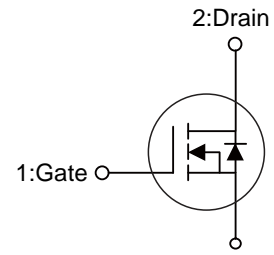


Symbol

■ PRODUCT CHARACTERISTICS

$V_{DSS}$	20V
$R_{DS(ON)}$ Typ(@ $V_{GS}=4.5V$ )	9.5m $\Omega$
$R_{DS(ON)}$ Typ(@ $V_{GS}=2.5V$ )	12m $\Omega$
$I_D$	40A



■ APPLICATIONS

- \* Motor Control
- \* High Performance SMPS
- \* DC/DC Converter

■ FEATURE

- \* Low Gate Charge
- \* Ultra-low RDS(ON)



■ ORDER INFORMATION

Order Codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT40N02D	TO-252	2500 pieces/Reel

■ ABSOLUTE MAXIMUM RATINGS( $T_A=25^\circ C$ , unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DSS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current Continuous(@ $V_{GS}=10V, T_A=25^\circ C$ )	$I_D$	40	A
Drain Current Pulsed	$I_{DM}$	160	A
Avalanche Energy *	$E_{AS}$	80	mJ
Power Dissipation	$P_D$	35	W
Junction Temperature	$T_J$	+150	$^\circ C$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ C$

■ THERMAL CHARACTERISTICS

Parameter	Symbol	Typ	Unit
Junction to Case	$R_{thJC}$	3.6	$^\circ C/W$

Note: \* EAS condition:  $T_J=25^\circ C, V_{DD}=12V, V_G=10V, L=0.5mH, R_g=25\Omega$

**■ ELECTRICAL CHARACTERISTICS** ( $T_C=25^{\circ}\text{C}$ , unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain to Source Breakdown Voltage	$V_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
Drain to Source Leakage Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	1	$\mu A$
Gate to Source Forward Leakage	$I_{GSS(F)}$	$V_{DS}=0V, V_{GS}=+12V$	-	-	100	nA
Gate to Source Reverse Leakage	$I_{GSS(R)}$	$V_{DS}=0V, V_{GS}=-12V$	-	-	-100	nA
On characteristics						
Drain to Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=20A$	-	9.5	13	$m\Omega$
		$V_{GS}=2.5V, I_D=10A$	-	12	15	$m\Omega$
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.3	0.72	1.5	V
Dynamic characteristics						
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, f=1.0MHz$	-	2.4	-	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=3A$	-	8.7	-	S
Input Capacitance	$C_{iss}$	$V_{DS}=12V, V_{GS}=0V$ $f=1.0MHz$	-	860	-	pF
Output Capacitance	$C_{oss}$		-	160	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	140	-	pF
Resistive Switching Characteristics						
Turn-on Delay Time	$t_{d(ON)}$	$V_{GS}=4.5V, V_{DS}=10V$ $I_D=20A, R_G=3\Omega$	-	9	-	ns
Rise Time	$t_r$		-	19	-	ns
Turn-off Delay Time	$t_{d(OFF)}$		-	38	-	ns
Fall Time	$t_f$		-	24	-	ns
Total Gate Charge	$Q_g$	$I_D=20A, V_{DS}=10V$ $V_{GS}=4.5V$	-	18	-	nC
Gate to Source Charge	$Q_{gs}$		-	3.5	-	nC
Gate to Drain("Miller") Charge	$Q_{gd}$		-	5.5	-	nC
Source-Drain Diode Characteristics						
Continuous Source Current(Body Diode)	$I_S$		-	-	40	A
Maximum Pulsed Current(Body Diode)	$I_{SM}$		-	-	160	A
Diode Forward Voltage	$V_{SD}$	$I_{SD}=1A, V_{GS}=0V$	-	0.74	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_{SD}=20A, T_J=25^{\circ}\text{C}$ $di/dt=100A/\mu s$	-	7.5	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	1.6	-	nC

