

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
-40V	8.6mΩ@-10V	-55A
	13mΩ@4.5V	

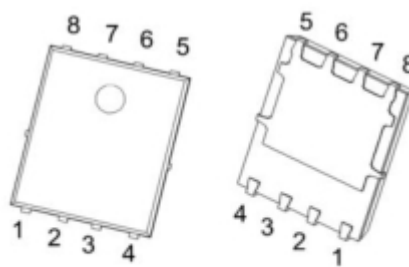
## Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation

## Applications

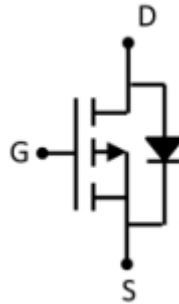
- Power switch
- Load switch in high current applications
- DC/DC converters

## Package

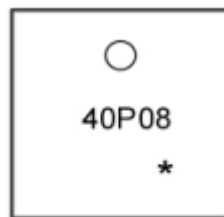


PDFN5×6-8L

## Circuit diagram



## Marking



40P08 : Product code  
\* : Month code

## Absolute maximum ratings

( $T_a=25^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-55	A
Pulsed Drain Current	$I_{DM}$	-220	A
Maximum Power Dissipation ( $T_c=25^{\circ}\text{C}$ )	$P_D$	90	W
Single pulse avalanche energy <sup>1</sup>	$E_{AS}$	700	mJ
Thermal Resistance, Junction-to-Case <sup>2</sup>	$R_{\theta JC}$	1.39	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^{\circ}\text{C}$

## Electrical characteristics

( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)

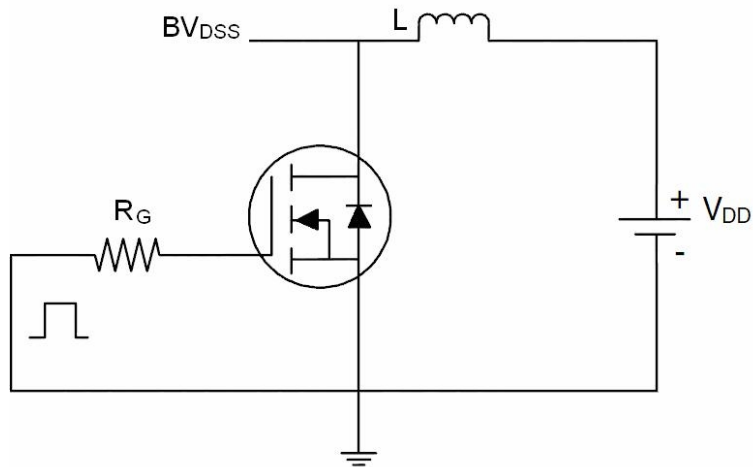
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV (BR)DSS	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-40			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V			-1	uA
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			±100	uA
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.2	-1.6	-2.5	V
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A		8.6	11	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -8A		13	18	
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> =0V, f=1MHz		4004		pF
Output Capacitance	C <sub>oss</sub>			309		
Reverse Transfer Capacitance	C <sub>rss</sub>			229		
Switching Characteristics						
Turn-on Delay Time	T <sub>d(on)</sub>	V <sub>DD</sub> = -20V, I <sub>D</sub> = -10A , V <sub>GS</sub> = -10V, R <sub>G</sub> =3Ω		9.9		nS
Turn-on Rise Time	T <sub>r</sub>			32		
Turn-off Delay Time	T <sub>d(off)</sub>			46		
Turn-off Fall Time	T <sub>f</sub>			53		
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	V <sub>DS</sub> = -20V, , I <sub>D</sub> = -20A V <sub>GS</sub> = -10V		31		nC
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>			67		
Gate-Source Charge	Q <sub>gs</sub>			13.2		
Gate-Drain Charge	Q <sub>gd</sub>			11		
Drain-Source Diode Characteristics						
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V,I <sub>S</sub> = -60A			-1.2	V

