



-60V, -15A, 70mΩ Fast Switching MOSFETs

Features

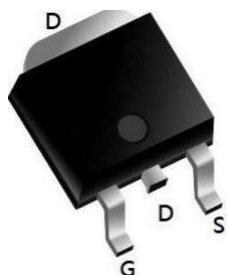
- | Super Low Gate Charge
- | Advanced high cell density Trench technology
- | Excellent CdvV/dt effect decline
- | 100% EAS Guaranteed

Applications

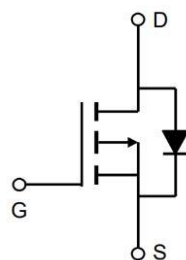
- | PWM applications
- | Load Switch
- | Power management

RoHS

TO252-3L



Equivalent Circuit



Absolute Maximum Ratings (T_C=25°C unless otherwise specified noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	-60	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _D @T _C =25°C	-15	A
	I _D @T _C =100°C	-8.3	A
Pulsed Drain Current ¹	I _{DM}	-26	A
Single Pulse Avalanche Energy ²	EAS	29.8	mJ
Total Power Dissipation	P _D	31.3	W
Storage Temperature Range	T _{STG}	-55 to 150	°C
Operating Junction Temperature Range	T _J	-55 to 150	°C
Maximum Temperature for Soldering	T _L	260	°C
Thermal Resistance Junction ambient	R _{θJA}	62	°C/W
Thermal Resistance Junction Case	R _{θJC}	4	°C/W



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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS}=0V, I_D=-250\mu A$	-60	-	-	V
Drain to Source Leakage Current	I_{DSS}	$V_{DS}=480V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	-1	μA
		$V_{DS}=-48V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	-	-	-5	μA
Gate to Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-	-2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-10A$	-	70	90	m Ω
		$V_{GS}=-4.5V, I_D=-5A$	-	85	115	
Forward Transconductance	g_{fs}	$V_{DS}=-5V, I_D=-15A$	-	35	-	S
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=-15V,$ $f=1.0\text{MHz}$	-	1080	-	pF
Output Capacitance	C_{oss}		-	73	-	
Reverse Transfer Capacitance	C_{rss}		-	50	-	
Total Gate Charge	Q_g	$V_{DS}=-12V, I_D=-6A,$ $V_{GS}=-4.5V$	-	11.8	-	nC
Gate-Source Charge	Q_{gs}		-	1.9	-	
Gate-Drain("Miller")Charge	Q_{gd}		-	6.5	-	
Turn-on Delay Time	$T_{d(on)}$	$V_{GS}=-10V,$ $R_G=3.3\Omega, V_{DD}=-15V,$ $I_D=-1A$	-	8.8	-	nS
Turn-on Rise Time	t_r		-	19.6	-	
Turn-Off Delay Time	$T_{d(off)}$		-	47.2	-	
Turn-Off Fall Time	T_f		-	9.6	-	
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-15A, T_J=25^{\circ}\text{C}$	-	-	-1	V
Pulsed Source Current ^{2,5}	I_{SM}	$V_G=V_D=0V, \text{Force Current}$	-	-	-26	A
Continuous Source Current ^{1,5}	I_S		-	-	-15	A

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-24.4A$.
- 4.The power dissipation is limited by 150°C junction temperature.
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Performance Characteristics