■ TYPICAL CHARACTERISTICS

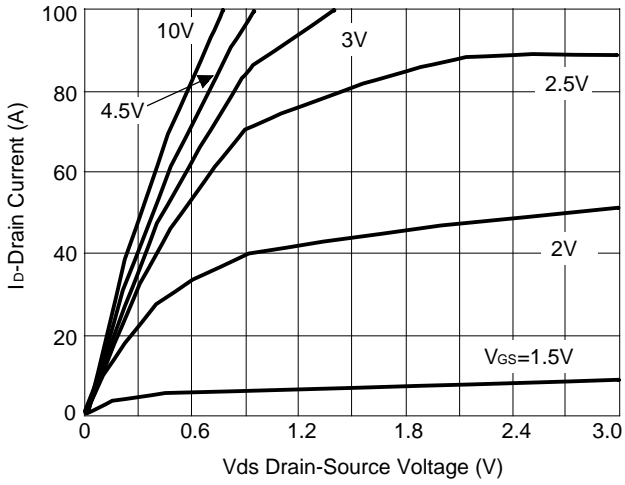


Figure 1: Output Characteristics

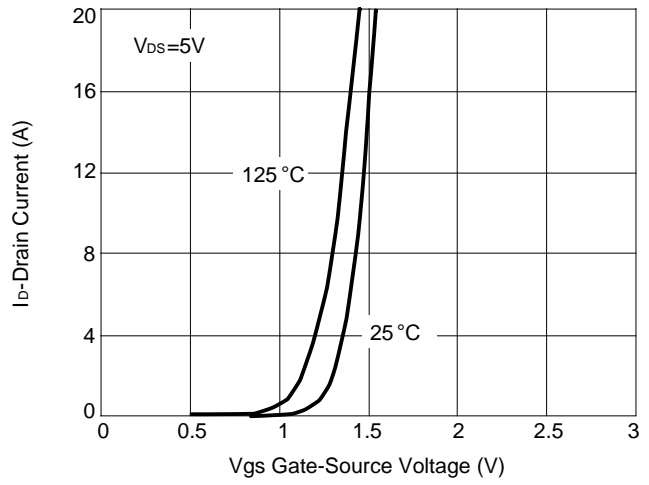


Figure 2: Transfer Characteristics

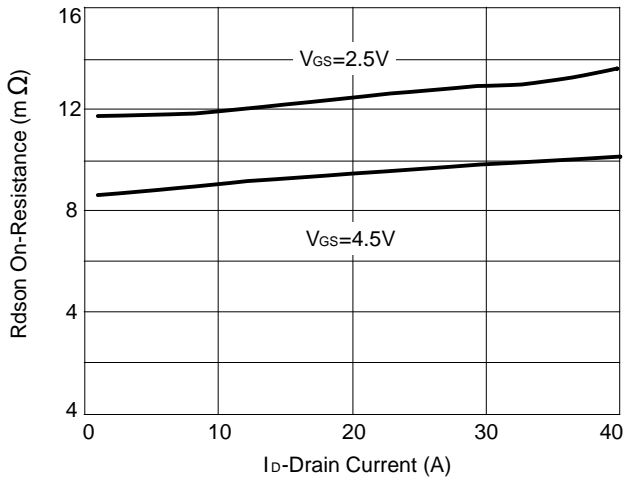


Figure 3: Rdson-Drain Current

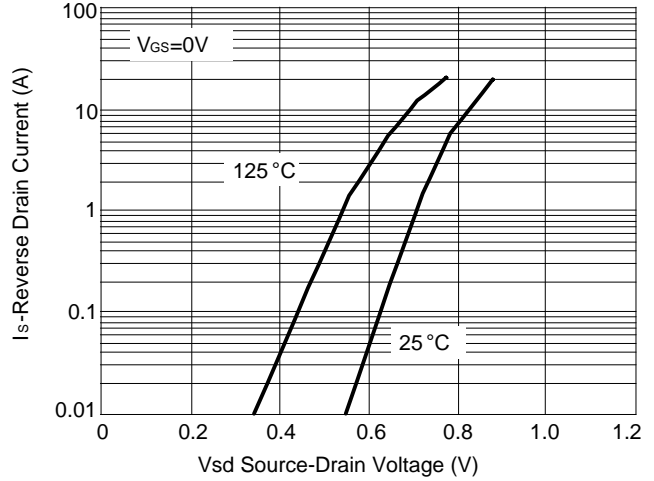


