MT20025S

N-Channel Enhancement Mode Field Effect Transistor

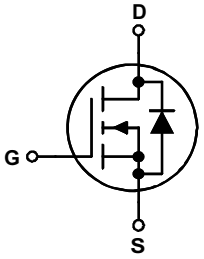
MT Semiconductor®

http://www.mtsemi.com

Product Summary

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Typ
20V	90A	4 @ VGS=2.5V
		2.5@ VGS=4.5V

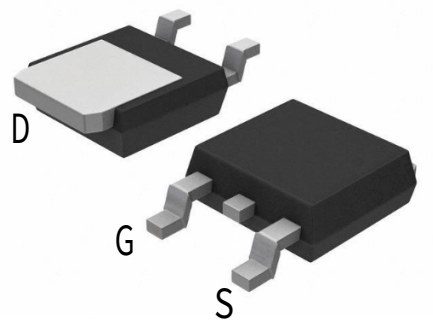
Simplified Schematic



Features

- Super high dense cell design for low $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement

MARKING DIAGRAM & PIN ASSIGNMENT



Applications

- LED Display

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous[a] @Tj=125℃	I_D	90	A
- Pulse *d*[b]	I_{DM}	270	A
Drain-source Diode Forward Current[a]	I_S	125	A
Maximum Power Dissipation[a]	P_D		
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient[a]	Rth J_A	100	℃/W

ELECTRICAL CHARACTERISTICS (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V,V_{GS}=0V			1	μA
Gate-Body Leakage	I_{GSS}	V_{GS}=±8V,V_{DS}=0V			±100	nA
ON CHARACTERITICS						
Gate Threshold Voltage	V_{GS}(th)	V_{DS}=V_{GS},I_D=250μA	0.5	0.7	1.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=2.5V,I_D=2.8A		3.8	4	mΩ
		V_{GS}=4.5V,I_D=2.0A		2.5	2.8	
Forward Transconductance	g_{FS}	V_{GS}=7V,I_D=5A		5		S
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS}=10V,V_{GS}=0V f=1.0MHz		608		pF
Output Capacitance	C_{OSS}			115		pF
Reverse Transfer Capacitance	C_{RSS}			86		pF
SWITCHING CHARACTERISISTICS						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD}=10V I_D=3.6A, V_{GEN}=4.5V R_L=10ohm R_{GEN}=10ohm		10		ns
Rise Time	tr			14		ns
Turn-Off Delay Time	$t_{D(OFF)}$			39		ns
Fall Time	tf			26		ns
Total Gate Charge	Q_g	V_{DS}=10V,I_D=1A V_{GS}=4.5V		9.2		nC
Gate-Source Charge	Q_{gs}			1.6		nC
Gate-Drain Charge	Q_{gd}			2.6		nC

ELECTRICAL CHARACTERICS (TA=25℃ unless otherwise noted)

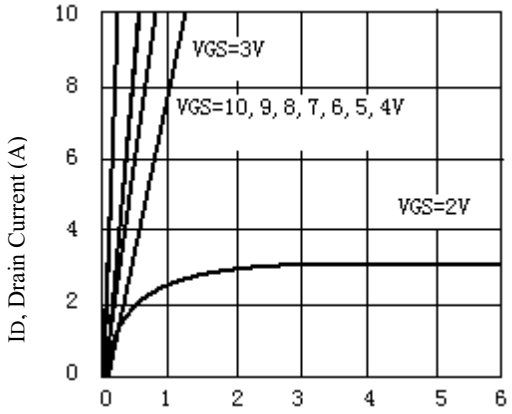
Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=1.25A		0.84	1.3	V

Notes

a. Surface Mounted on FR4 Board, t≦10sec

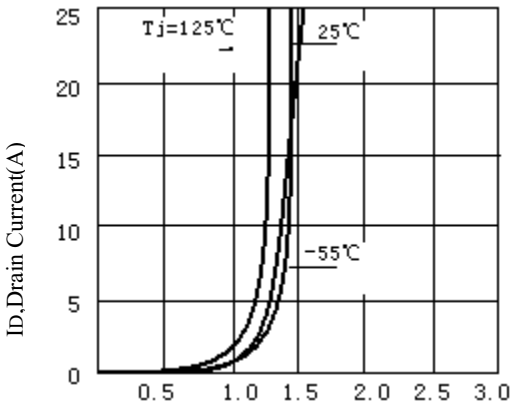
b. Pulse Test: Pulse Width≦300Us, Duty Cycle≦2%

c. Guaranteed by design, not subject to production testing.



