



## N-Channel Enhancement-Mode MOSFET

### General Description

This series is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics

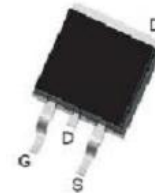
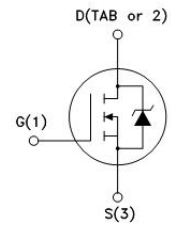
### Pin configurations

See Diagram below

### Features

For a single MOSFET

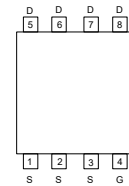
- $V_{DS} = 100V$
- $R_{DS(ON)} = 3.6m\Omega @ V_{GS}=10V$



TO-263



TO-220



DFN5x6

### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
WLQ10N140	DFN5X6	WLQ10N140XXXX YYYY	5000

### Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current <sup>1</sup>	Continuous	140	A
	Pulsed	480	
Single Pulse Avalanche Energy	$E_{AS}$	609	mJ
Power Dissipation	$P_D$	223	W
Operating Junction Temperature Range	$T_J$	-55 to 150	$^{\circ}C$

### Thermal Resistance

Symbol	Parameter	Value	Units
$R_{\theta JA}$	Junction to Ambient	62	$^{\circ}C/W$



Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0 V, I <sub>D</sub> =250μA,	100			V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> = 80V, V <sub>GS</sub> =0V			1.0	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =20 V			100	nA
V <sub>GS(th)L</sub>	Gate Threshold Voltage Low	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	2.0	3.0	V
V <sub>GS(th)H</sub>	Gate Threshold Voltage High	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	3.0	4.0	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =50A		3.6	4.2	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =50A		140		S
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =40V, f=1MHz		4300		pF
C <sub>oss</sub>	Output Capacitance			1000		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			50		pF
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =50A		115		nC
Q <sub>gs</sub>	Gate Source Charge			28		nC
Q <sub>gd</sub>	Gate Drain Charge			26		nC
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =50V, R <sub>GEN</sub> =3.0Ω I <sub>D</sub> =50A		30		ns
t <sub>d(off)</sub>	Turn-Off Delay Time			99		ns
t <sub>d(r)</sub>	Turn-On Rise Time			20		ns
t <sub>d(f)</sub>	Turn-Off Fall Time			37		ns
<b>Source-Drain Diode Characteristics</b>						
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =50A		0.9	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> =50A		73		ns
Q <sub>RR</sub>	Reverse Recovery Charge	di/dt=100A/μs <sup>1</sup>		150		nC



