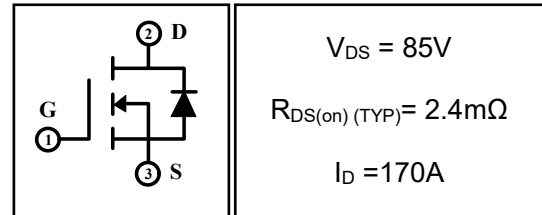


170A 85V N-channel Enhancement Mode Power MOSFET

1 Description

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

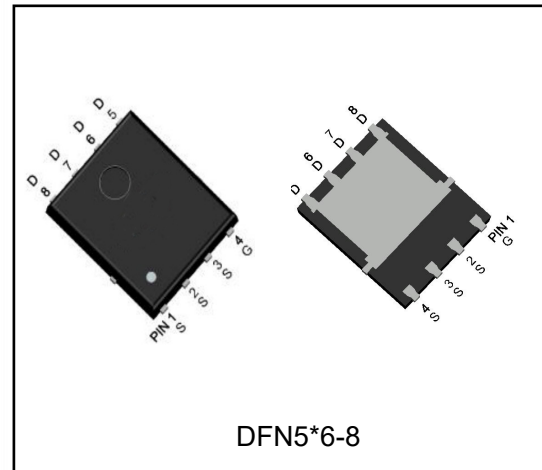


2 Features

- Fast switching
- Low on resistance
- Low gate charge
- High avalanche current
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

3 Applications

- Synchronous rectification in SMPS
- Hard switching and high speed circuit
- Power tools
- UPS
- Motor control



4 Electrical Characteristics

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

Parameter		Symbol	Rating	Units
Drain-to-Source Voltage		V_{DSS}	85	V
Gate-to-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	170	A
	$T_C=100^\circ C$		120	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	680	A
Single Pulse Avalanche Energy ⁽⁴⁾		E_{AS}	841	mJ
Power Dissipation	$T_a=25^\circ C$	P_{tot}	2.7	W
	$T_C=25^\circ C$	P_{tot}	167	W
Junction Temperature Range		T_j	-55~175	$^\circ C$
Storage Temperature Range		T_{stg}	-55~175	$^\circ C$

4.2 Thermal Characteristics

Parameter	Symbol	Value		Units
		Typ	Max	
Thermal Resistance, Junction to Case-sink	R_{thJC}	---	0.9	$^\circ C/W$
Thermal Resistance, Junction to Ambient	R_{thJA}	---	55	$^\circ C/W$

4.3 Electrical Characteristics (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-to-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	85	--	--	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =85V, V _{GS} =0V, T _C =25℃	--	--	1	μA
		V _{DS} =85V, V _{GS} =0V, T _C =125℃	--	--	100	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
Drain-to-Source on-state Resistance	R _{DS(on)}	V _{GS} =10V, I _D =80A	--	2.4	2.9	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =40V, f=1.0MHz	--	5621	--	pF
Output Capacitance	C _{oss}		--	923	--	
Reverse Transfer Capacitance	C _{rss}		--	10	--	
Gate Resisitance	R _G	V _{DD} =0V, V _{GS} =0V, F=1MHz	--	3	--	Ω
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	I _D =80A, V _{DD} =40V, V _{GS} =10V, R _{GEN} =3Ω	--	26	--	nS
Turn-on Rise Time	t _r		--	67	--	
Turn-off Delay Time	t _{d(off)}		--	63	--	
Turn-off Fall Time	t _f		--	37	--	
Total Gate Charge	Q _g	I _D =80A, V _{DD} =40V, V _{GS} =10V	--	85	--	nC
Gate-to-Source Charge	Q _{gs}		--	35	--	
Gate-to-Drain(“Miller”) Charge	Q _{gd}		--	18	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V _{SD}	V _{GS} =0V, I _S =50A	--	--	1.2	V
Diode Forward Current	I _S		--	--	170	A
Reverse Recovery Time ⁽³⁾	t _{rr}	T _J =25℃, I _F =50A, dI _F /dt=100A/μS, V _{GS} =0V	--	79	--	nS
Reverse Recovery Charge ⁽³⁾	Q _{rr}		--	110	--	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: L=0.5mH, V_{DD}=50V, V_{GATE}=85V, Start T_J=25°C.

