

Mosfet

General Description

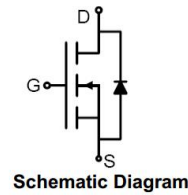
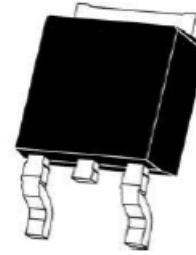
These N-channel enhancement mode power mosfets used advanced trench technology design, provided excellent $R_{DS(on)}$ and low gate charge. Which accords with the RoHS standard.

Features

- $V_{DS} = 30V, I_D = 90A$
 $R_{DS(on)}, 3.8 m\Omega$ (Typ) @ $V_{GS} = 10V$
 $R_{DS(on)}, 6.4 m\Omega$ (Typ) @ $V_{GS} = 4.5V$
- Low on resistance
- Low gate charge
- Fast switching
- Low reverse transfer capacitances

Application

- DC-DC converters
- Synchronous Rectifier



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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous ^{Note3}	TC=25°C	I_D	90	A
	TC=100°C		63	A
Drain Current-Pulsed ^{Note1}		I_{DM}	200	A
Avalanche Energy ^{Note4}		E_{AS}	280	mJ
Avalanche Current		I_{AS}	33	A
Maximum Power Dissipation	TC=25°C	P_D	105	W
Storage Temperature Range		T_{STG}	-55 to +150	°C
Operating Junction Temperature Range		T_J	-55 to +150	°C

Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	3.3	-	°C/W

Electrical Characteristics(TJ=25℃ unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =250uA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =250uA	1.0	1.7	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _{DS} =30A	-	3.8	4.9	mΩ
		V _{GS} =4.5V, I _{DS} =20A	-	6.4	7.9	

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} = 0V, f=1MHz	-	1963	-	pF
Output Capacitance	C _{OSS}		-	248	-	
Reverse Transfer Capacitance	C _{rss}		-	221	-	
Gate Resisistance	R _g	V _{DD} =0V, V _{GS} =1V, F=1MHz	-	1.43	-	Ω

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T _{d(on)}	V _{GS} =10V, V _{DS} =15V, R _{GEN} =3Ω I _D =20A	-	55	-	ns
Rise Time	t _r		-	36.4	-	
Turn-Off Delay Time	T _{d(off)}		-	37.5	-	
Fall Time	t _f		-	14	-	
Total Gate Charge at 10V	Q _g	V _{DS} =15V, I _{DS} =45A, V _{GS} =10V	-	41	-	nC
Gate to Source Gate Charge	Q _{gs}		-	6.4	-	
Gate to Drain"Miller"Charge	Q _{gd}		-	11	-	

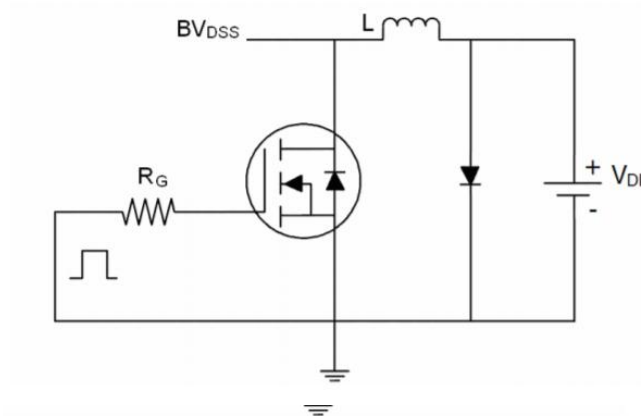
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{DS} =20A	-	-	1.2	V
Reverse Recovery Time	t _{rr}	TJ=25℃, IF=20A	-	21.7	-	nS
Reverse Recovery Charge	Q _{rr}	di/dt=100A/us	-	7.2	-	nC

Notes:

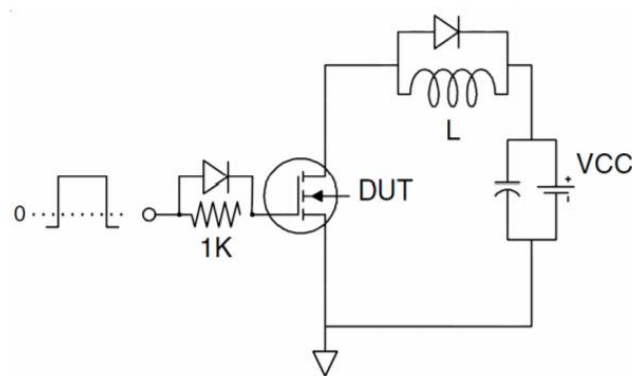
- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: EAS condition: L=0.5mH, VDD=15V, VG=10V, V_{GATE}=30V, Start TJ=25℃.