**Note:**

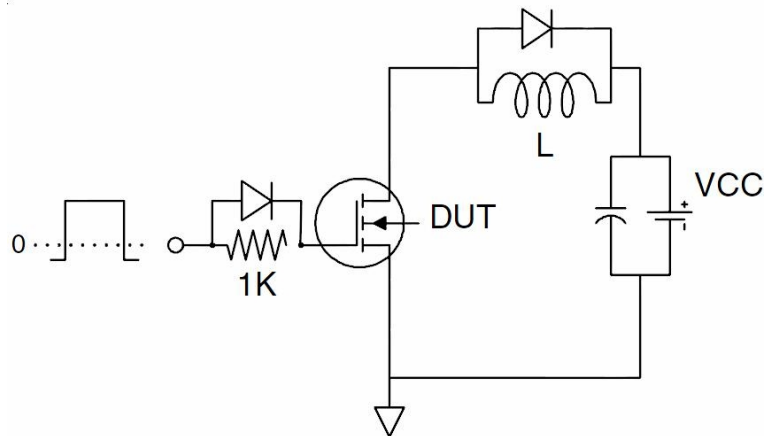
1.  $E_{AS}$  condition:  $T_j = 25^{\circ}\text{C}, V_{DD} = -20V, V_G = -10V, L = 1mH, R_g = 25\Omega$
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

