



N-Channel Enhancement Mode Field Effect Transistor

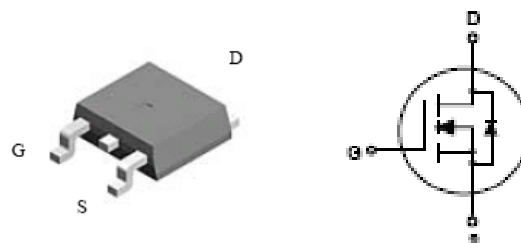
FEATURES

- Super high dense cell design for low $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement
- TO-252 package



NOTE: The MT50N03 is available
in a lead-free package

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω) Typ
30V	30A	11 @ $V_{GS}=10V$
		17 @ $V_{GS}=4.5V$



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ^a @ $T_j=125^\circ C$ - Pulse d^b	I_D	30	A
	I_{DM}	90	A
Drain-source Diode Forward Current ^a	I_S	30	A
Maximum Power Dissipation ^a	P_D	50	W
Operating Junction and Storage Temperature Range	T_j, T_{STG}	-55 to 175	$^\circ C$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient ^a	$R_{th JA}$	50	$^\circ C/W$
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ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

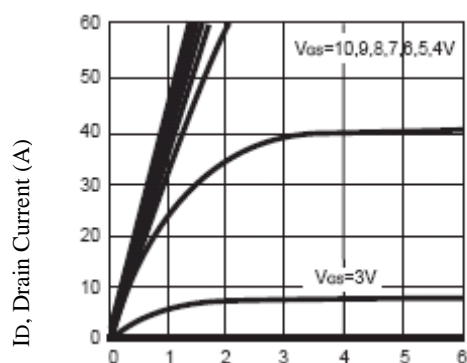
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V,I _D =-250μA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V,V _{GS} =0V			1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±24V,V _{DS} =0V			±100	nA
ON CHARACTERITICS						
Gate Threshold Voltage	V _{GS} (th)	V _{DS} =V _{GS} ,I _D =-250μA	1	1.5	3	V
Drain-Source On-State Resistance	R _{DS} (ON)	V _{GS} =10V,I _D =30A		11	14	m Ω
		V _{GS} =4.5V,I _D =30A		17	21	
Forward Transconductance	g _{FS}	V _{GS} =15V,I _D =15A		30		S
DAYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =15V,V _{GS} =0V f=1.0MHz		1200		pF
Output Capacitance	C _{OSS}			530		pF
Reverse Transfer Capacitance	C _{RSS}			150		pF
SWITCHING CHARACTERISISTICS						
Turn-On Delay Time	t _D (ON)	V _{DD} =15V I _D =1A, V _{GEN} =10V R _L =15ohm R _{GEN} =6ohm		5		ns
Rise Time	tr			65		ns
Turn-Off Delay Time	t _D (OFF)			67		ns
Fall Time	tf			90		ns
Total Gate Charge	Q _g	V _{DS} =15V,I _D =20A V _{GS} =5V R _{GEN} =4.7ohm		34.4	75	nC
Gate-Source Charge	Q _{gs}			5.1		nC
Gate-Drain Charge	Q _{gd}			7		nC

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

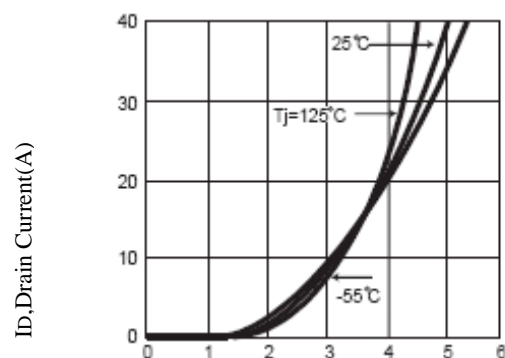
Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =30A		0.85	1.3	V

Notes

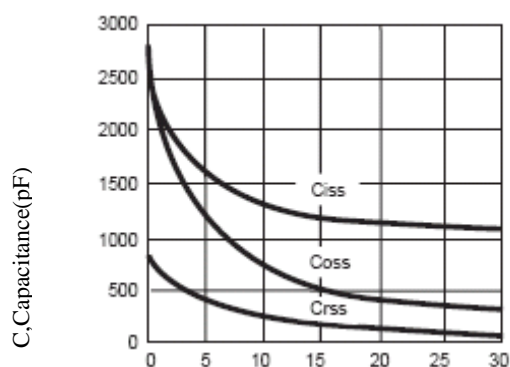
- Surface Mounted on FR4 Board, t ≤ 10sec
- Pulse Test: Pulse Width ≤ 300Us, Duty Cycle ≤ 2%
- Guaranteed by design, not subject to production testing.



