

# N-Channel Enhancement Mode MOSFET

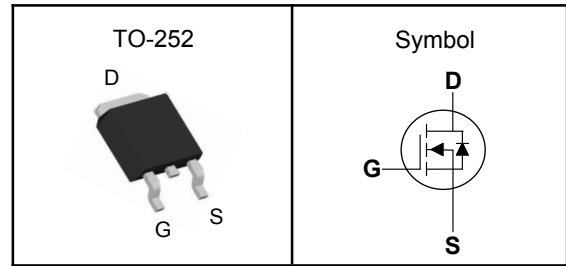
## Features

- 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
$R_{DS(ON)-Typ}$	1.1	$\Omega$
$I_D$	5	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	$\pm 30$	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 <sup>3</sup>	270	mJ	
$I_{DM}^{①}$	Pulse Drain Current Tested	---	A	
$I_D$	Continuous Drain Current	$T_c=25^\circ\text{C}$	5	A
$P_D$	Maximum Power Dissipation	$T_c=25^\circ\text{C}$	25	W

## Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	3.45	$^\circ\text{C/W}$

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

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

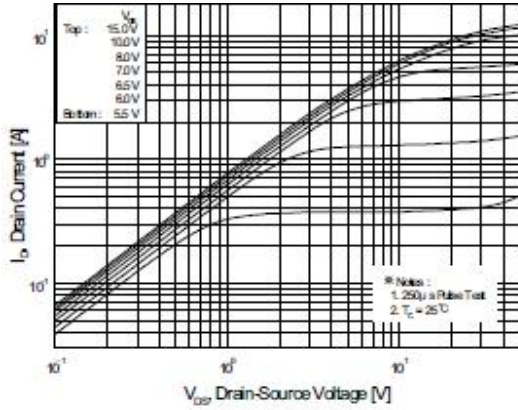
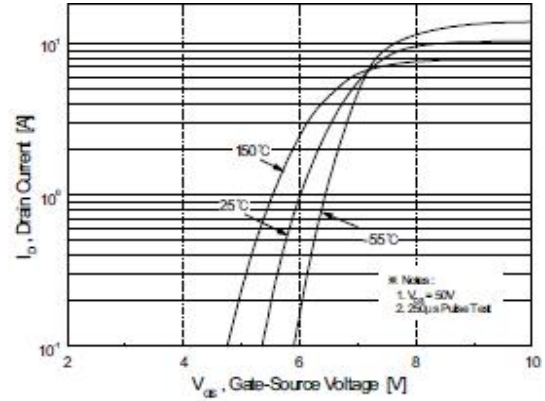
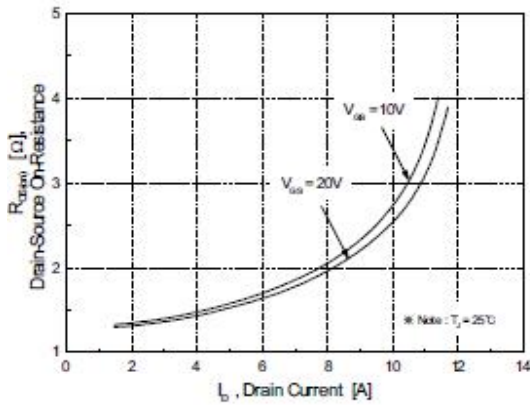
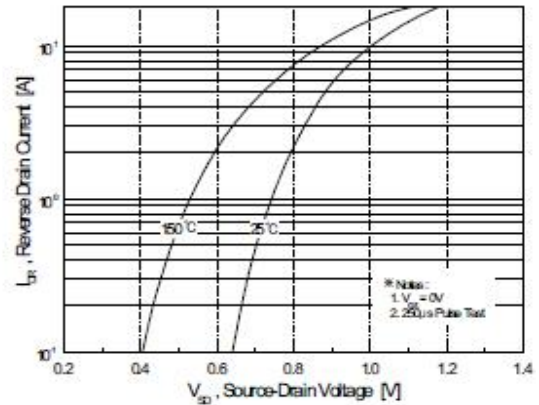
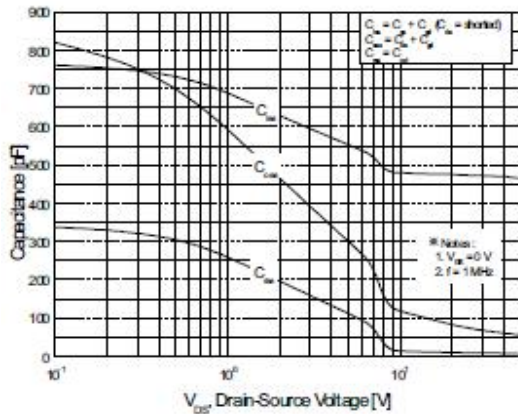
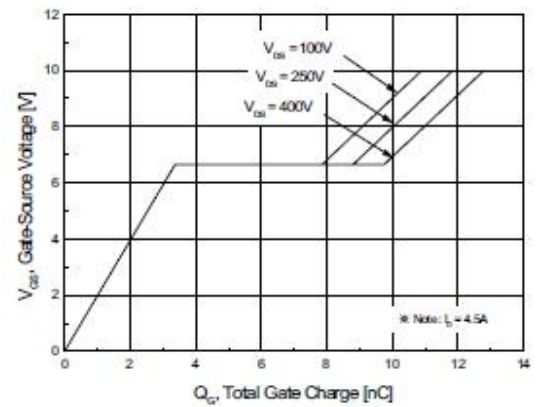
Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.