Test Circuit

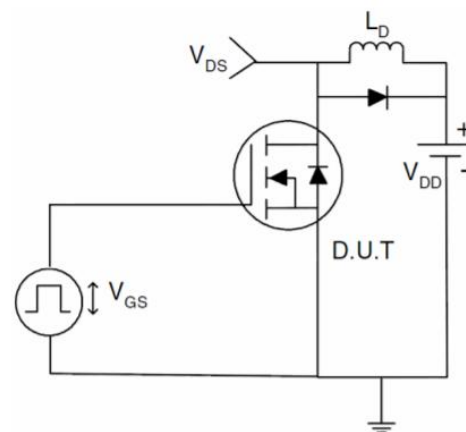
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

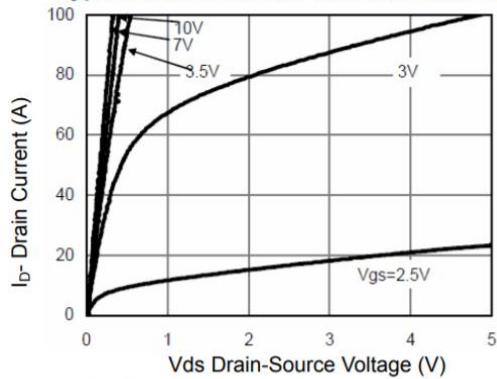


Figure 1 Output Characteristics

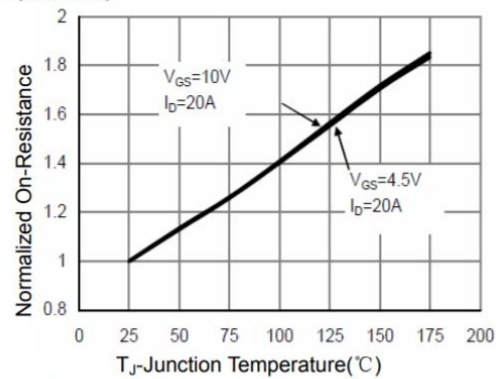


Figure 4 Rds(on)-Junction Temperature

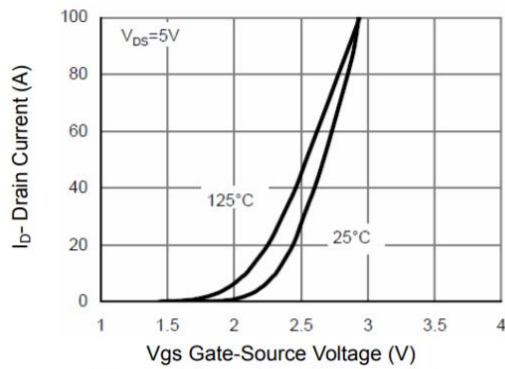


Figure 2 Transfer Characteristics

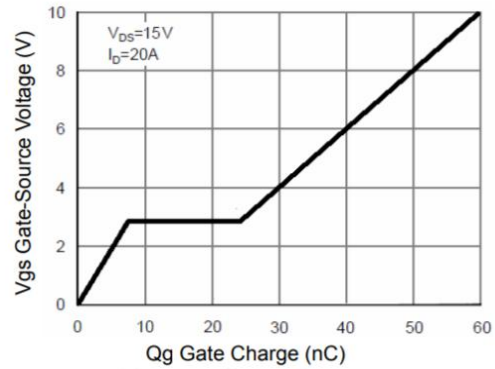


Figure 5 Gate Charge

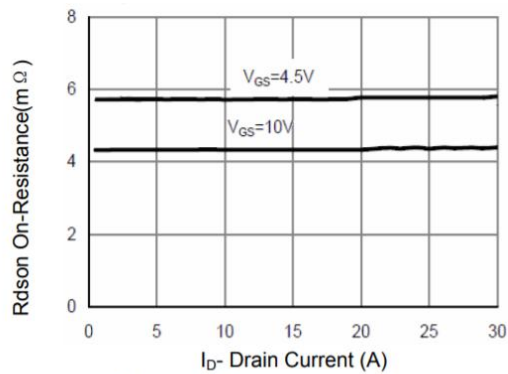


Figure 3 Rds(on)- Drain Current

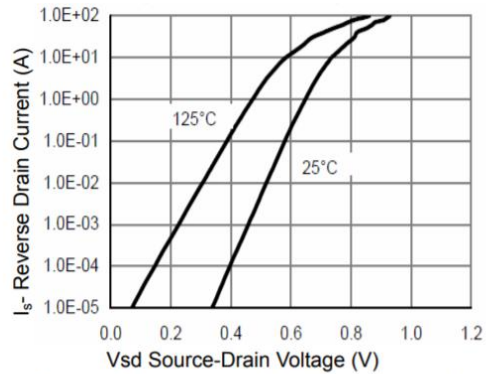