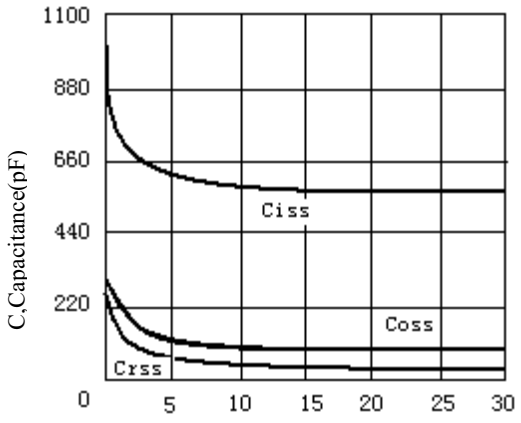
V_{DS}, Drain-to-Source Voltage (V)

Figure 1.Output Characteristics



V_{GS}, Gate-to-source Voltage (V)

Figure 2.Transfer Characteristics



VGS, Drain-to Source Voltage

Figure3.Capacitance

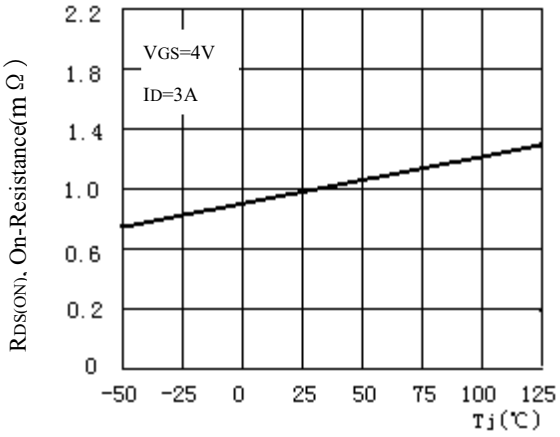


Figure4. On-Resistance Variation with Temperature

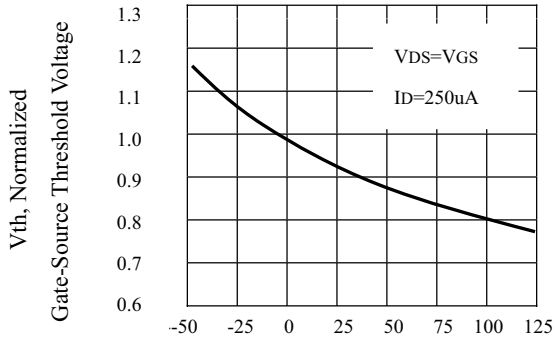


Figure5.Gate Threshold Variation With Temperature

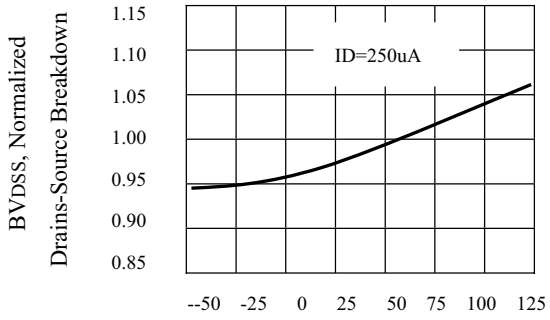


Figure6.Breakdown Voltage Variation With Temperature

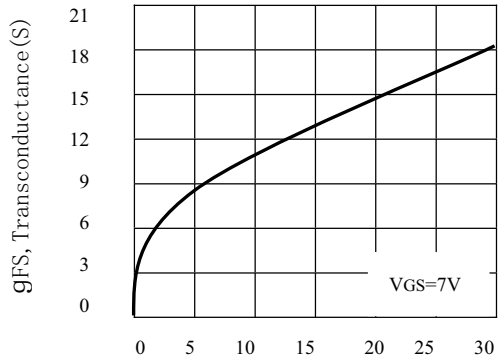


Figure7.Transconductance Variation With Drain Current