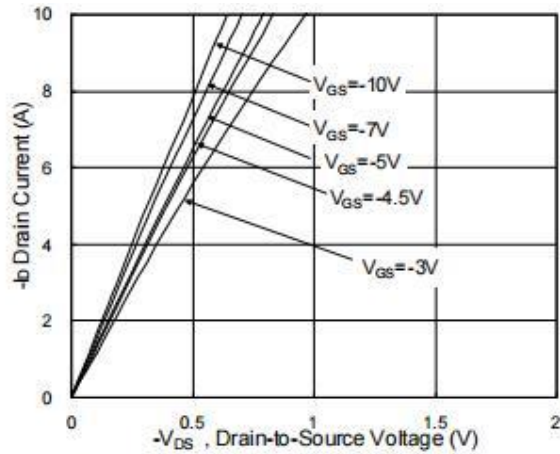


Fig.1 Typical Output Characteristics

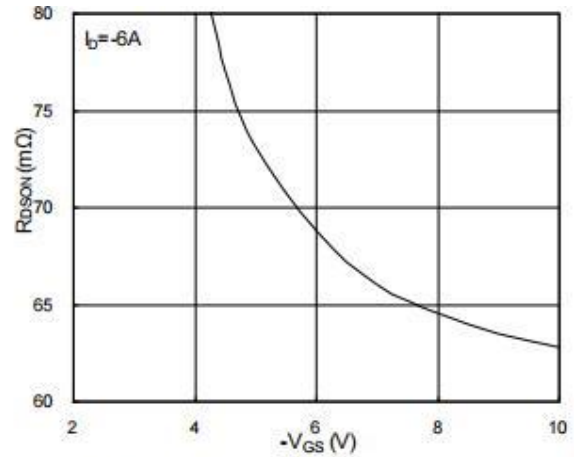


Fig.2 On-Resistance v.s Gate-Source

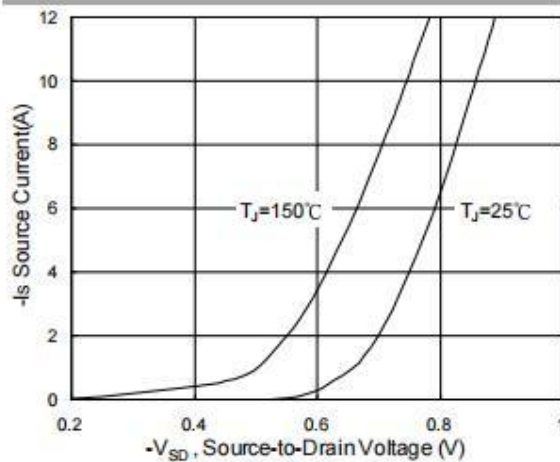


Fig.3 Forward Characteristics of Reverse

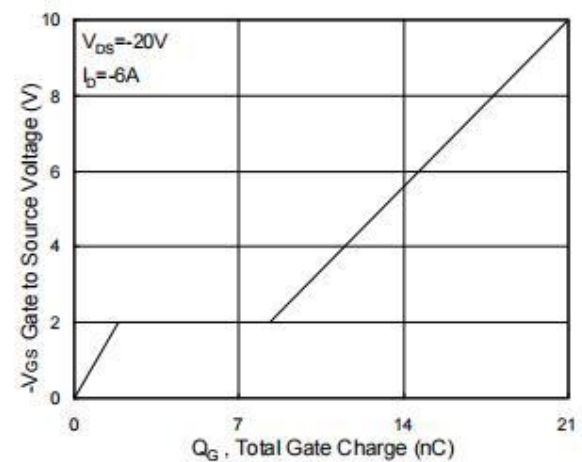


Fig.4 Gate-Charge Characteristics

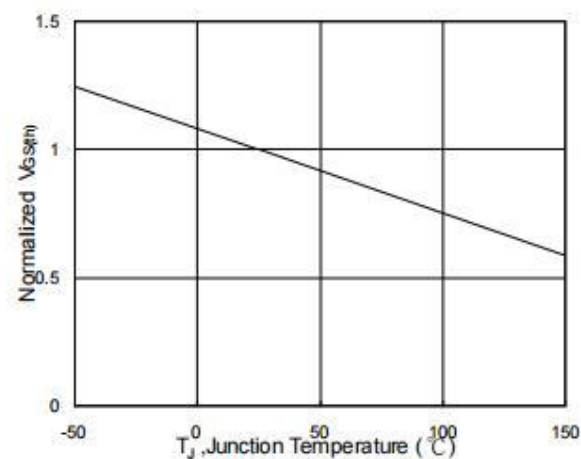


