

# MT3055L

## N-Channel Enhancement Mode Field Effect Transistor

### Product Summary

PRODUCT SUMMARY		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Typ
25V	15A	55 @ V <sub>GS</sub> =4.5V
		60 @ V <sub>GS</sub> =2.5V

### Features

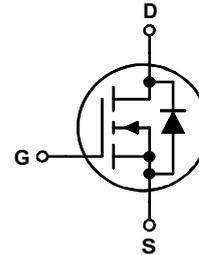
- Super high dense cell design for low R<sub>DS(ON)</sub>
- Rugged and reliable
- Simple drive requirement



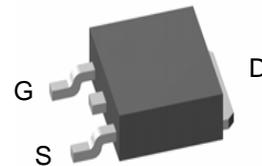
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### Simplified Schematic



### MARKING DIAGRAM & PIN ASSIGNMENT



**D-PAK  
TO-252-2L**

### Absolute Maximum Ratings (T<sub>A</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	25	V
Gate-Source Voltage	V <sub>GS</sub>	±12	V
Drain Current-Continuous <sup>a</sup> @T <sub>j</sub> =125°C	I <sub>D</sub>	15	A
	I <sub>DM</sub>	48	A
- Pulse <i>d</i> <sup>b</sup>			
Drain-source Diode Forward Current <sup>a</sup>	I <sub>S</sub>	1.7	A
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	55	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient <sup>a</sup>	R <sub>th JA</sub>	50	°C/W
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ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25 °C unless otherwise noted)

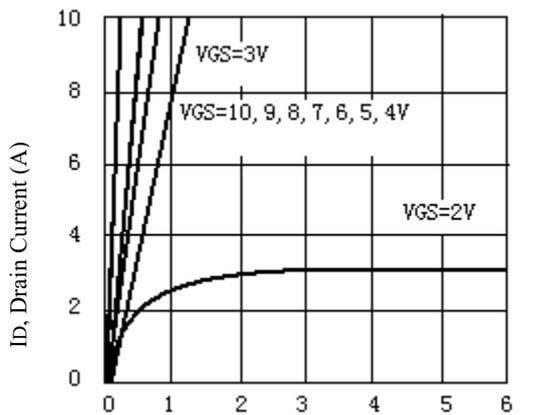
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	25			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.8	1.1	2.0	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =2.8A		50	65	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2.0A		60	85	
Forward Transconductance	g <sub>FS</sub>	V <sub>GS</sub> =7V, I <sub>D</sub> =5A		5		S
DAYNAMIC CHARACTERISTICS						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V f=1.0MHz		608		pF
Output Capacitance	C <sub>OSS</sub>			101		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			59		pF
SWITCHING CHARACTERISISTICS						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =10V I <sub>D</sub> =15A, V <sub>GEN</sub> =4.5V R <sub>L</sub> =10ohm R <sub>GEN</sub> =10ohm		6.5		ns
Rise Time	t <sub>r</sub>			32.1		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			58.4		ns
Fall Time	t <sub>f</sub>			48		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =1A V <sub>GS</sub> =4.5V		6		nC
Gate-Source Charge	Q <sub>gs</sub>			1.35		nC
Gate-Drain Charge	Q <sub>gd</sub>			1.5		nC

ELECTRICAL CHARACTERICS (TA=25°C unless otherwise noted)

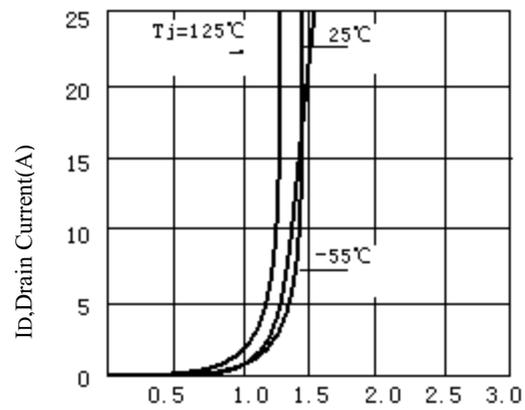
Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	VSD	VGS=0V,Is=1.25A		0.84	1.2	V

Notes

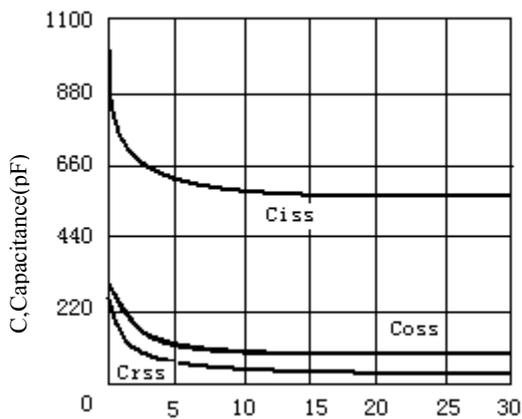
- a. Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$
- b. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
- c. Guaranteed by design, not subject to production testing.



