

# N-Channel Enhancement Mode MOSFET

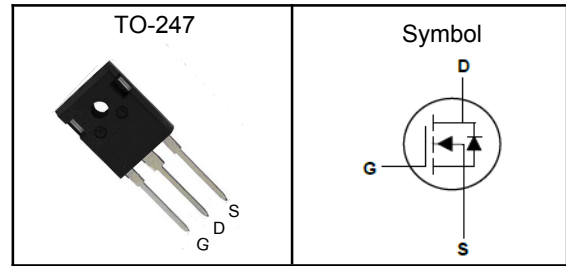
## Features

- 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
$R_{DS(ON)-Typ}$	90	m $\Omega$
$I_D$	40	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>	5000	mJ
$I_{DM}^{①}$	Pulse Drain Current Tested	160	A
$I_D$	Continuous Drain Current	$T_c=25^\circ\text{C}$	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 <sup>①</sup>	62.5	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>①</sup>	0.3	$^\circ\text{C/W}$

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 1in<sup>2</sup> 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
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	500	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=500V, V_{GS}=0V$	---	---	5	$\mu A$
$V_{GS(th)}$	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	$V_{GS}=10V, I_D=23A$	---	90	110	$m\Omega$
gfs	Forward Transconductance	$V_{DS}=25V, I_{BS}=23A$	---	31.5	---	S
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=25V, \text{Freq.}=1\text{MHz}$	---	8.76	---	nF
$C_{oss}$	Output Capacitance		---	0.7	---	
$C_{rss}$	Reverse Transfer Capacitance		---	0.1	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=250V, R_G=10\Omega, I_D=23A, V_{GS}=10V$	---	48	---	nS
$T_r$	Turn-on Rise Time		---	64	---	
$T_{d(off)}$	Turn-off Delay Time		---	274	---	
$T_f$	Turn-off Fall Time		---	100	---	
$Q_g$	Total Gate Charge	$V_{DD}=250V, V_{GS}=10V, I_D=23A$	---	165.3	---	nC
$Q_{gs}$	Gate-Source Charge		---	42	---	
$Q_{gd}$	Gate-Drain Charge		---	34.8	---	
<b>Source-Drain Characteristics</b> ( $T_J=25^{\circ}\text{C}$ )						
$V_{SD}$	Diode Forward Voltage <sub>z</sub>	$V_{GS}=0V, I_S=40A, T_J=25^{\circ}\text{C}$	---	---	1.5	V
$t_{rr}$	Reverse Recovery Time	$I_S=40A, V_{GS}=0V, di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	338	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	3.4	---	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.

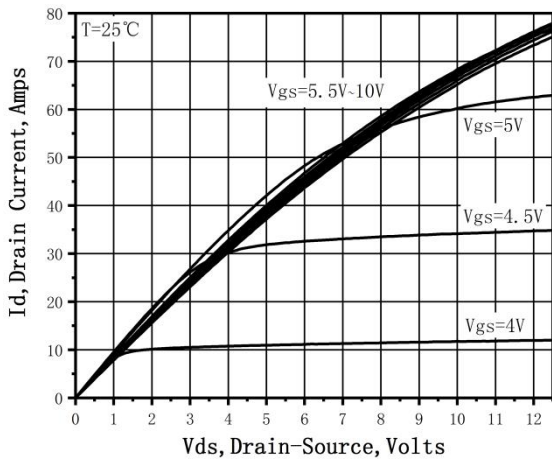
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**Typical Characteristics**