## Test Circuits

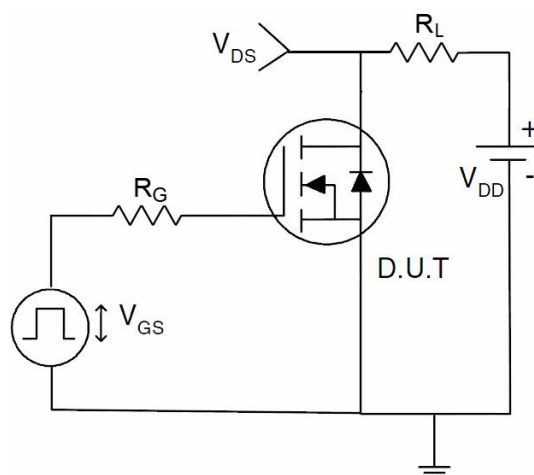
- EAS Test Circuits



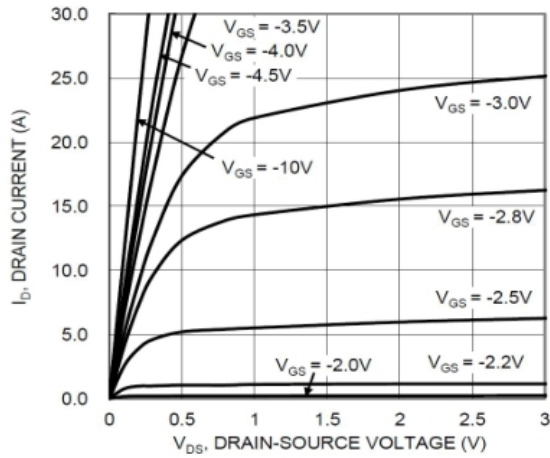
- Gate Charge Test Circuit



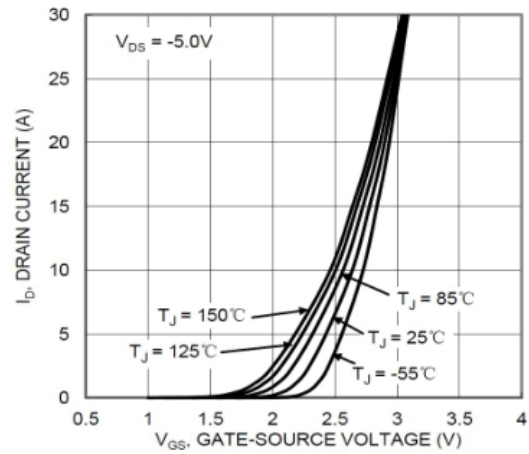
- Switch Time Test Circuit



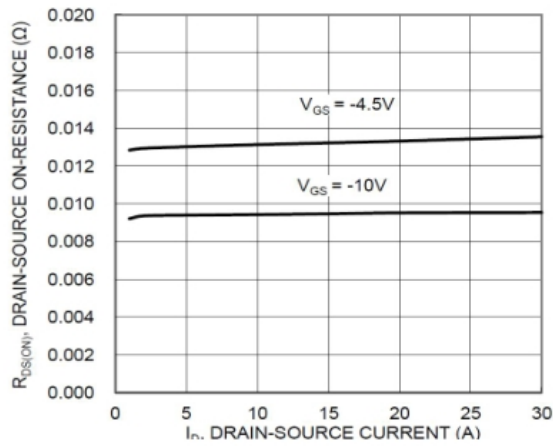
## Typical Characteristics



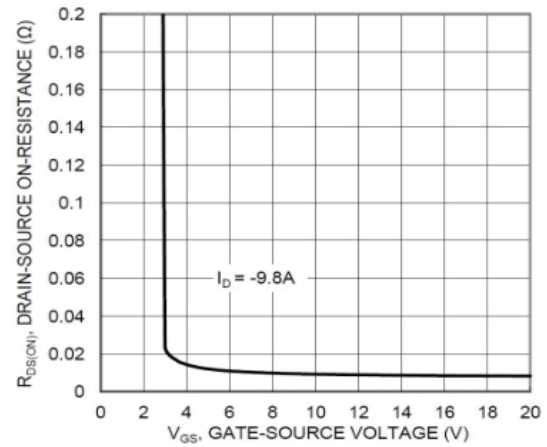
Typical Output Characteristic



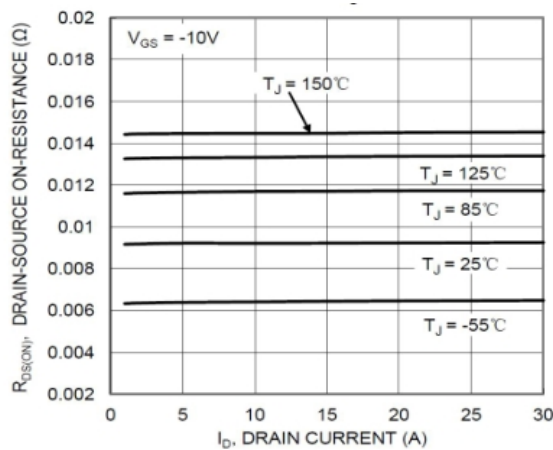
Typical Transfer Characteristic



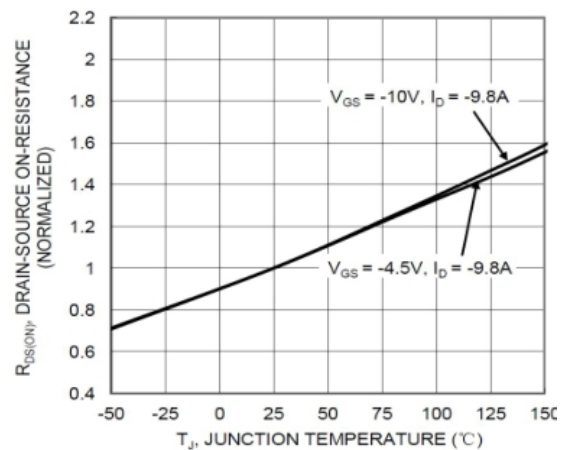
Typical On-Resistance vs. Drain Current and Gate Voltage



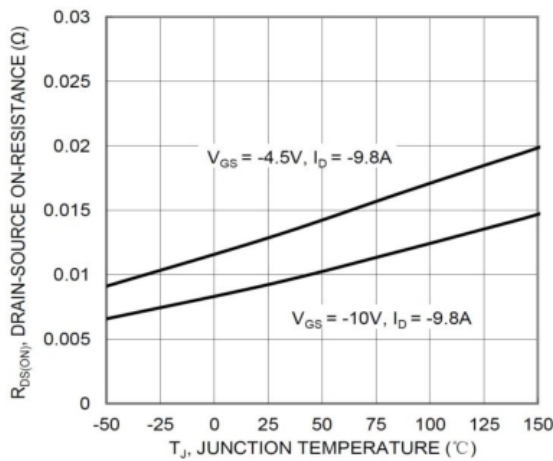
Typical Transfer Characteristic



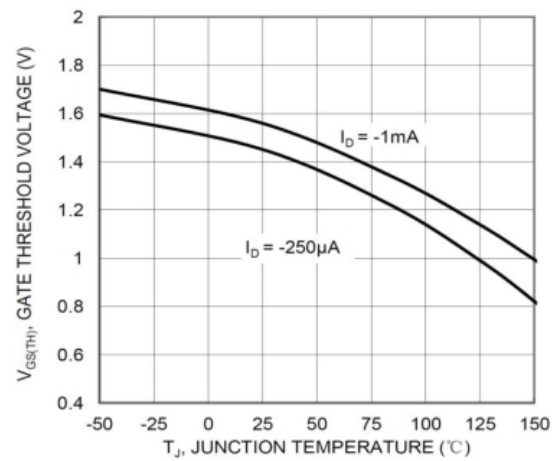
Typical On-Resistance vs. Drain Current and Temperature