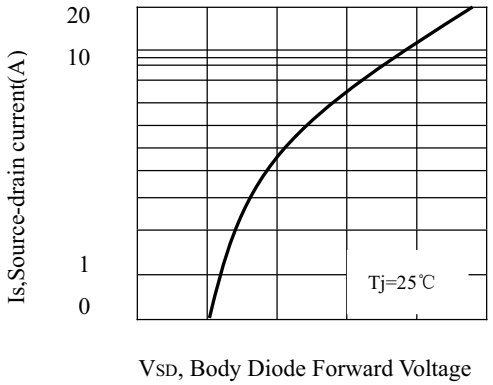


Figure8.Body Diode Forward Voltage Variation with Source Current

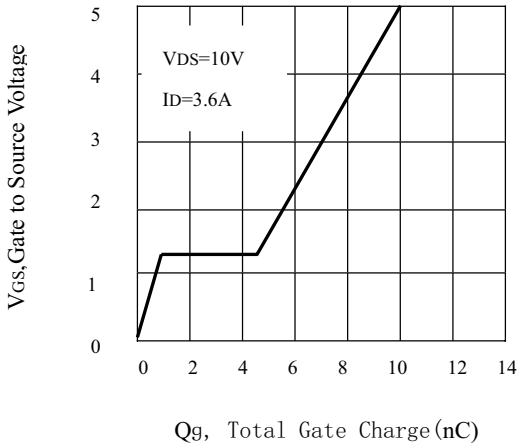


Figure9. Gate Charge

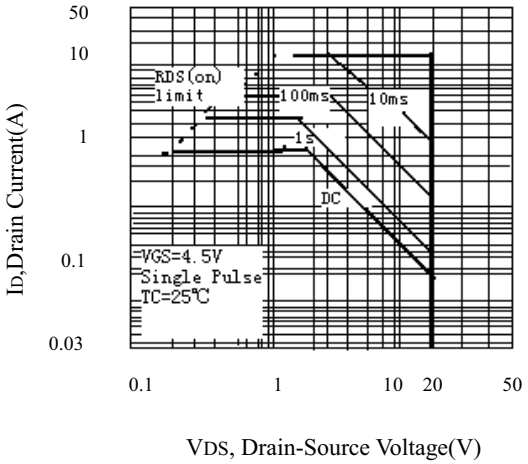


Figure10.Maximum Safe Operating Area

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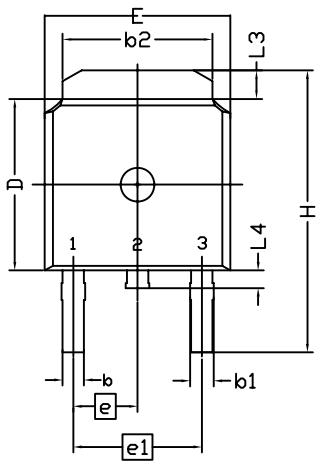
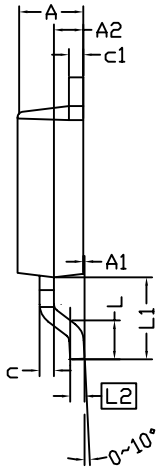
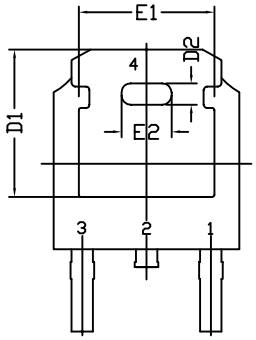
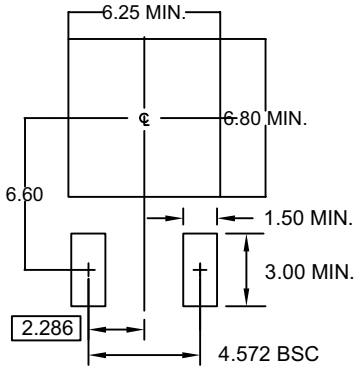
TO252(DPAK) PACKAGE OUTLINE







RECOMMENDED LAND PATTERN



UNIT: mm

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

NOTE
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