5 Typical characteristics diagrams

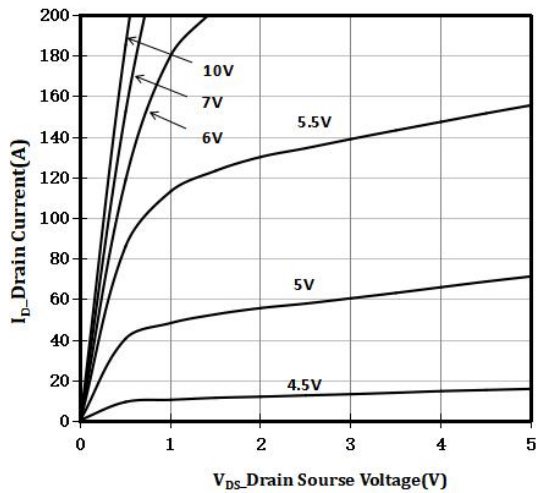


Figure 1 Output Characteristics

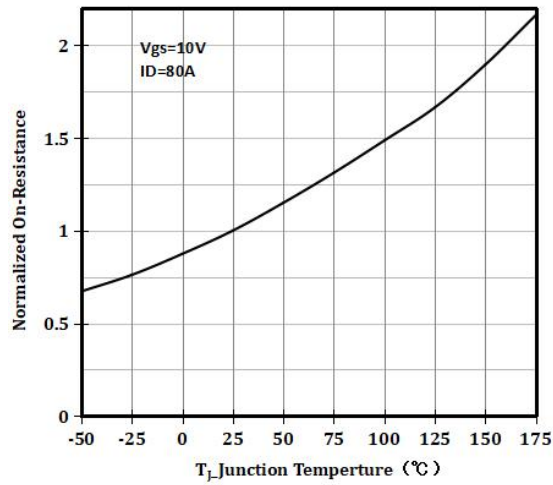


Figure 2 Rdson-Junction Temperature

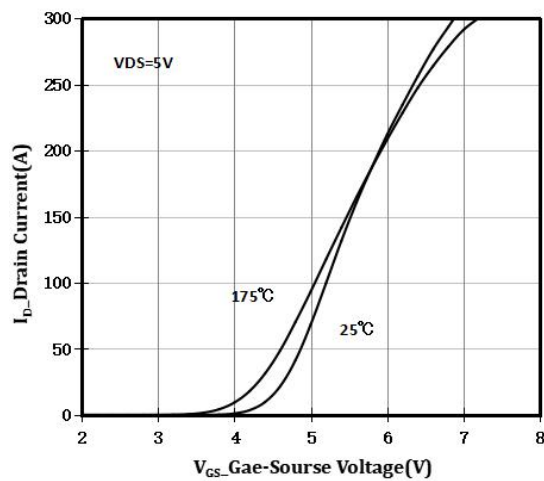


Figure 3 Transfer Characteristics

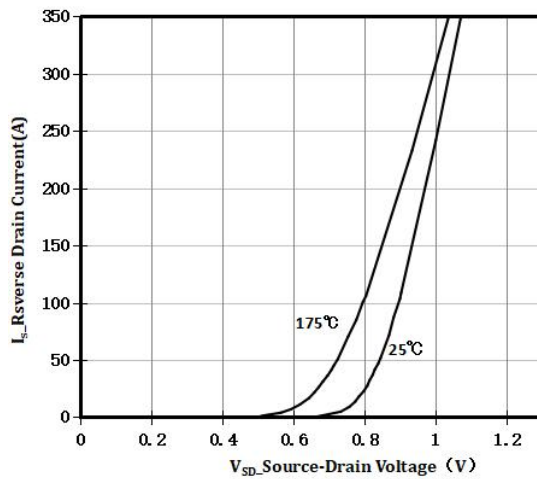