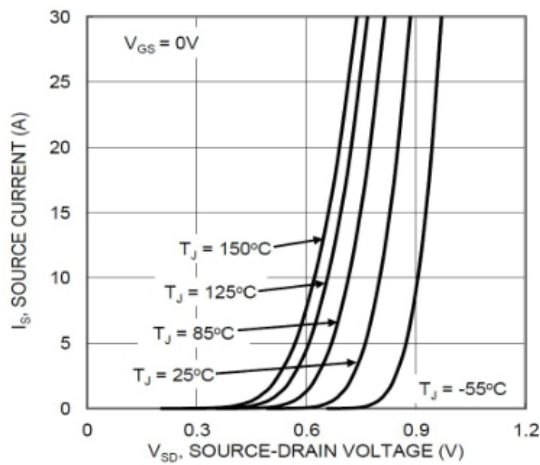
On-Resistance Variation with Temperature



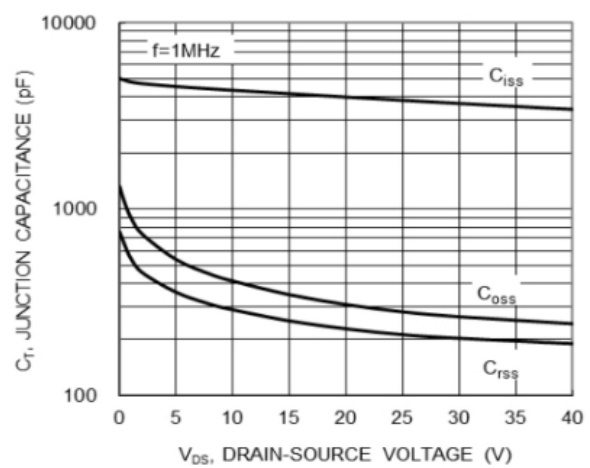
On-Resistance Variation with Temperature



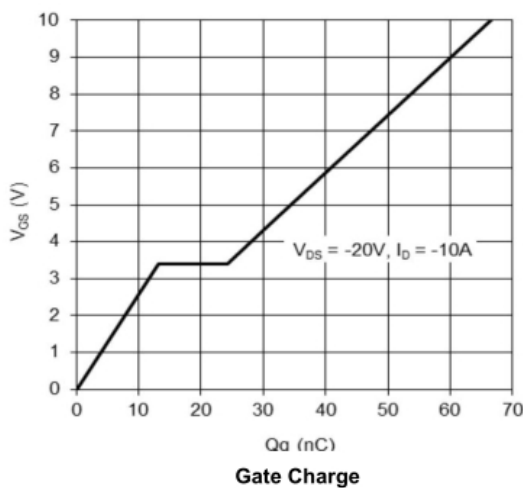
Gate Threshold Variation vs. Junction Temperature