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

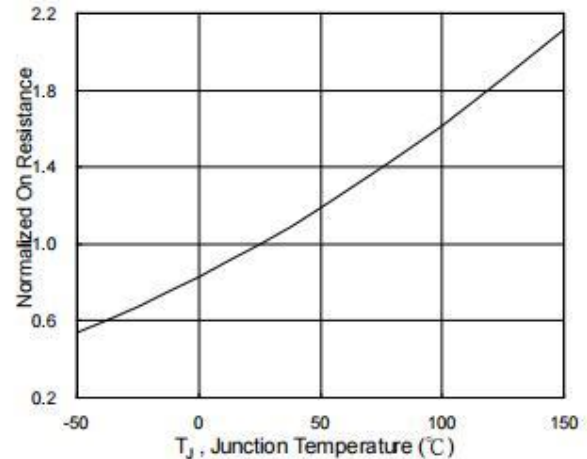


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

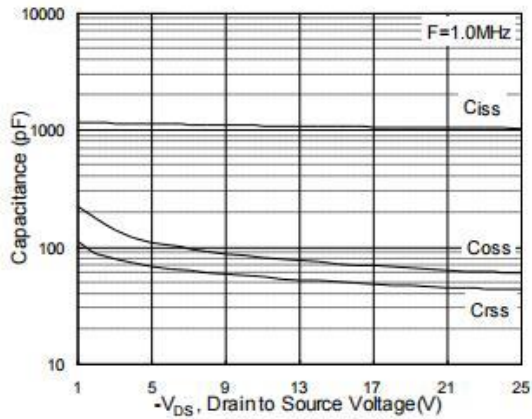


Fig.7 Capacitance

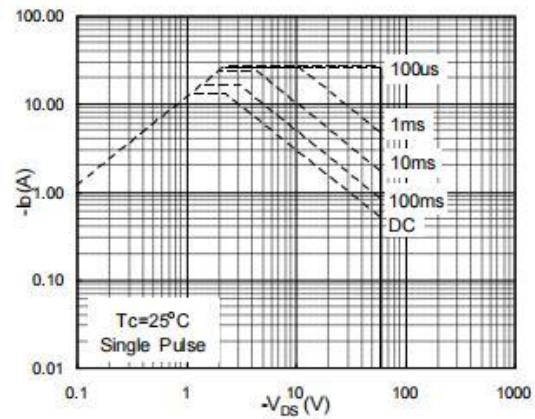


Fig.8 Safe Operating Area

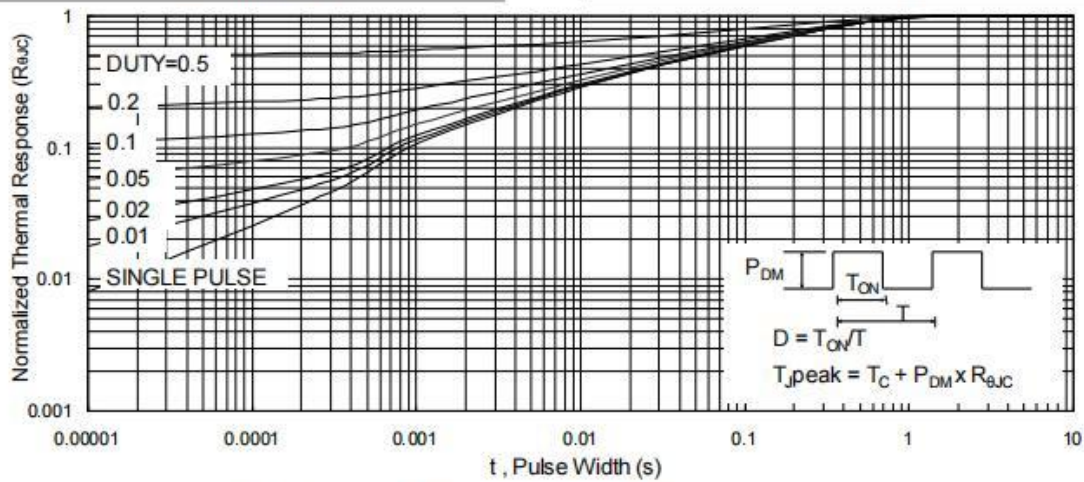


Fig.9 Normalized Maximum Transient Thermal Impedance