Figure 4 Source-Drain Diode Forward

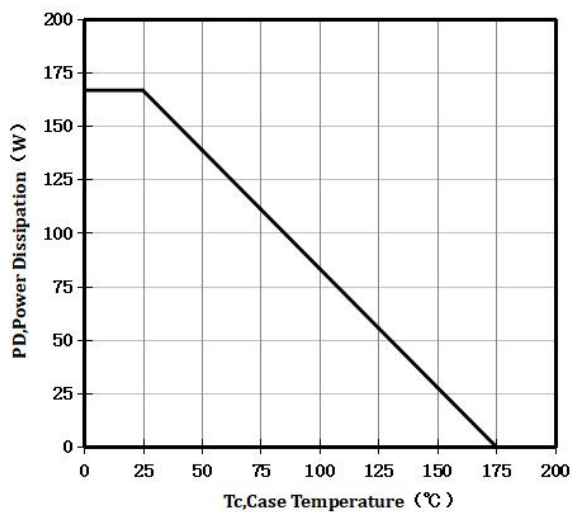


Figure 5 Power De-rating

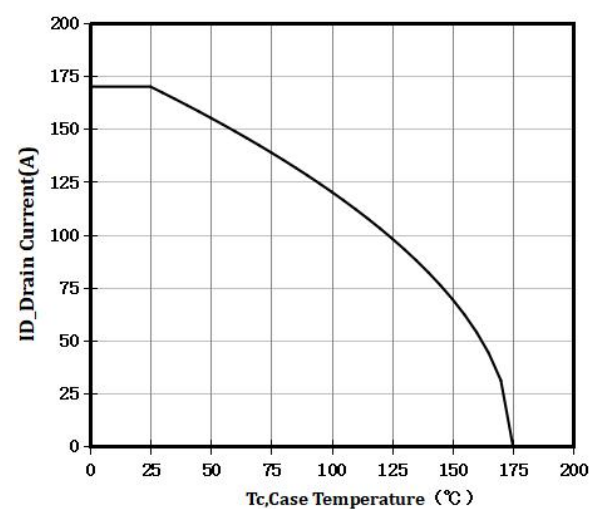


Figure 6 Current De-rating

5 Typical characteristics diagrams(continues)

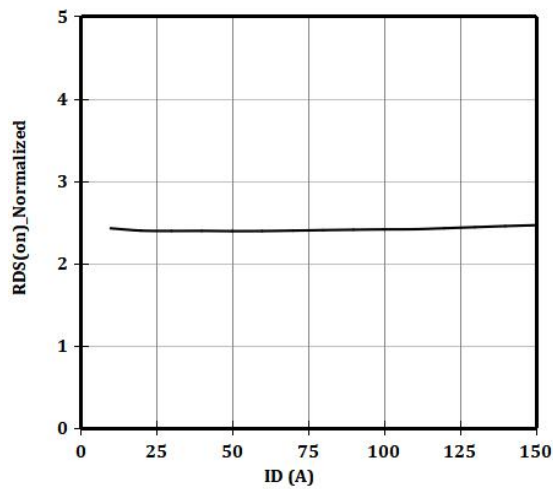


Figure 7 Rdson- Drain Current