VDS, Drain-to-Source Voltage (V)  
Figure 1. Output Characteristics



VGS, Gate-to-source Voltage (V)  
Figure 2. Transfer Characteristics



VGS, Drain-to Source Voltage

Figure3. Capacitance

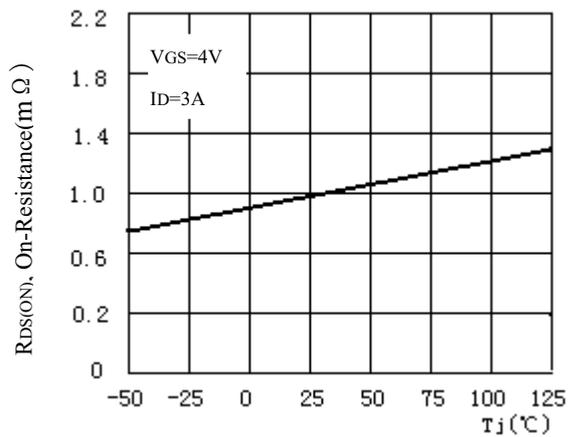
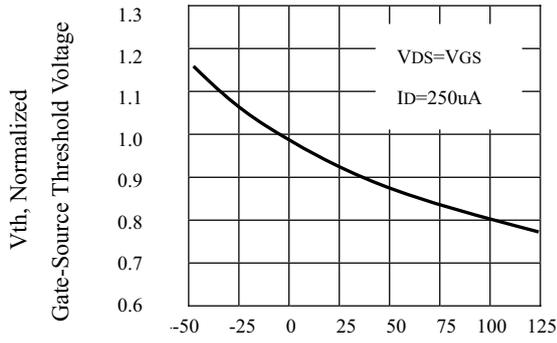
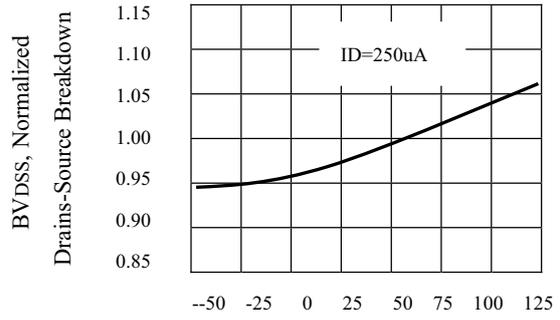


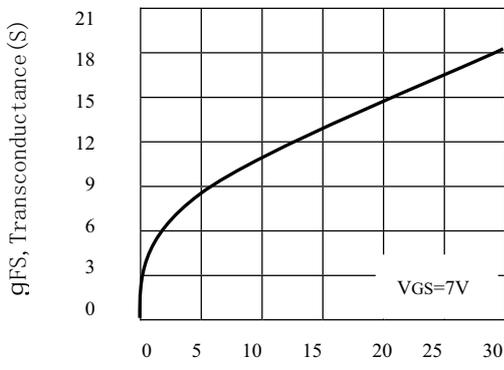
Figure4. On-Resistance Variation with Temperature



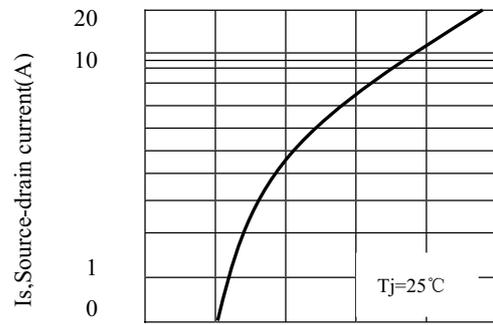
Tj, Junction Temperature(°C)  
 Figure5. Gate Threshold Variation With Temperature



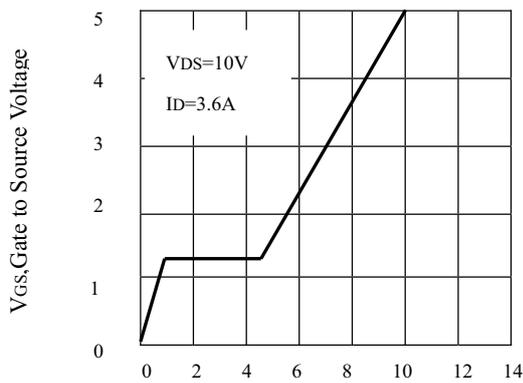
Tj, Junction Temperature (°C)  
 Figure6. Breakdown Voltage Variation With Temperature



