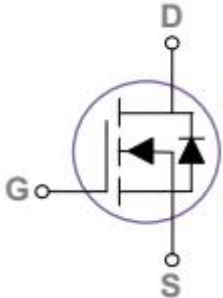
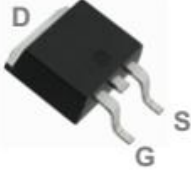


N-Channel Power MOSFET

<p>General Features</p> <ul style="list-style-type: none"> ● $V_{DS} = 60V, I_D = 17A$ $R_{DS(ON)} < 75\ m\Omega @ V_{GS} = 10V$ $R_{DS(ON)} < 90\ m\Omega @ V_{GS} = 4.5V$ ● Improved dv/dt capability ● High density cell design for ultra low Rdson ● Good stability and uniformity with high EAs ● Excellent package for good heat dissipation 	 <p>Schematic diagram</p>
<p>Applications</p> <ul style="list-style-type: none"> ● Power switching application ● Hard switched and high frequency circuits ● Motor drive 	 <p>TO252 Pin Configuration</p>

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ($T_C = 25^\circ C$)	$I_D(25^\circ C)$	17	A
Drain Current-Continuous ($T_C = 100^\circ C$)	$I_D(100^\circ C)$	12	A
Pulsed Drain Current	I_{DM}	44	A
Maximum Power Dissipation	P_D	25	W
Derating factor		0.2	W/ $^\circ C$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-50 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	3.3	°C/W
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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$	-	60	75	m Ω
		$V_{GS}=4.5V, I_D=3A$	-	70	90	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=3A$	-	4	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	500	725	PF
Output Capacitance	C_{oss}		-	45	65	PF
Reverse Transfer Capacitance	C_{rss}		-	16	30	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=1A$ $V_{GS}=10V, R_G=3.3\Omega$	-	2.9	6	nS
Turn-on Rise Time	t_r		-	9.5	18.	nS
Turn-Off Delay Time	$t_{d(off)}$		-	18.4	35	nS
Turn-Off Fall Time	t_f		-	5.3	10	nS
Total Gate Charge	Q_g	$V_{DS}=48V, I_D=6A,$ $V_{GS}=10V$	-	9.3	13	nC
Gate-Source Charge	Q_{gs}		-	2.1	3	nC
Gate-Drain Charge	Q_{gd}		-	1.8	4	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	-	-	1.0	V
Diode Forward Current ^(Note 2)	I_S	$V_G=V_D=0V$	-	-	11	A
Reverse Recovery Time	t_{rr}	$V_{GS}=30V, I_S=1A, T_J=25^\circ\text{C}$	-	23.2	-	nS
Reverse Recovery Charge	Q_{rr}	$di/dt = 100A/\mu s$ ^(Note 3)	-	14.3	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics (Curves)