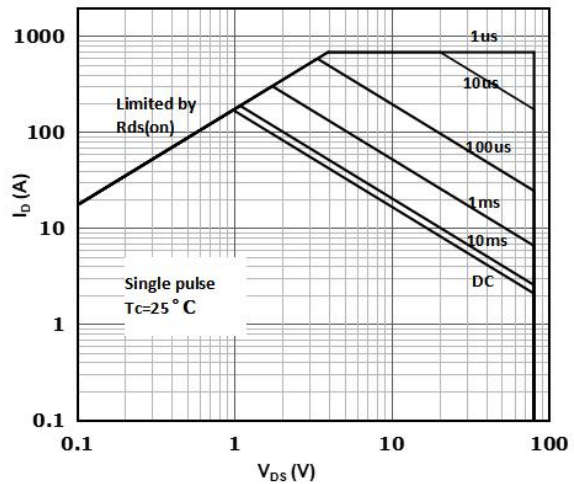


Figure 8 Safe Operation Area

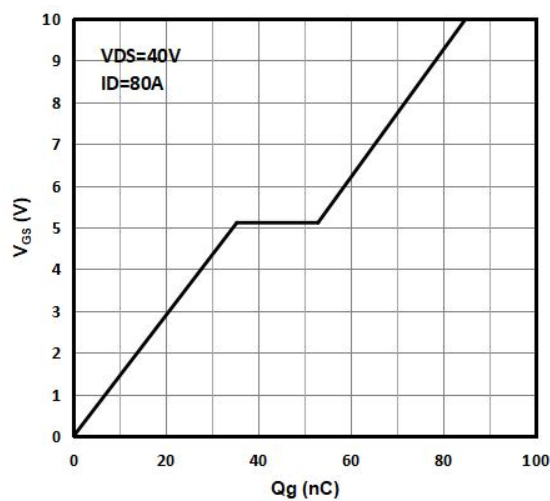


Figure 9 Gate Charge

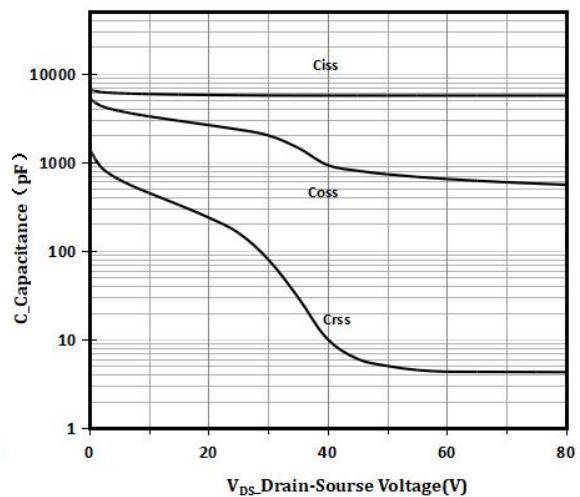


Figure 10 Capacitance vs Vds

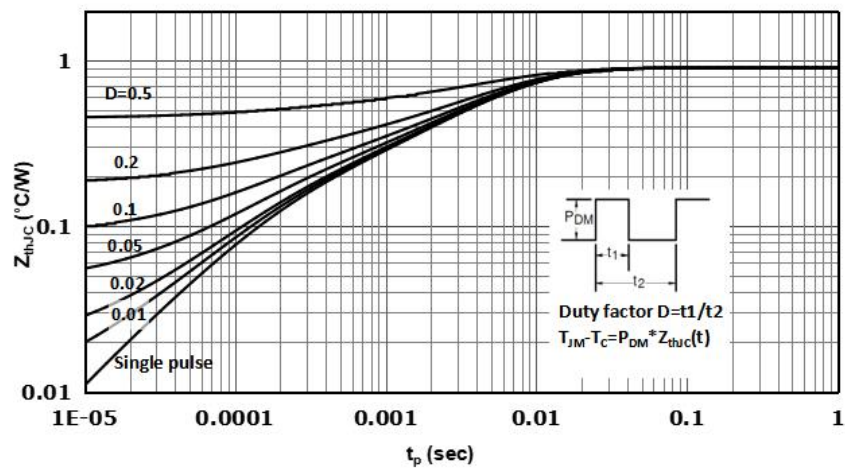
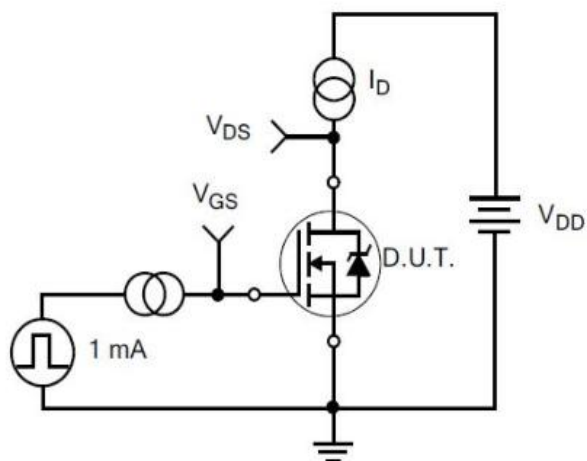
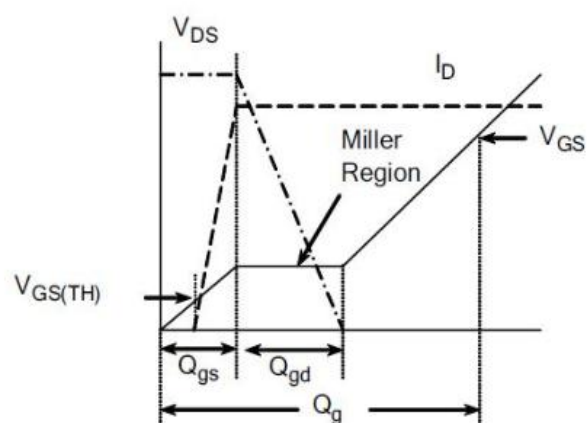