Figure 1. On-Region Characteristics

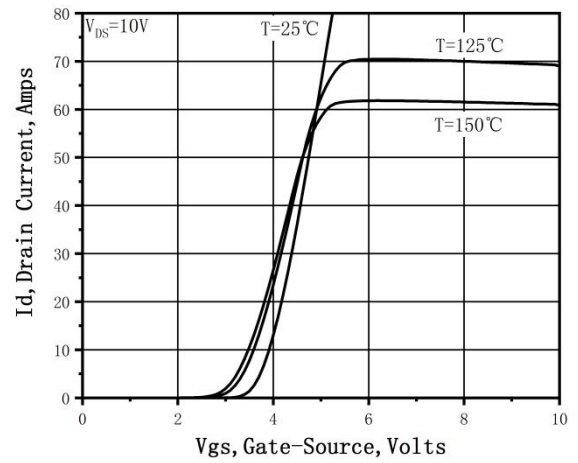


Figure 2. Transfer Characteristics

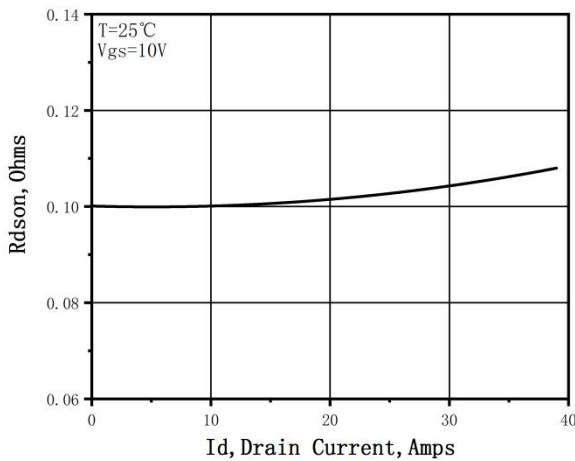


Figure 3. Static Drain-Source On Resistance

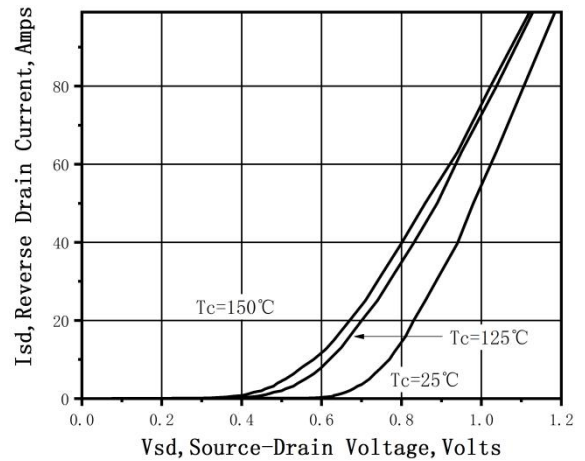
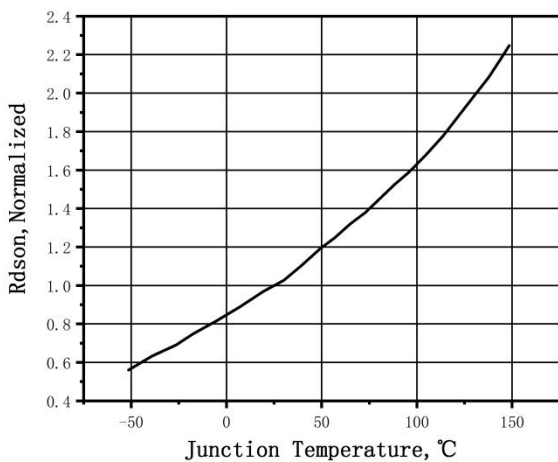
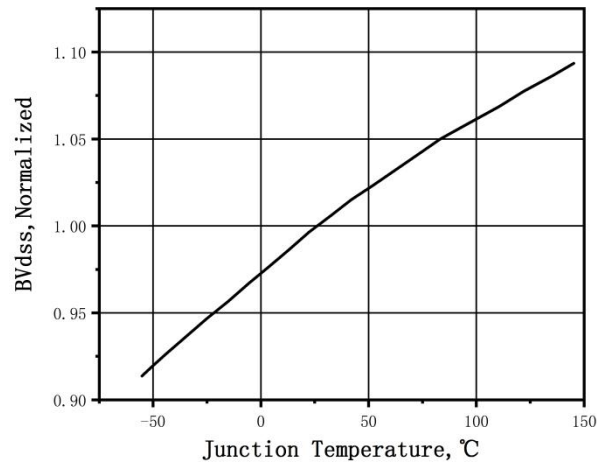


Figure 4. Typical Body Diode Transfer Characteristics


 Figure 5. Normalized  $R_{DS(on)}$  vs. Temperature

 Figure 6. Normalized  $BV_{DSS}$  vs. Temperature

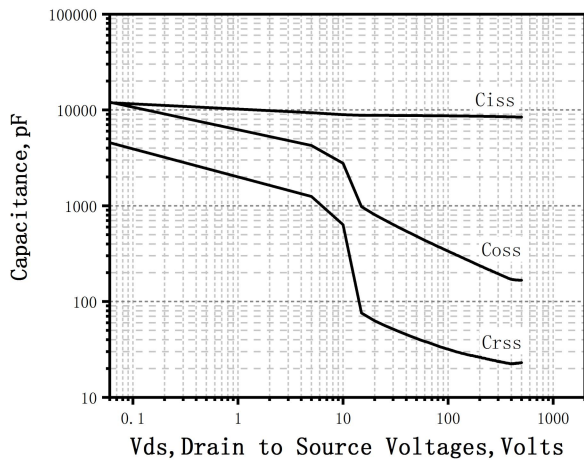
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Figure 7. Capacitance Characteristics