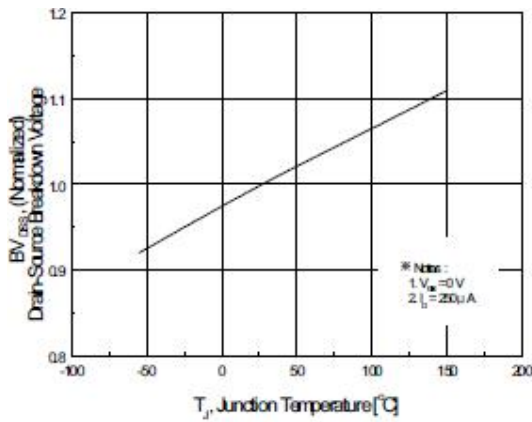
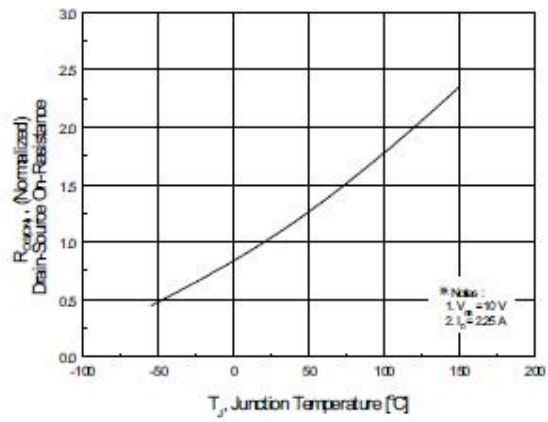
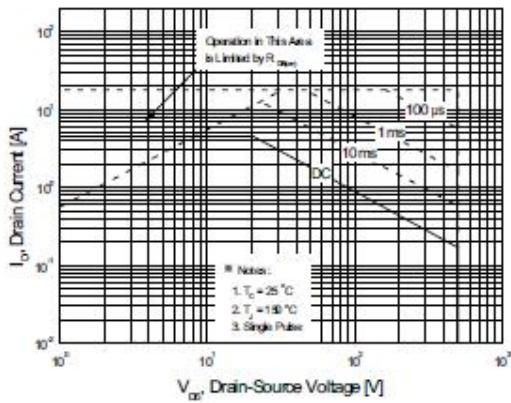
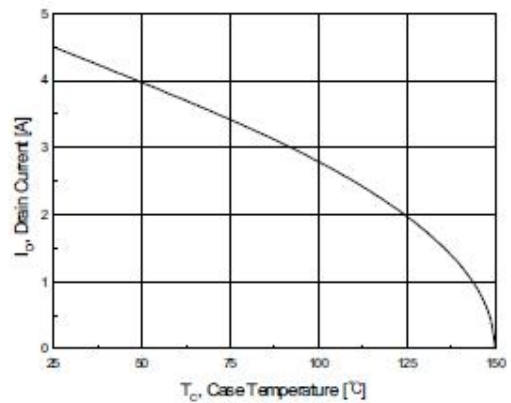
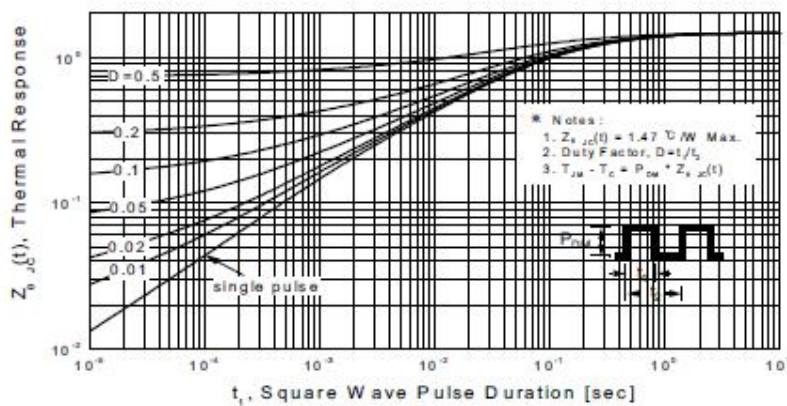
**N-Channel Enhancement Mode MOSFET****Electrical Characteristics** ( $T_J=25^\circ\text{C}$ , Unless Otherwise Noted)