Figure 11 Normalized Maximum Transient Thermal Impedance

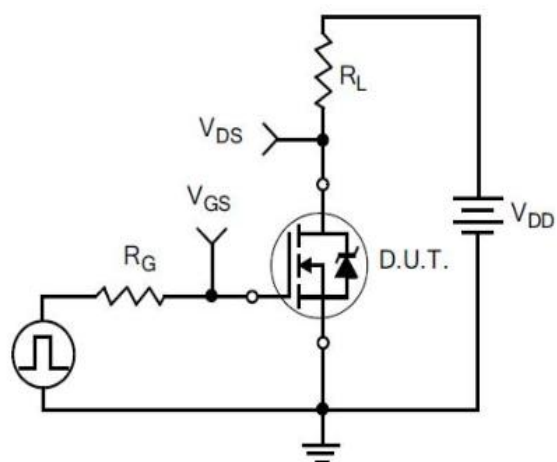
6 Typical Test Circuit and Waveform



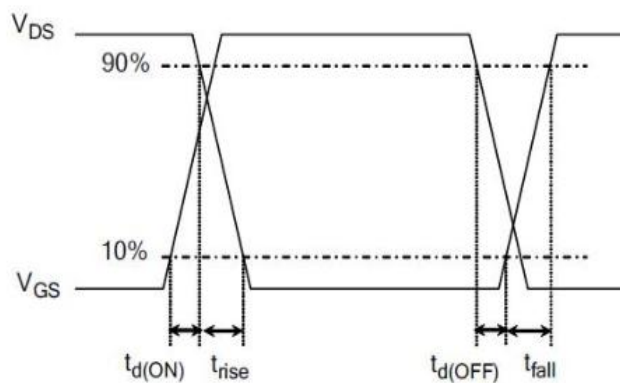
1) Gate Charge Test Circuit



2) . Gate Charge Waveform



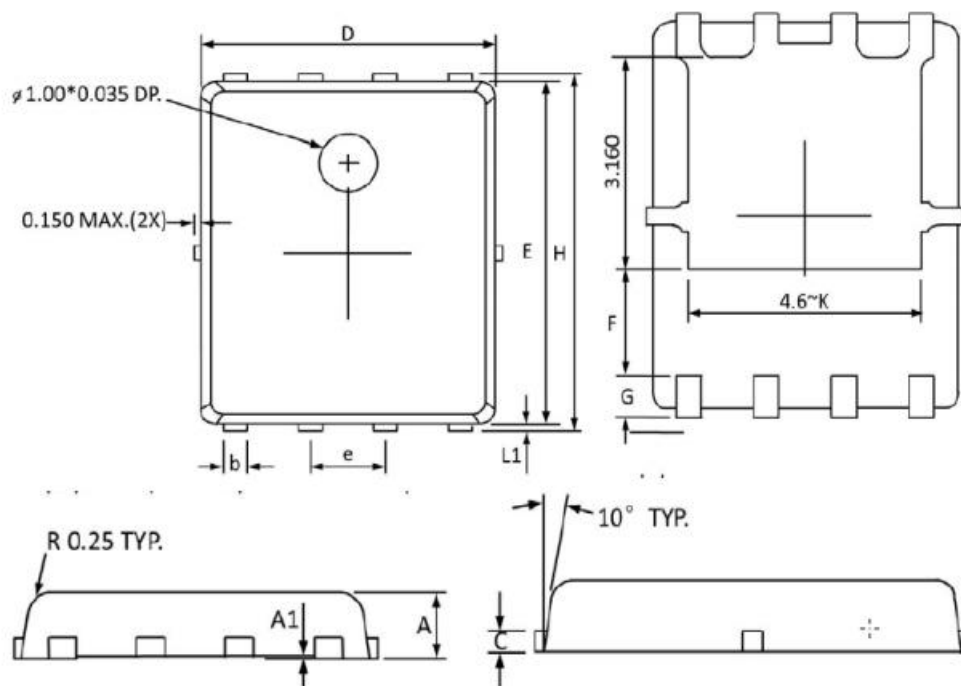
3) Resistive Switching Test Circuit



4) Resistive Switching Waveforms

8 Dimensions

PPAK5x6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.600 Ref		1.600 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	3.200 Ref		3.200 Ref	