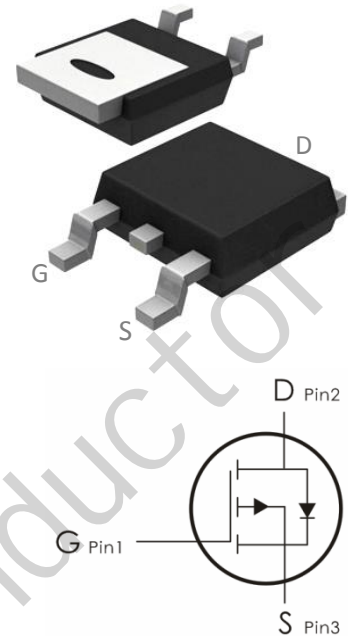


## Description:

This P-Channel MOSFET uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. It can be used in a wide variety of applications.



## Features:

- 1)  $V_{DS}=-30V, I_D=-40A, R_{DS(ON)}<20m\ \Omega @V_{GS}=-10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.

## Absolute Maximum Ratings: ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	-40	A
	Continuous Drain Current- $T_C=100^\circ C$	-22	
	Pulsed Drain Current <sup>1</sup>	-140	
$E_{AS}$	Single Pulse Avalanche Energy	---	mJ
$P_D$	Power Dissipation	40	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

## Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.1	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62	

Package Marking and Ordering Information :

Part NO.	Marking	Package
AOD417	AOD417	TO-252

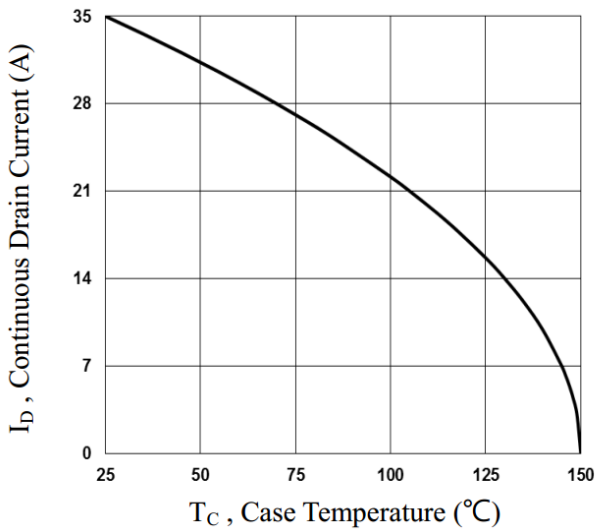
Electrical Characteristics: ( $T_C=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	-30	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=-30V, T_J=25^\circ\text{C}$	---	---	-1	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	-1.0	-1.6	-2.5	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS}=-10V, I_D=-8A$	---	16.5	20	m $\Omega$
		$V_{GS}=-4.5V, I_D=-5A$	---	25.6	32	
$G_{FS}$	Forward Transconductance	$V_{DS}=-10V, I_D=-3A$	---	6.8	---	S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$	---	1250	1820	pF
$C_{oss}$	Output Capacitance		---	160	235	
$C_{rss}$	Reverse Transfer Capacitance		---	90	130	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time <sup>2,3</sup>	$V_{DS}=-15V, I_D=-1A,$ $R_{GEN}=6\ \Omega, V_{GS}=-10V$	---	5.8	11	ns
$t_r$	Rise Time <sup>2,3</sup>		---	18.8	36	ns
$t_{d(off)}$	Turn-Off Delay Time <sup>2,3</sup>		---	46.9	89	ns
$t_f$	Fall Time <sup>2,3</sup>		---	12.3	23	ns
$Q_g$	Total Gate Charge <sup>2,3</sup>	$V_{GS}=4.5V, V_{DS}=15V,$ $I_D=5A$	---	11	17	nC
$Q_{gs}$	Gate-Source Charge <sup>2,3</sup>		---	3.4	6	nC
$Q_{gd}$	Gate-Drain "Miller" Charge <sup>2,3</sup>		---	4.2	8	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V

