30V, 150A N-Channel MOSFET

General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

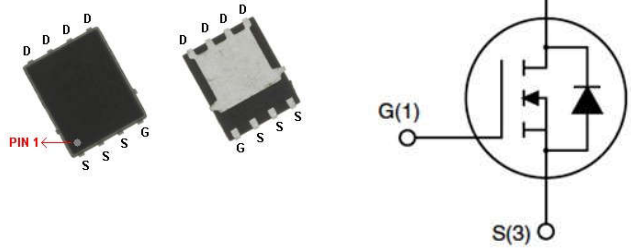
Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max.	I_D
30 V	2.0 mΩ	150 A

Features

- 30 V, 150 A, $R_{DS(ON)}$ Max. = 2.0 mΩ @ V_{GS} = 10 V
- Improved dv/dt capability
- Fast switching
- Green Device Available

PPAK5×6 Pin Configuration



Applications

- Networking
- LED Lighting Applications
- Quick Charger Applications
- DC-DC Power Management

Absolute Maximum Ratings (Tc = 25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C = 25℃)	150	A
	Drain Current – Continuous (T_C = 100℃)	75	A
I_{DM}	Drain Current – Pulsed[1]	430	A
E_{AS}	Single Pulse Avalanche Energy[2]	180	mJ
P_D	Power Dissipation (T_C = 25℃)	35	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.5	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	85	
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Electrical Characteristics (T_J = 25℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V , I_D = 250 μA	30			V
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 30 V, V_{GS} = 0 V ,T_J = 25℃			1	μA
		V_{DS} =24 V, V_{GS} = 0 V, T_J = 125℃			10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 30 A		1.55	2.0	mΩ
		V_{GS} = 4.5 V, I_D = 15 A		2.0	3.0	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS} , I_D = 250 μA	1.0	1.6	2.5	V
gfs	Forward Transconductance	V_{DS} = 5 V, I_D = 15 A		48		S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 24 A		40		nC
Q_{gs}	Gate-Source Charge			6		
Q_{gd}	Gate-Drain Charge			19		
$T_{d(on)}$	Turn-On Delay Time	V_{DS} = 15 V, V_{GS} = 10 V , R_{GEN} = 1 Ω, I_D = 1 A		20		ns
T_r	Rise Time			32		
$T_{d(off)}$	Turn-Off Delay Time			75		
T_f	Fall Time			28		
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, F = 1 MHz		4800		pF
C_{oss}	Output Capacitance			735		
C_{rss}	Reverse Transfer Capacitance			420		

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G = V_D = 0 V, Force Current			150	A
I_{SM}	Pulsed Source Current				600	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V, I_S = 30 A			1.2	V
T_{rr}	Body Diode Reverse Recovery Time	I_S = 1 A, dI/dt = 100 A/μs		49	85	ns
Q_{rr}	Body Diode Reverse Recovery Charge			18	35	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. E_{AS} condition: T_J = 25℃, V_{DD} = 25 V, V_{GS} = 10 V, L = 0.1 mH, I_{AS} = 60 A, R_G = 25 Ω
3. The data tested by pulsed , pulse width ≤ 300μs, duty cycle ≤ 2%.