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### Typical Characteristics

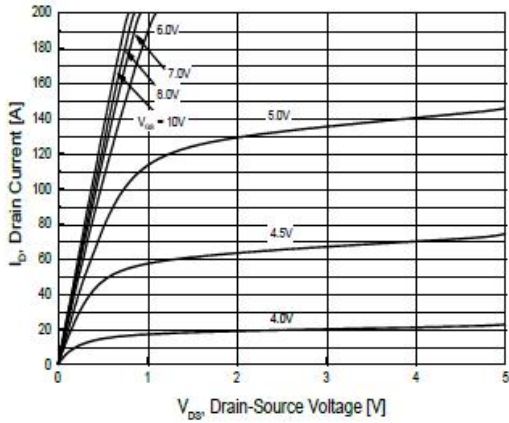


Fig.1 On-Region Characteristics

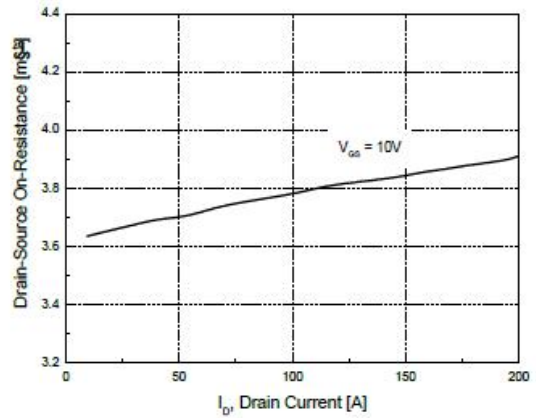


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

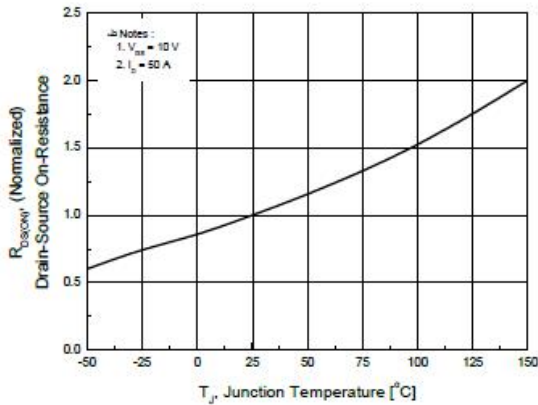


Fig.3 On-Resistance Variation with Temperature

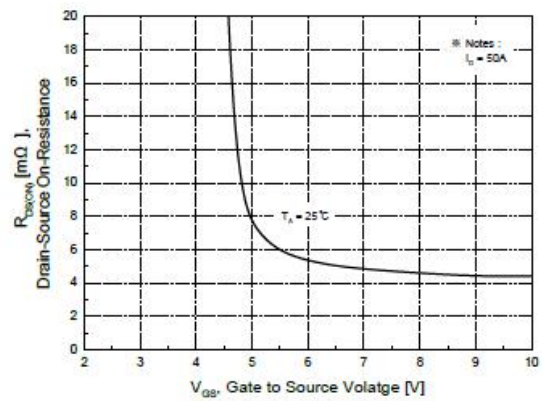


Fig.4 On-Resistance Variation with Gate to Source Voltage

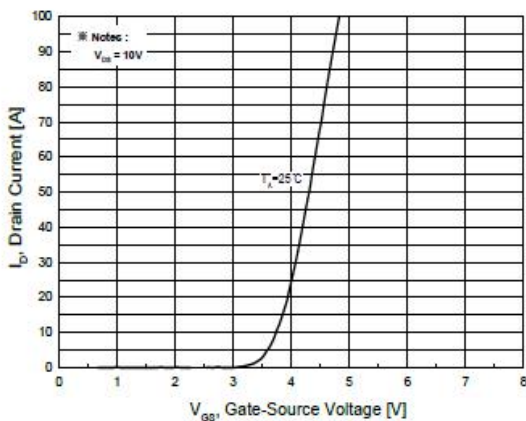


Fig.5 Transfer Characteristics

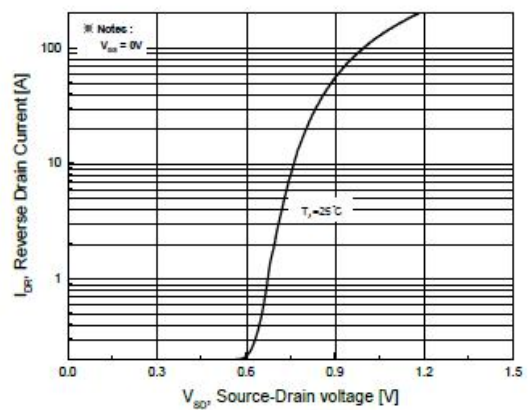