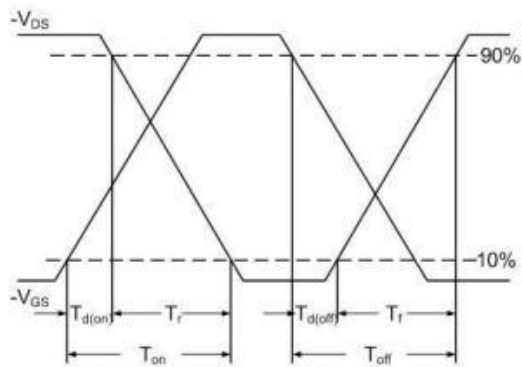


Fig.10 Switching Time Waveform

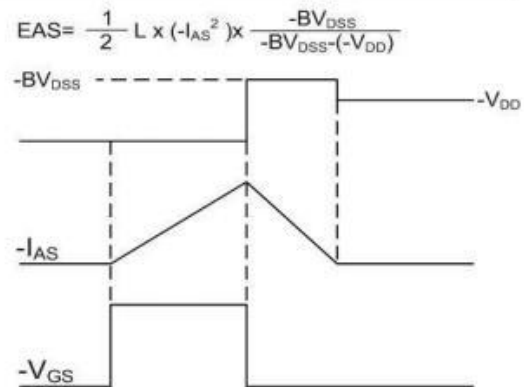
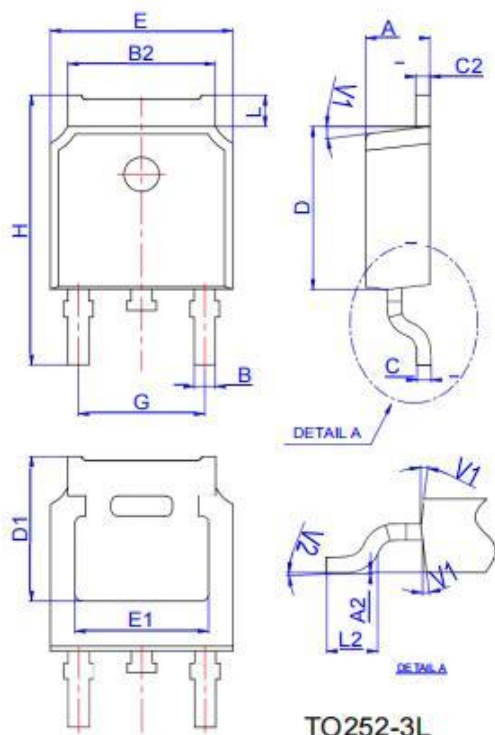


Fig.11 Unclamped Inductive Switching Waveform

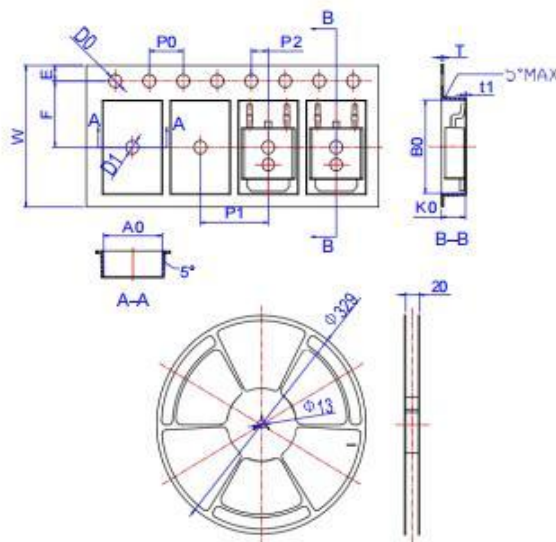


Package Mechanical Data TO252-3L



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO252-3L



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583