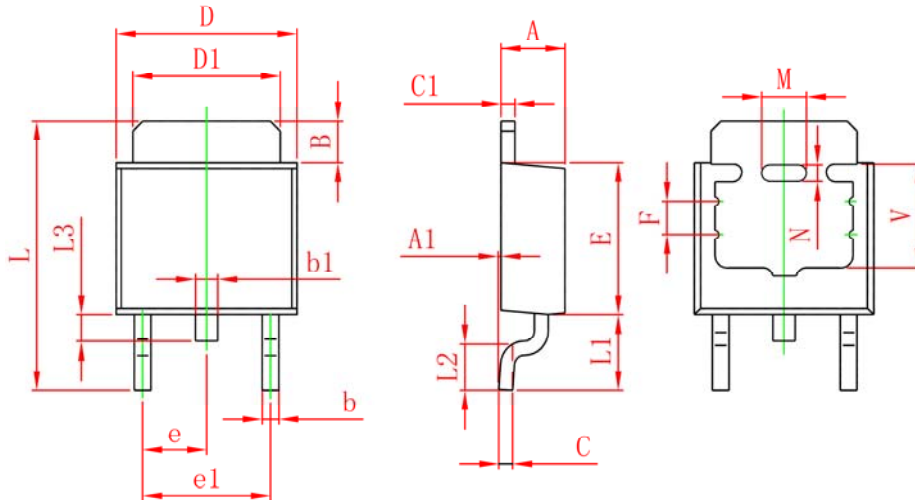
## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)





● **Package Information**

**TO-252C-2L PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
F	1.200REF.		0.047REF.	
M	1.600REF.		0.063REF.	
N	0.450REF.		0.018REF.	
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF		0.150 REF	