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



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Typical Characteristics

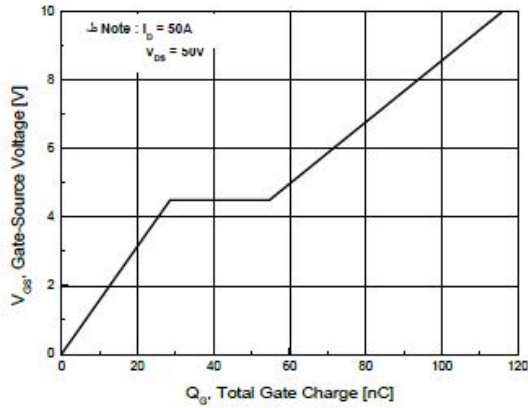


Fig.7 Gate Charge Characteristics

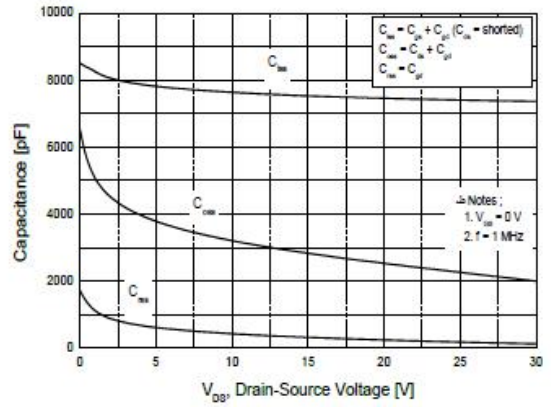


Fig.8 Capacitance Characteristics

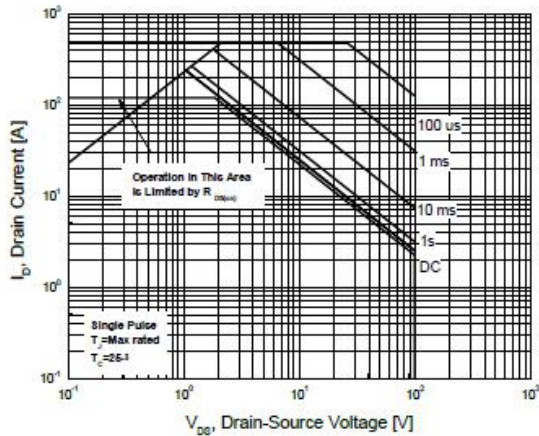


Fig.9 Maximum Safe Operating Area

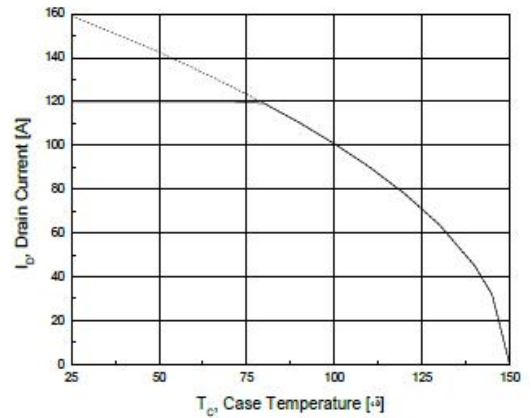


Fig.10 Maximum Drain Current vs. Case Temperature

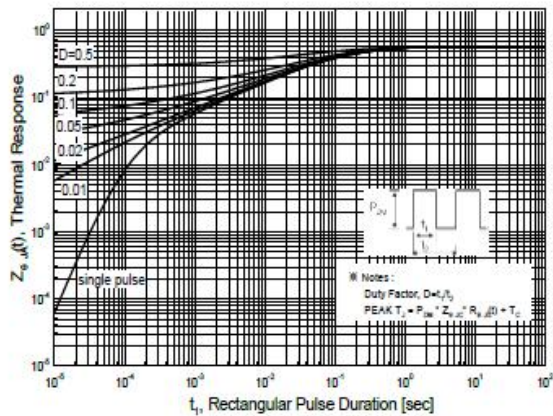
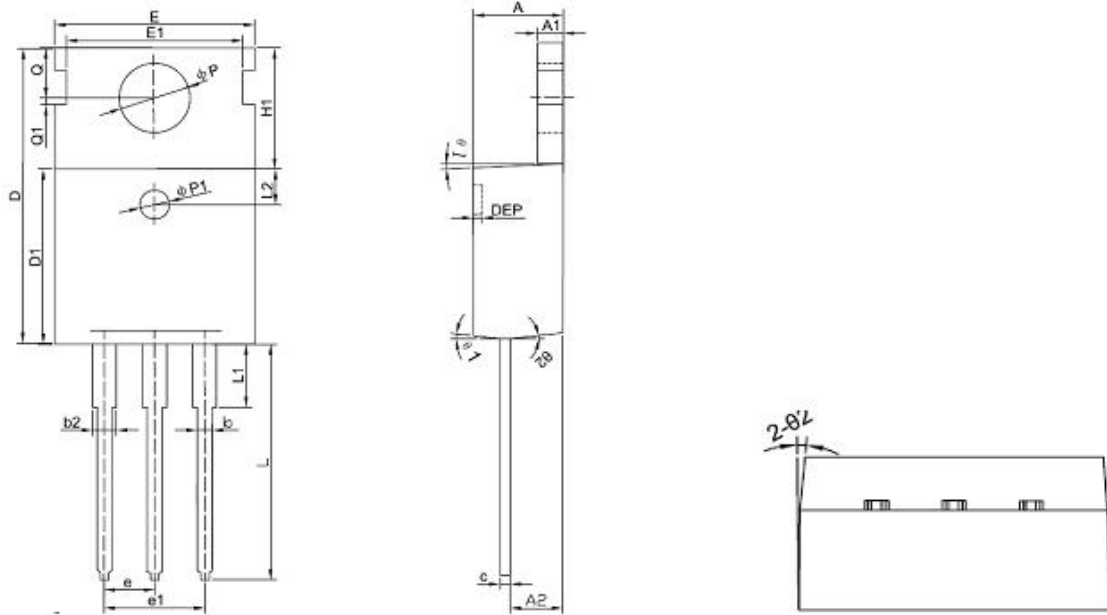