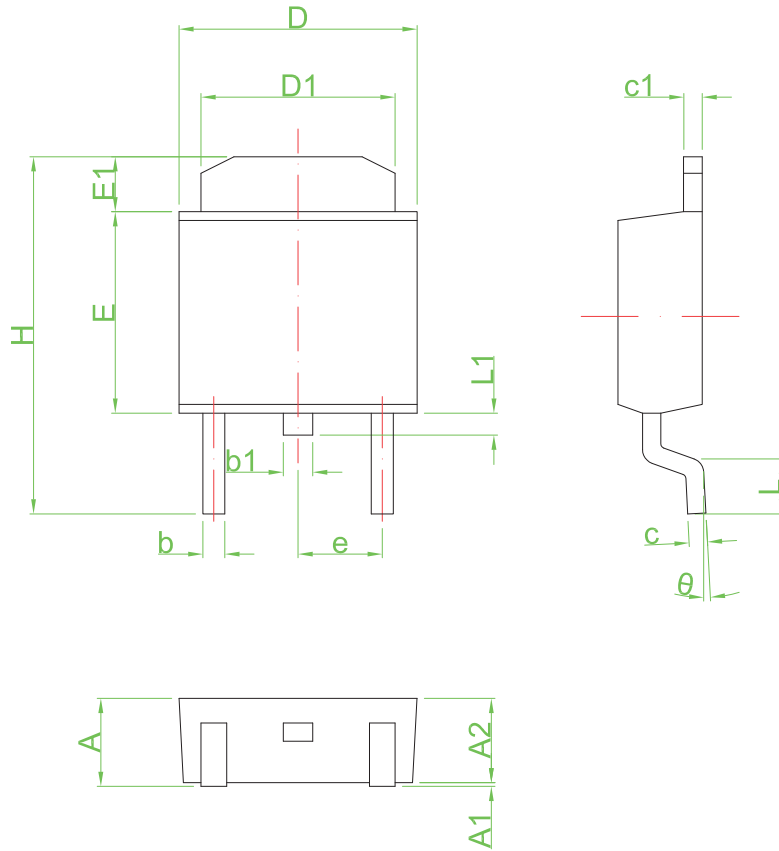
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250mA$	500	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=500V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	---	4	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=2.5A$	---	1.1	1.4	$\Omega$
<b>Dynamic Characteristics<sup>⑤</sup></b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Freq.=1MHz	---	620	---	pF
$C_{oss}$	Output Capacitance		---	70	---	
$C_{rss}$	Reverse Transfer Capacitance		---	8	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=250V, R_L=18\Omega,$ $V_{GS}=10V, R_G=25\Omega$	---	13	---	nS
$T_r$	Turn-on Rise Time		---	55	---	
$T_{d(off)}$	Turn-off Delay Time		---	25	---	
$T_f$	Turn-off Fall Time		---	35	---	
$Q_g$	Total Gate Charge	$V_{DS}=400V,$ $V_{GS}=10V, I_D=5A$	---	13	---	nC
$Q_{gs}$	Gate-Source Charge		---	3.4	---	
$Q_{gd}$	Gate-Drain Charge		---	6.4	---	
<b>Source-Drain Characteristics (<math>T_J=25^\circ\text{C}</math>)</b>						
$V_{SD}$	Diode Forward Voltage <sup>②</sup>	$V_{GS}=0V, I_D=5A, T_J=25^\circ\text{C}$	---	---	5.0	V

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**

**Figure 2. Transfer Characteristics**

**Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage**

**Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature**

**Figure 5. Capacitance Characteristics**

**Figure 6. Gate Charge Characteristics**

**N-Channel Enhancement Mode MOSFET**

**Figure 7. Breakdown Voltage Variation vs. Temperature**

**Figure 8. On-Resistance Variation vs. Temperature**

**Figure 9. Maximum Safe Operating Area**

**Figure 10. Maximum Drain Current vs. Case Temperature**

**Figure 11. Transient Thermal Response Curve**

**N-Channel Enhancement Mode MOSFET**
**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
theta	0°	8°	0°	8°