V_{DS}, Drain-to-Source Voltage (V)
Figure 1. Output Characteristics



V_{GS}, Gate-to-source Voltage (V)
Figure 2. Transfer Characteristics



V_{GS}, Drain-to Source Voltage
Figure3. Capacitance

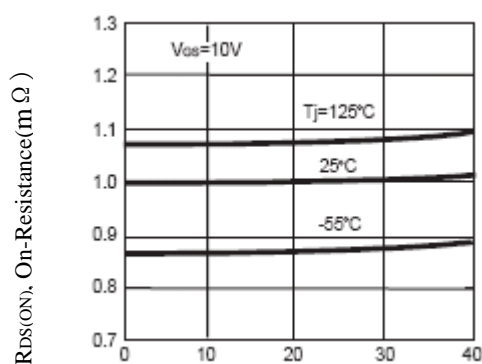
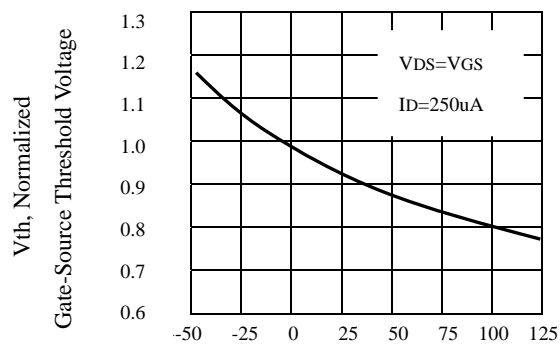
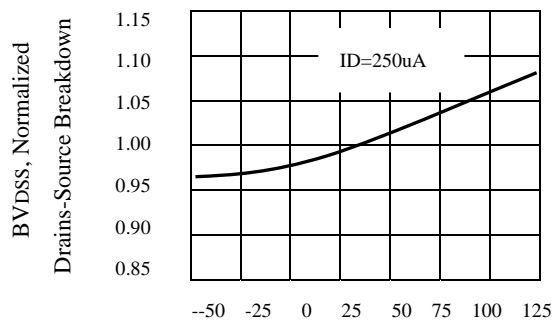


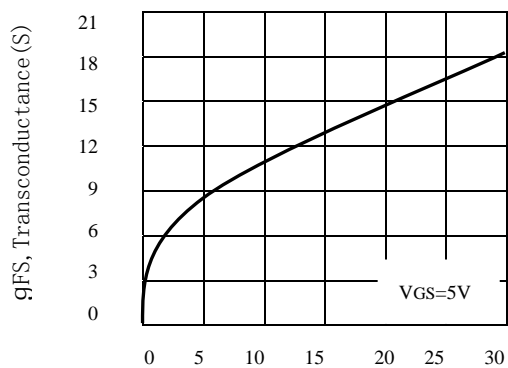
Figure4. On-Resistance Variation with Temperature



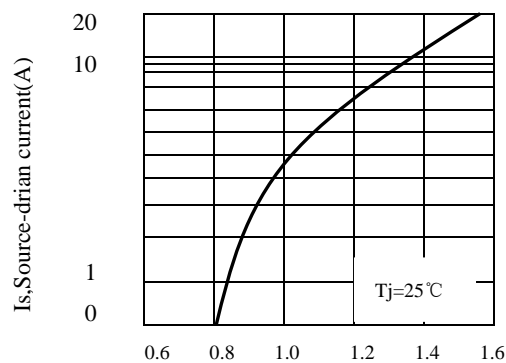
Tj, Junction Temperature(°C)
Figure5. Gate Threshold Variation
With Temperature



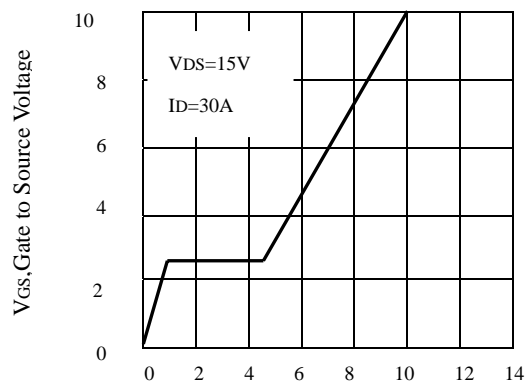
Tj, Junction Temperature (°C)
Figure6. Breakdown Voltage Variation
With Temperature



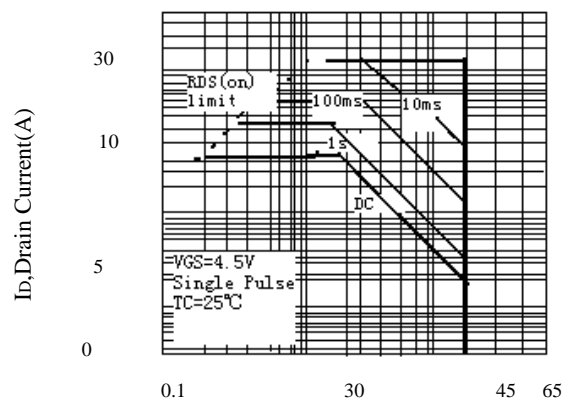
ID, Drain-Source Current (A)
Figure7. Transconductance Variation
With Drain Current



VSD, Body Diode Forward Voltage
Figure8. Body Diode Forward Voltage



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



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



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