Typical Performance Characteristics

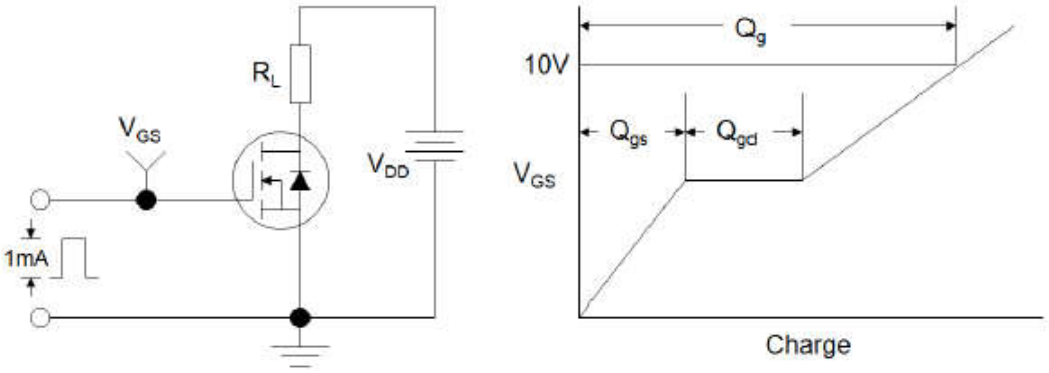


Figure1: Gate Charge Test Circuit & Waveform

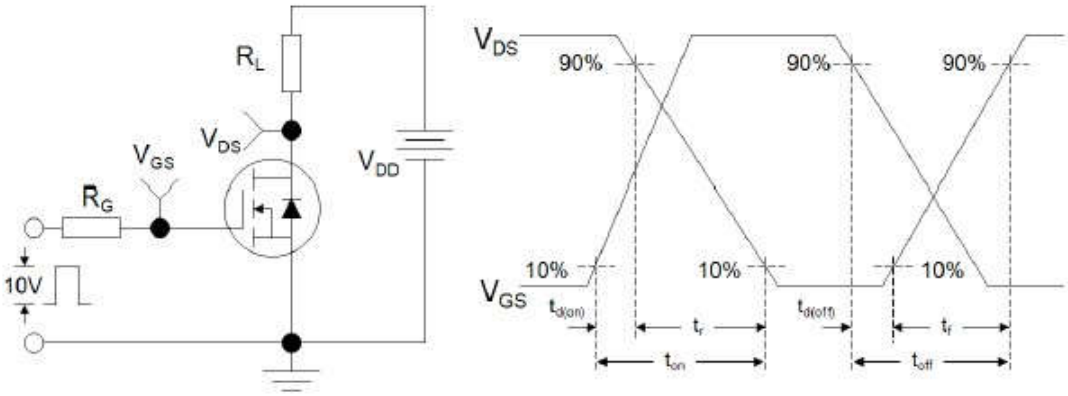


Figure 2: Resistive Switching Test Circuit & Waveforms

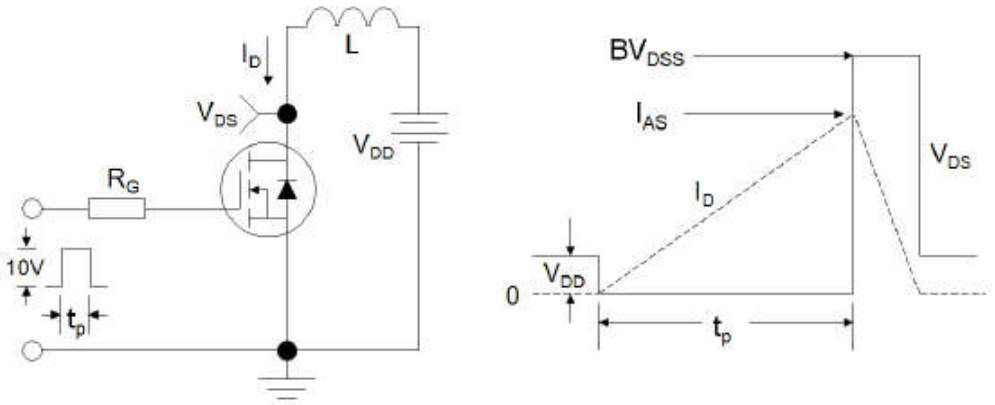


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

Typical Performance Characteristics (Continued)