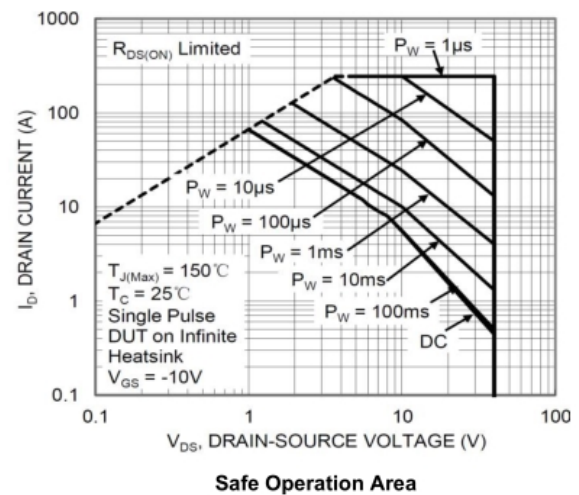
Diode Forward Voltage vs. Current



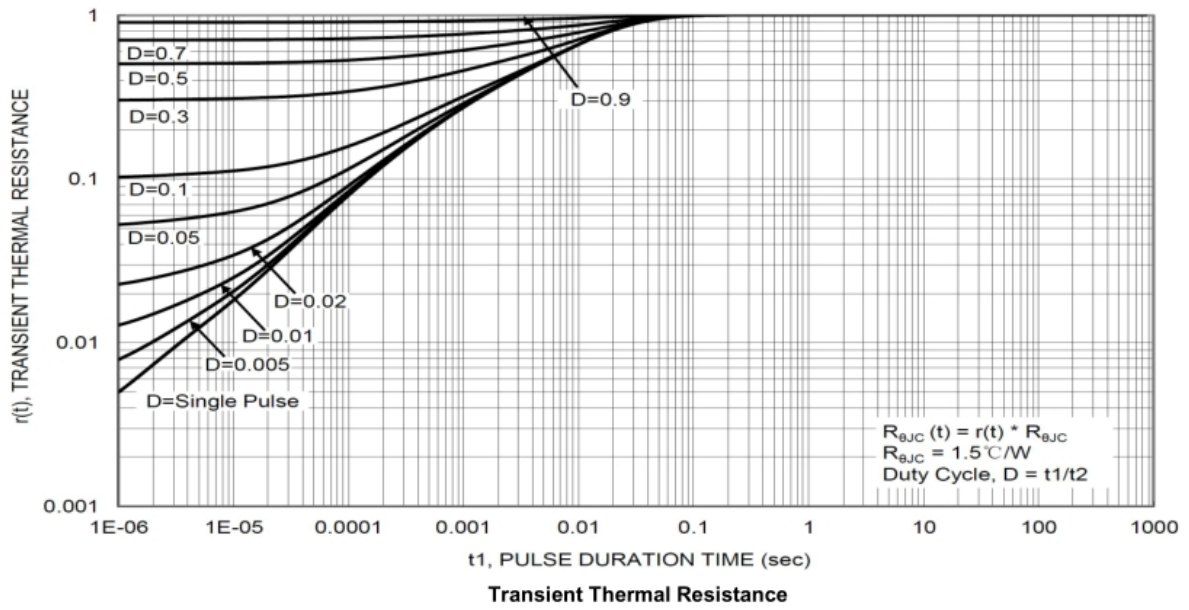
Typical Junction capacitance



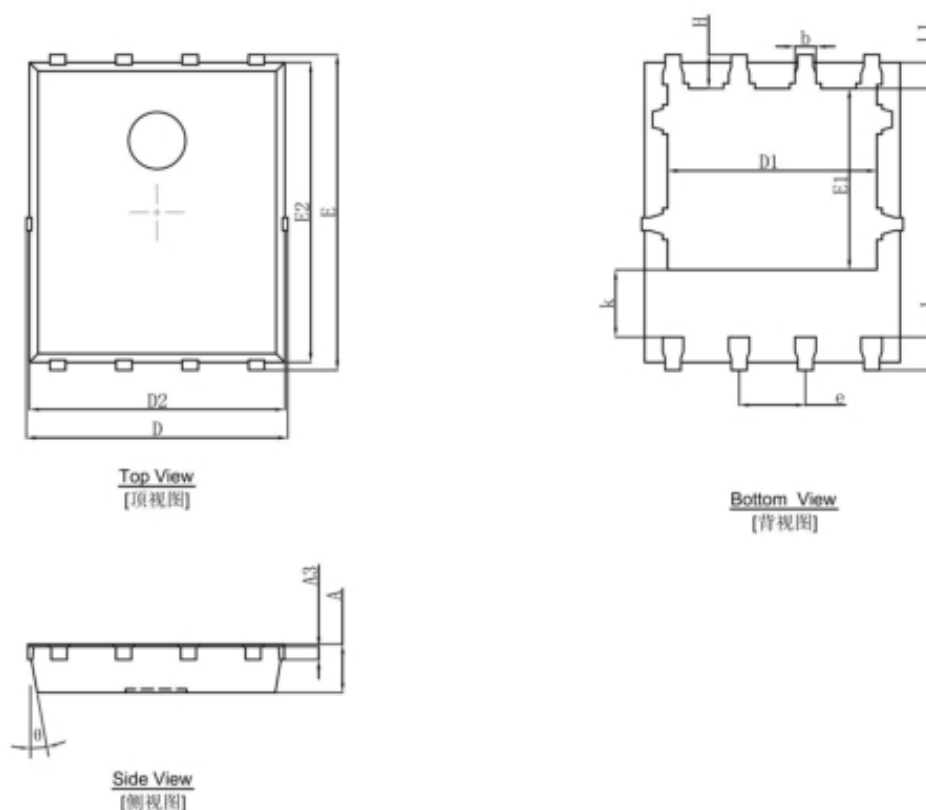
Gate Charge



Safe Operation Area



## PDFN5×6-8L Package Information



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	1.270TYP.		0.050TYP.	
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
$\theta$	10°	12°	10°	12°