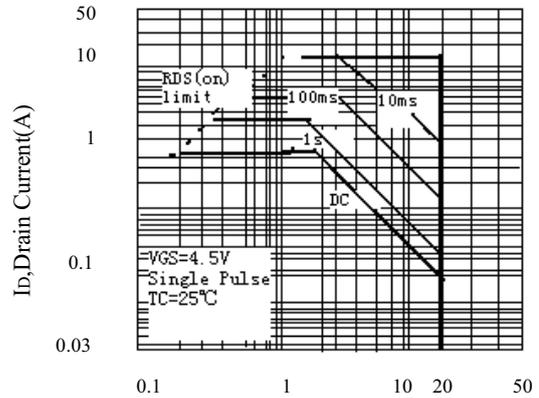
Ids, Drain-Source Current (A)  
 Figure7. Transconductance Variation With Drain Current



VSD, Body Diode Forward Voltage  
 Figure8. Body Diode Forward Voltage Variation with Source Current



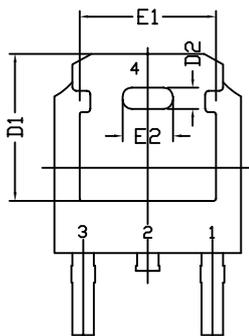
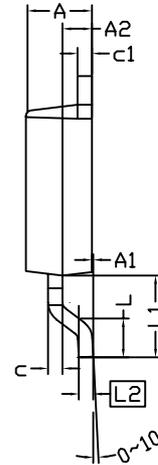
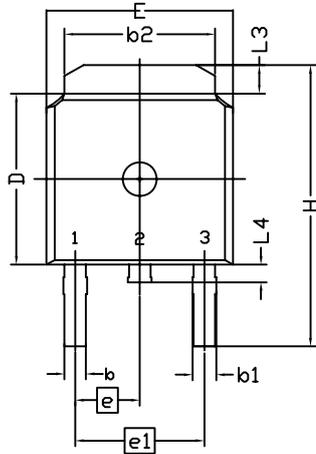
Qg, Total Gate Charge (nC)  
 Figure9. Gate Charge



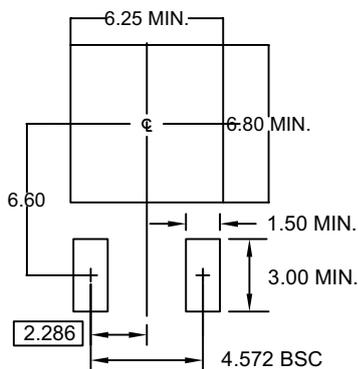
VDS, Drain-Source Voltage(V)  
 Figure10. Maximum Safe Operating Area

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Version	S

T0252(DPAK) PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MILS.
2. DIMENSION L IS MEASURED IN GAUGE PLANE
3. TOLERANCE 0.10 mm UNLESS OTHERWISE SPECIFIED
4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
5. REFER TO JEDEC TO-252 (AA)

SYMBOL	DIMENSION IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	2.184	2.286	2.388	0.086	0.090	0.094
A1	0.000	-----	0.127	0.000	-----	0.005
A2	0.889	1.041	1.143	0.035	0.041	0.045
b	0.635	0.762	0.889	0.025	0.030	0.035
b1	0.762	0.840	1.143	0.030	0.033	0.045
b2	4.953	5.340	5.461	0.195	0.210	0.215
c	0.450	0.508	0.610	0.018	0.020	0.024
c1	0.450	0.508	0.610	0.018	0.020	0.024
D	5.969	6.096	6.223	0.235	0.240	0.245
D1	5.210	5.249	5.380	0.205	0.207	0.212
D2	0.662	0.762	0.862	0.026	0.030	0.034
E	6.350	6.604	6.731	0.250	0.260	0.265
E1	4.318	4.826	4.901	0.170	0.190	0.193
E2	1.678	1.778	1.878	0.066	0.070	0.074
e	2.286 BSC			0.090 BSC		
e1	4.572 BSC			0.180 BSC		
H	9.398	10.033	10.414	0.370	0.395	0.410
L	1.270	1.520	2.032	0.050	0.060	0.080
L1	2.921 REF.			0.115REF.		
L2	0.408	0.508	0.608	0.016	0.020	0.024
L3	0.889	1.016	1.270	0.035	0.040	0.050
L4	0.635	-----	1.016	0.025	-----	0.040

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