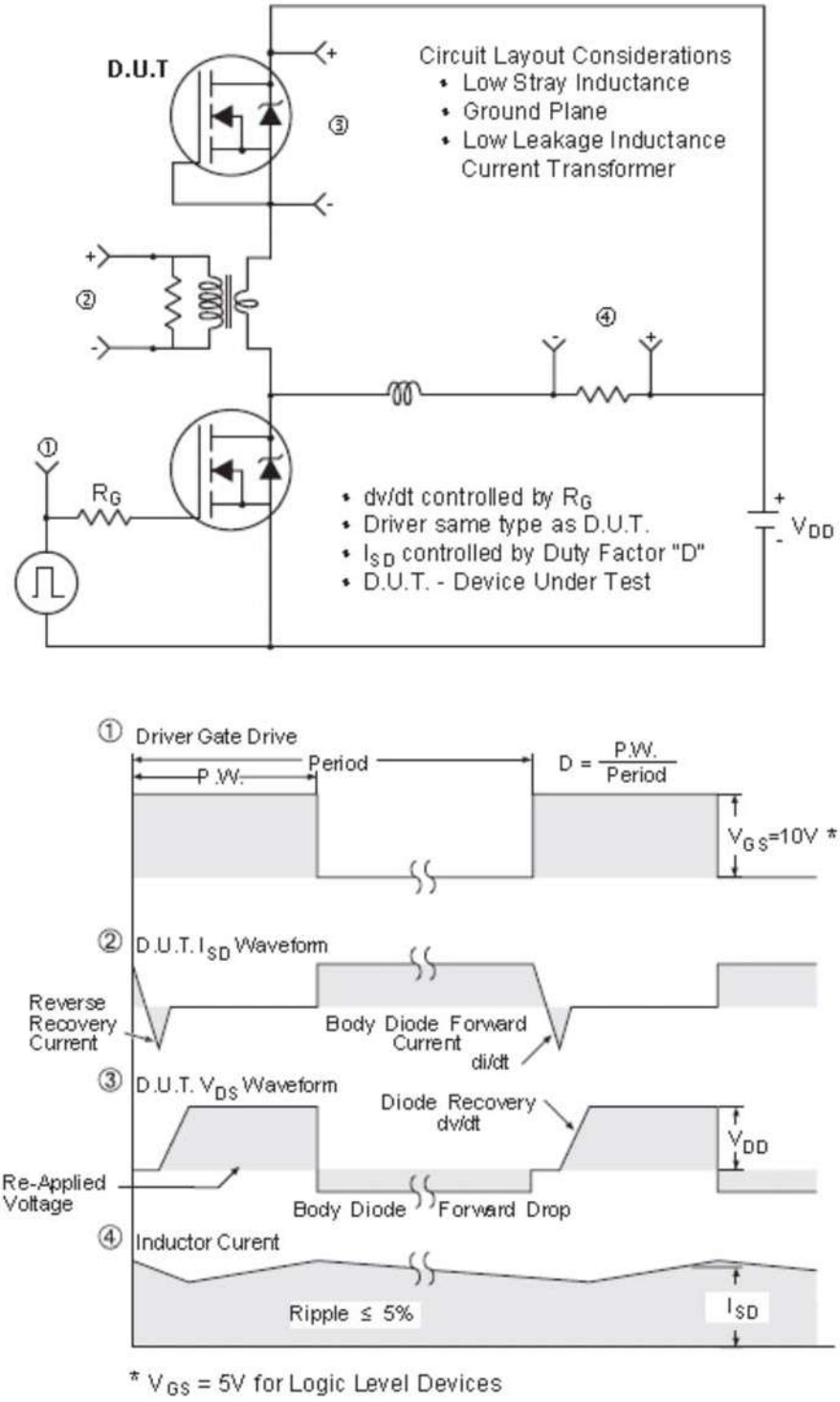
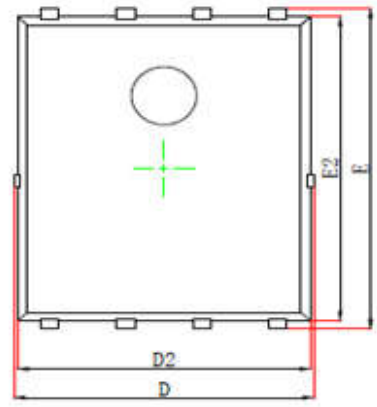
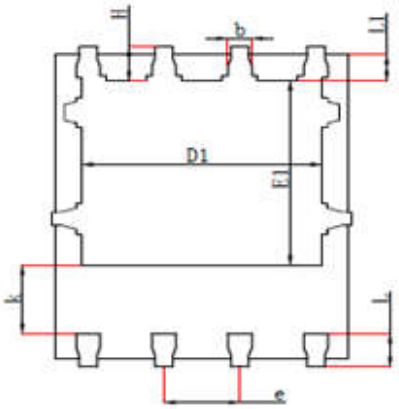


Figure 4: Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

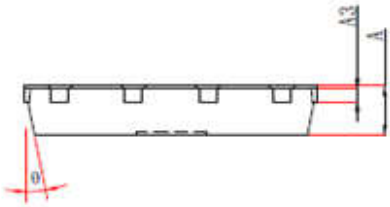
PPAK5×6 Package Information



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A3	0.254REF		0.010REF	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270BSC		0.050BSC	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

V 1.0