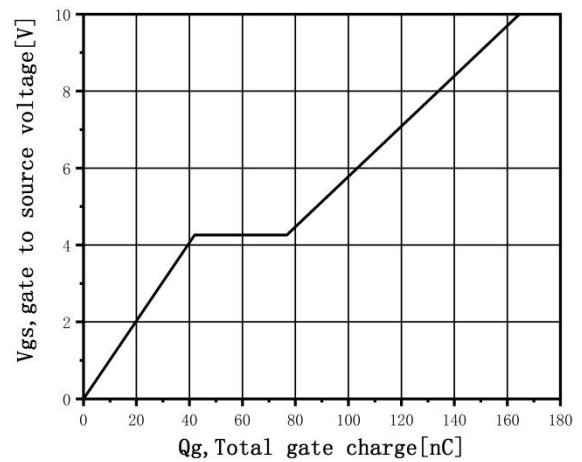


Figure 8. Gate Charge Characteristics

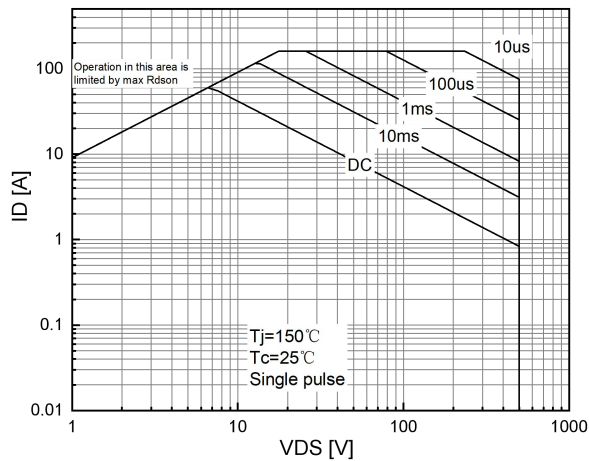


Figure 9. Maximum Safe Operating Area

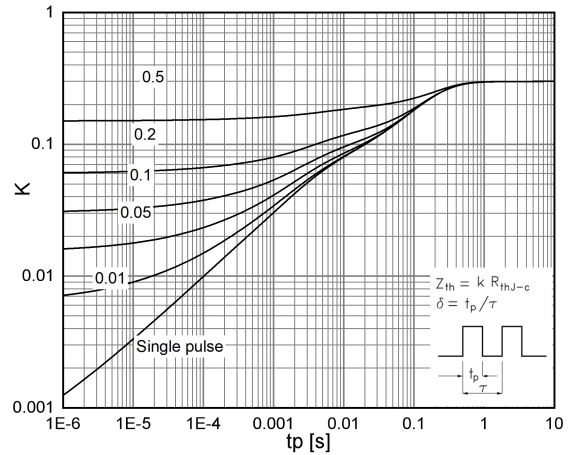
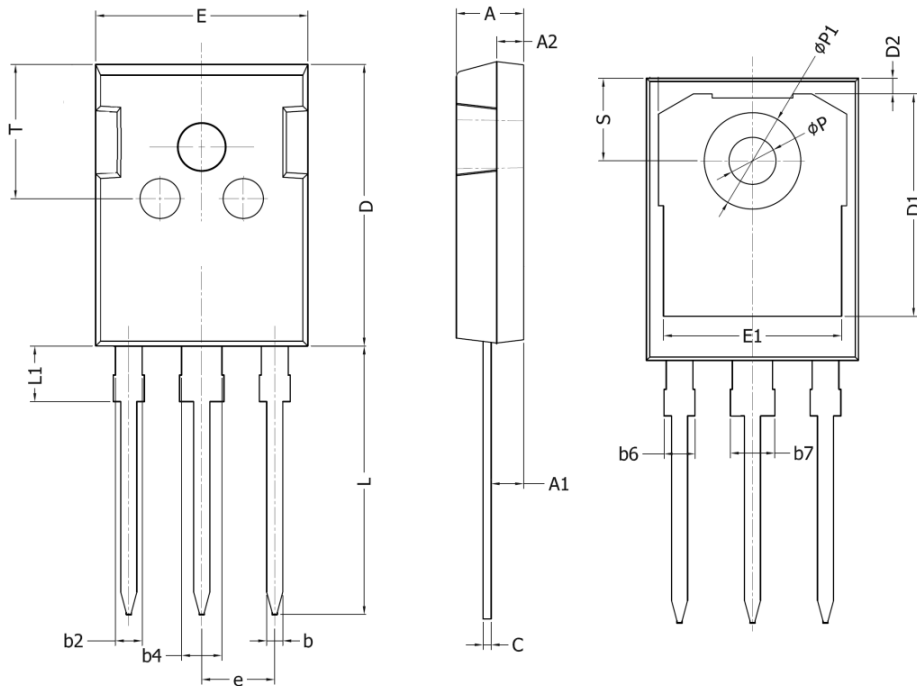


Figure 10. Transient Thermal Response Curve

**N-Channel Enhancement Mode MOSFET**
**TO-247 Package Outline Dimensions**


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.90	5.20
A1	2.31	2.51
A2	1.9	2.1
b	1.16	1.26
b2	1.96	2.06
b4	2.96	3.06
b6	-	2.25
b7	-	3.25
C	0.59	0.66
D	20.90	21.20
D1	16.25	16.85
D2	1.05	1.35
E	15.75	16.10
E1	13.00	13.60
e	5.436 BSC	
L	19.80	20.20
L1	-	4.30
P	3.40	3.60
P1	7.00	7.40
S	6.05	6.25
T	9.80	10.20