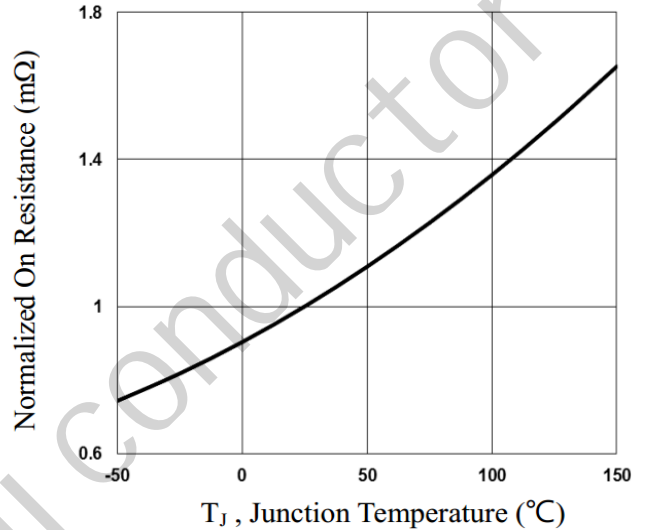
**Notes:**

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\cong$  300us , duty cycle  $\cong$  2%.
3. Essentially independent of operating temperature.

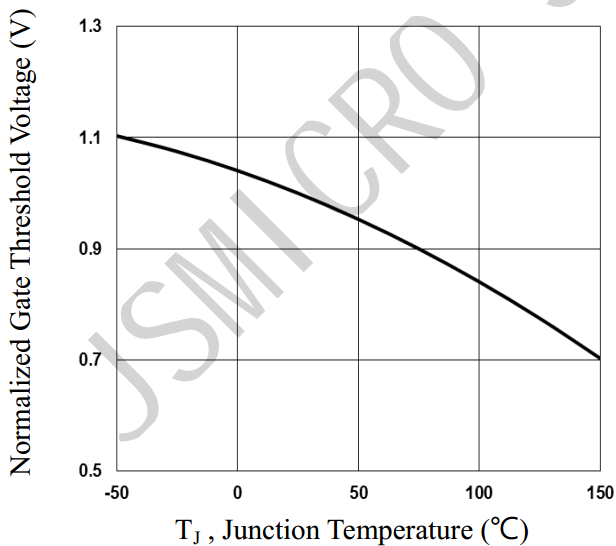
**Typical Characteristics:** ( $T_C=25^\circ\text{C}$  unless otherwise noted)



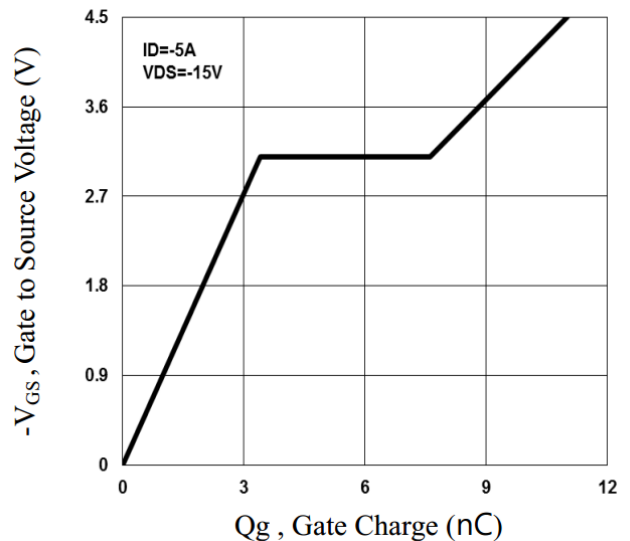
**Fig.1 Continuous Drain Current vs.  $T_C$**