Fig.11 Transient Thermal Response Curve



Package Outline Dimension

TO-220

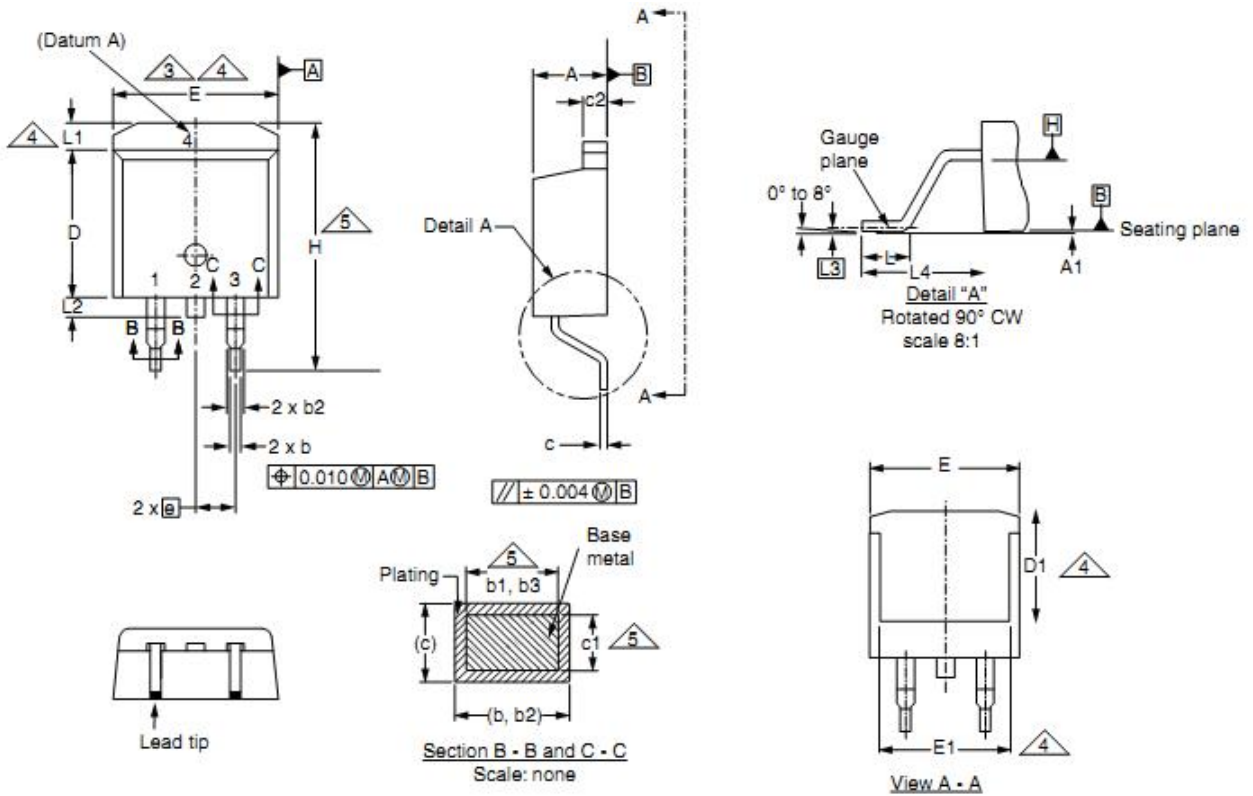


Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.400	4.550	4.700	0.173	0.179	0.185
A1	1.270	1.300	1.330	0.050	0.051	0.052
A2	2.590	2.690	2.790	0.102	0.106	0.110
b	0.770	-	0.900	0.030	-	0.035
b2	1.230	-	1.360	0.048	-	0.054
c	0.480	0.500	0.520	0.019	0.020	0.020
D	15.100	15.400	15.700	-	0.606	-
D1	9.000	9.100	9.200	0.354	0.358	0.362
DEP	0.050	0.285	0.520	0.002	0.011	0.020
E	10.060	10.160	10.260	0.396	0.400	0.404
E1	-	8.700	-	-	0.343	-
$\Phi P1$	1.400	1.500	1.600	0.055	0.059	0.063
e	2.54BSC			0.1BSC		
e1	5.08BSC			0.2BSC		
H1	6.100	6.300	6.500	0.240	0.248	0.256
L	12.750	12.960	13.170	0.502	0.510	0.519
L1	-	-	3.950	-	-	0.156
L2	1.85REF			0.073REF		