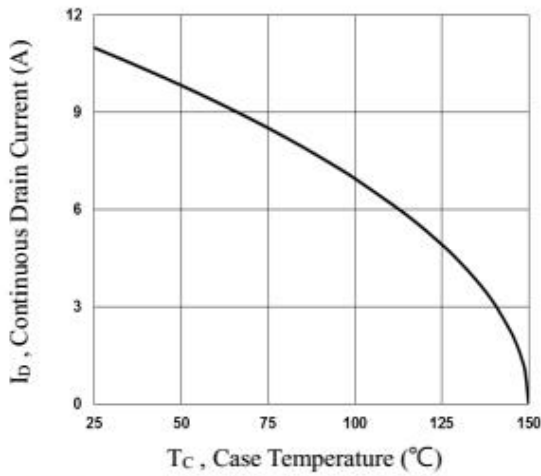


Fig.1 Continuous Drain Current vs. T_c

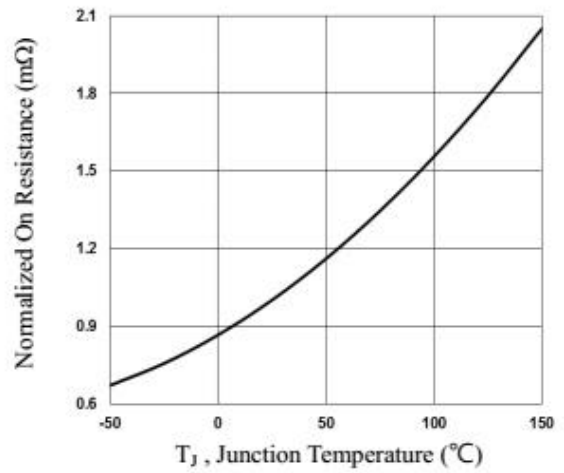


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

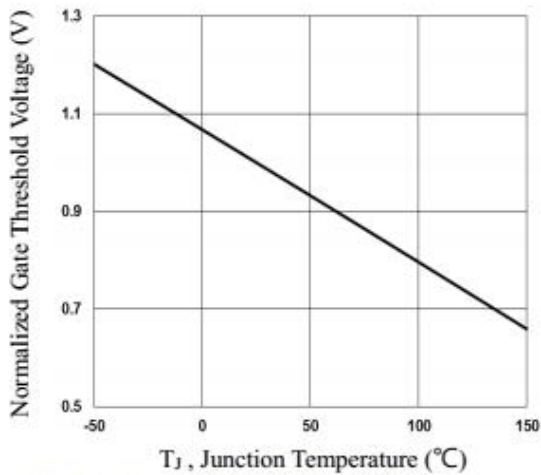


Fig.3 Normalized V_{th} vs. T_j

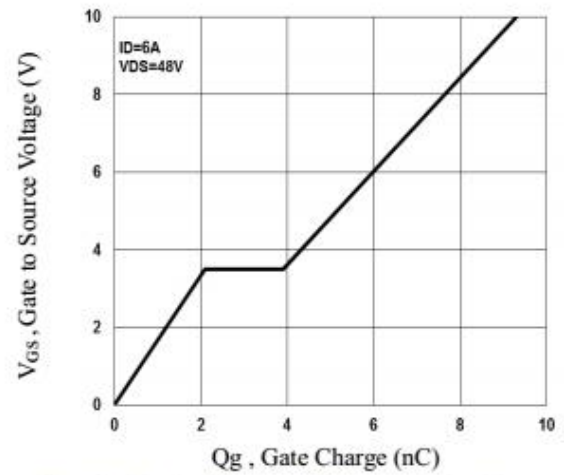


Fig.4 Gate Charge Characteristics

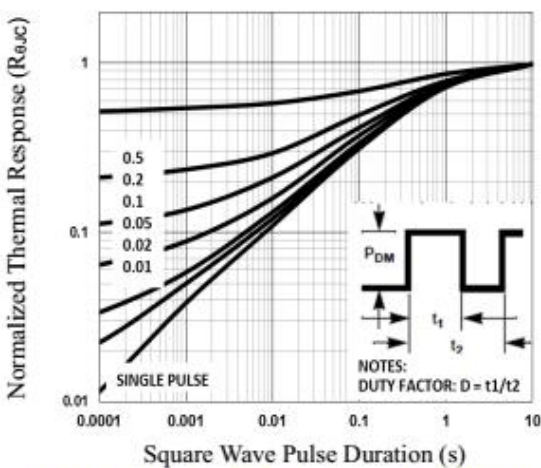


Fig.5 Normalized Transient Impedance

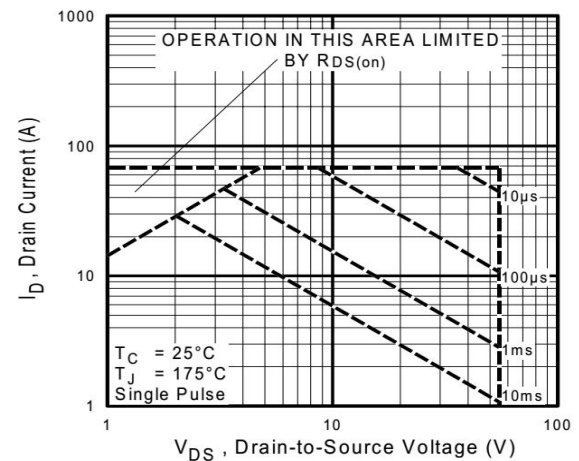


Fig.6 Maximum Safe Operation Area

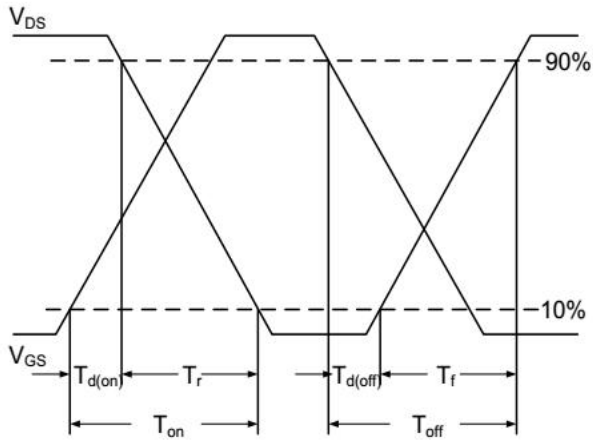


Fig.7 Switching Time Waveform

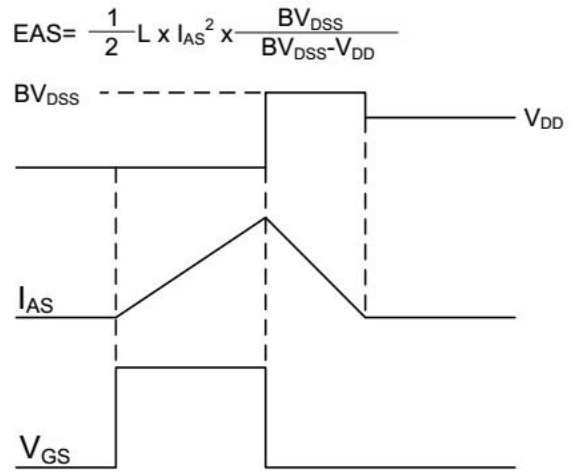
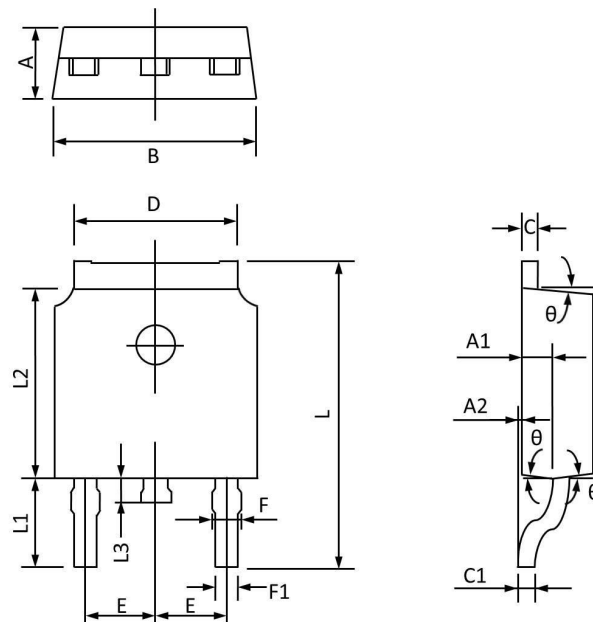


Fig.8 EAS Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

TO252 Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°

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