Figure 6 Source- Drain Diode Forward

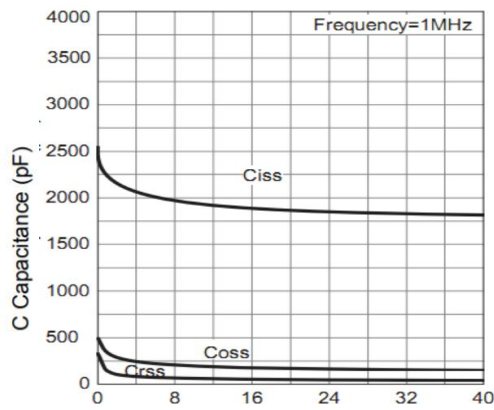


Figure 7 Capacitance vs Vds

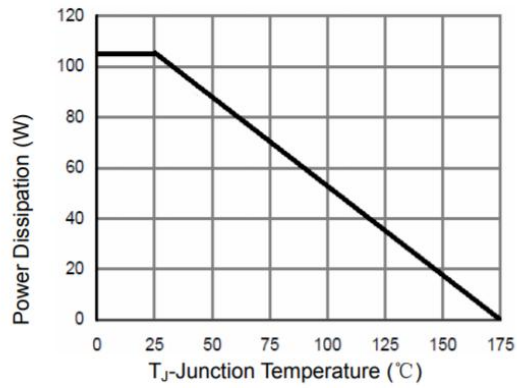


Figure 9 Power De-rating

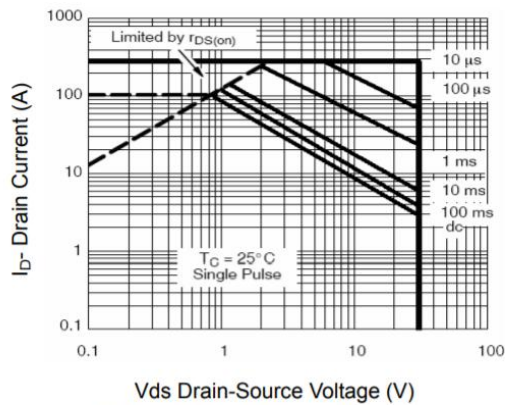


Figure 8 Safe Operation Area

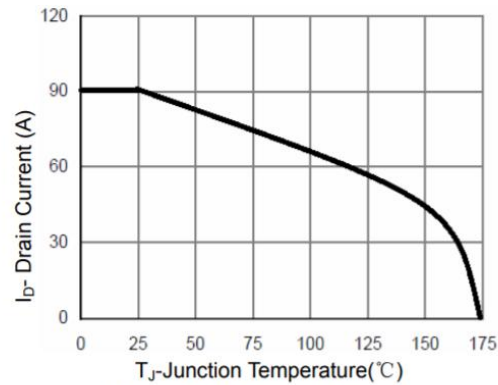


Figure 10 ID Current Derating

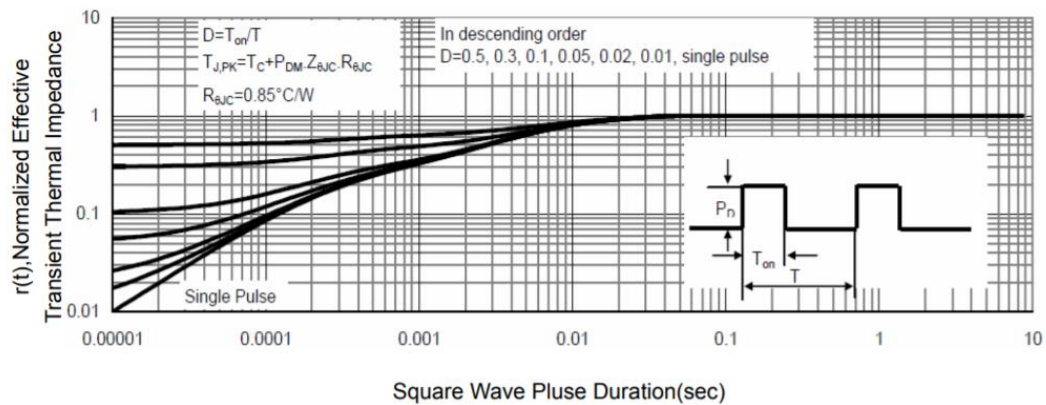
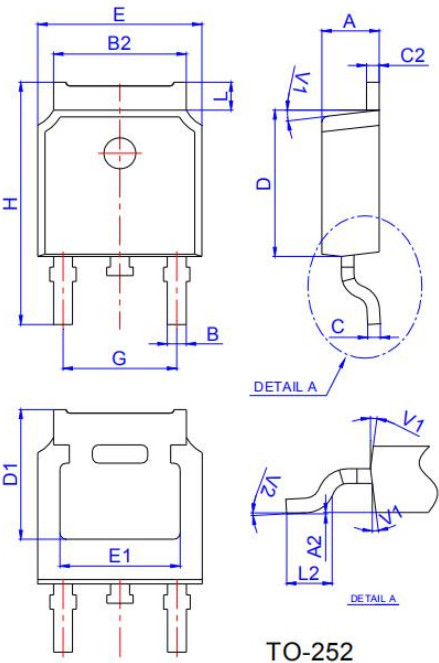


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data



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°