$\Phi P$	3.570	3.600	3.630	0.141	0.142	0.143
Q	2.730	2.800	2.870	0.107	0.110	0.113
Q1	-	0.200	-	-	0.008	-
$\theta 1$	5 <sup>0</sup>	7 <sup>0</sup>	9 <sup>0</sup>	5 <sup>0</sup>	7 <sup>0</sup>	9 <sup>0</sup>
$\theta 2$	1 <sup>0</sup>	3 <sup>0</sup>	5 <sup>0</sup>	1 <sup>0</sup>	3 <sup>0</sup>	5 <sup>0</sup>



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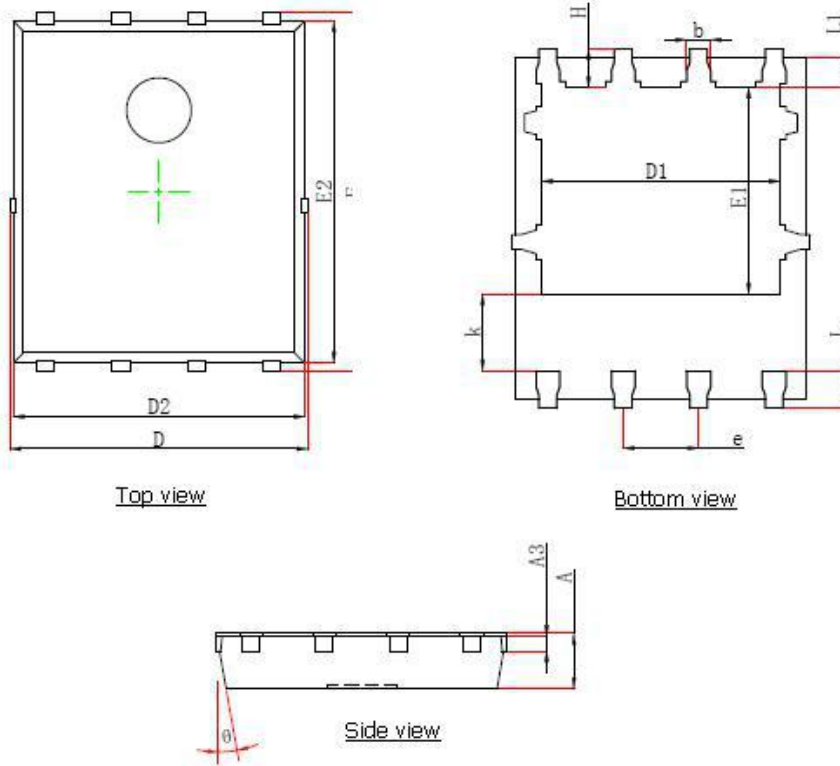
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b1	0.51	0.89	0.020	0.035
b2	1.14	1.78	0.045	0.070
b3	1.14	1.73	0.045	0.068
c	0.38	0.74	0.015	0.029
c1	0.38	0.58	0.015	0.023
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
E	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208



Package Outline Dimension

DFN5 × 6



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
θ	10°	12°	10°	12°