**Fig.2 Normalized RDSON vs.  $T_J$**



**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



**Fig.4 Gate Charge Waveform**

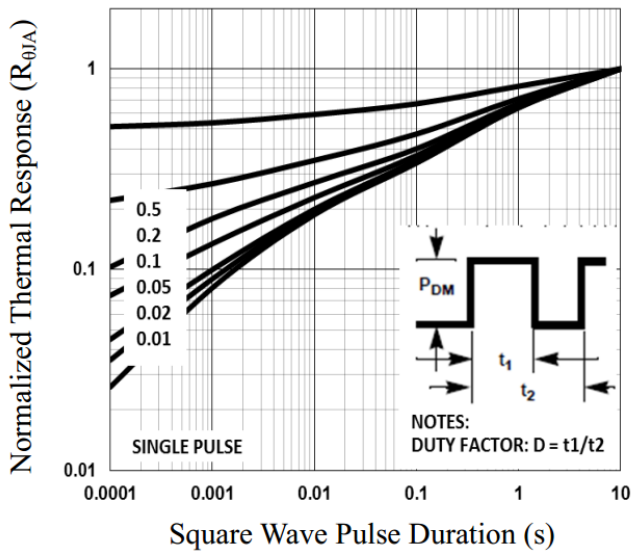


Fig.5 Normalized Transient Impedance

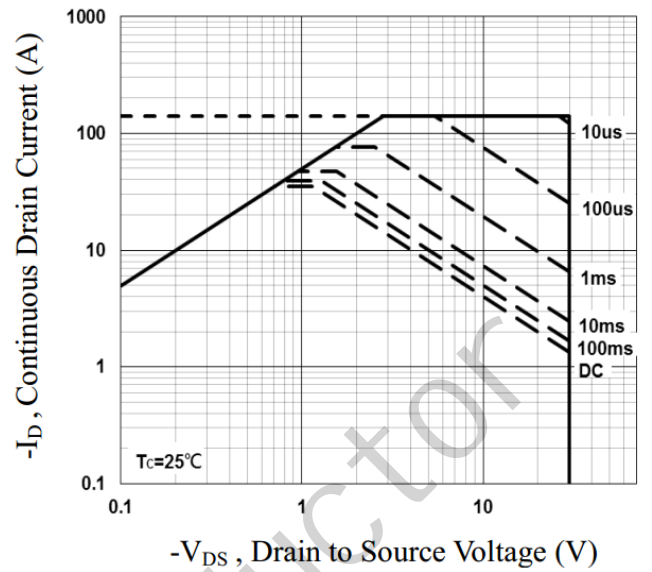


Fig.6 Maximum Safe Operation Area

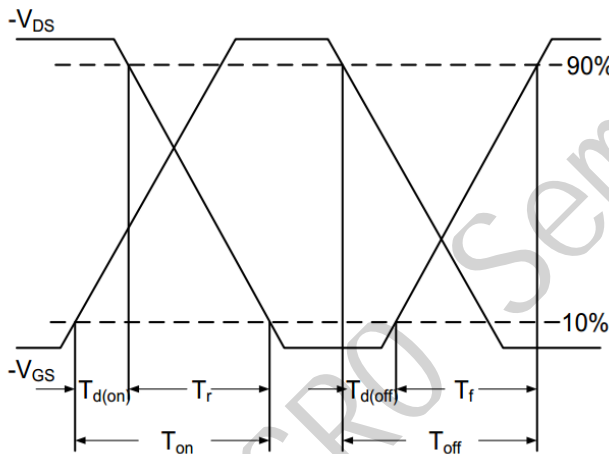


Fig.7 Switching Time Waveform

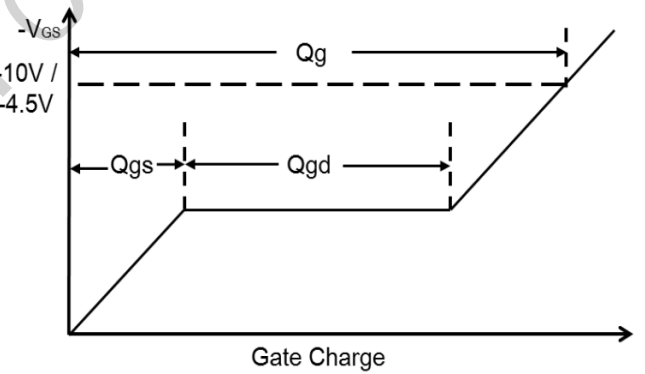
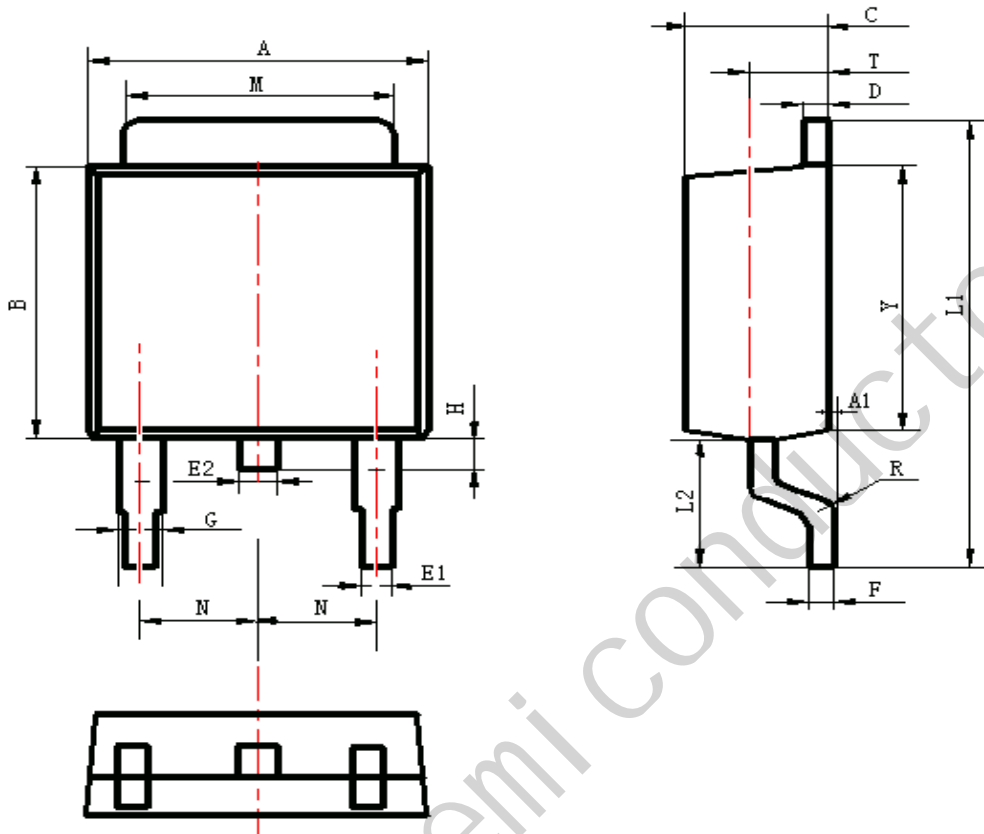


Fig.8 Gate Charge Waveform

**Package Outline: TO-252**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	6.30	6.90	0.248	0.272
A1	0.00	0.16	0.000	0.006
B	5.70	6.30	0.224	0.248
C	2.10	2.50	0.083	0.098
D	0.30	0.70	0.012	0.028
E1	0.60	0.90	0.024	0.035
E2	0.70	1.00	0.028	0.039
F	0.30	0.60	0.012	0.024
G	0.70	1.20	0.028	0.047
L1	9.60	10.50	0.378	0.413
L2	2.70	3.10	0.106	0.122
H	0.40	1.00	0.016	0.039
M	5.10	5.50	0.201	0.217
N	2.09	2.49	0.082	0.098
R	0.30		0.012	
T	1.40	1.60	0.055	0.063
Y	5.10	6.30	0.201	0.248