Figure 4: Source-Drain diode Forward

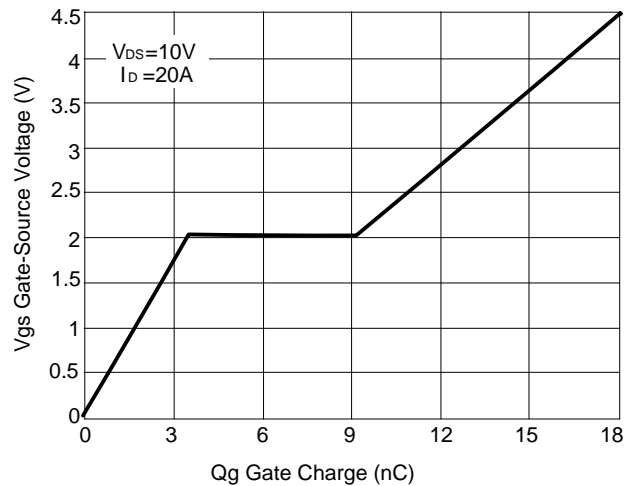


Figure 5: Gate Charge

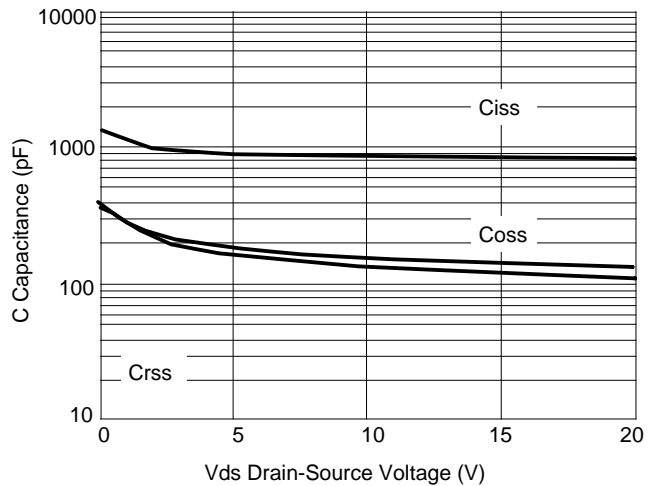


Figure 6: Capacitance vs Vds

■ TYPICAL CHARACTERISTICS(Cont.)

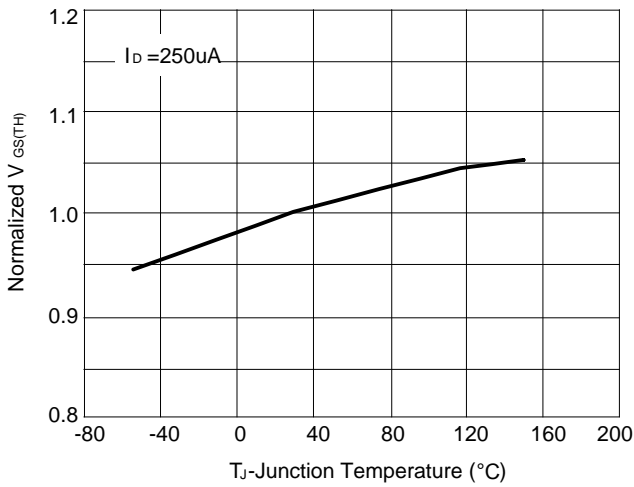


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

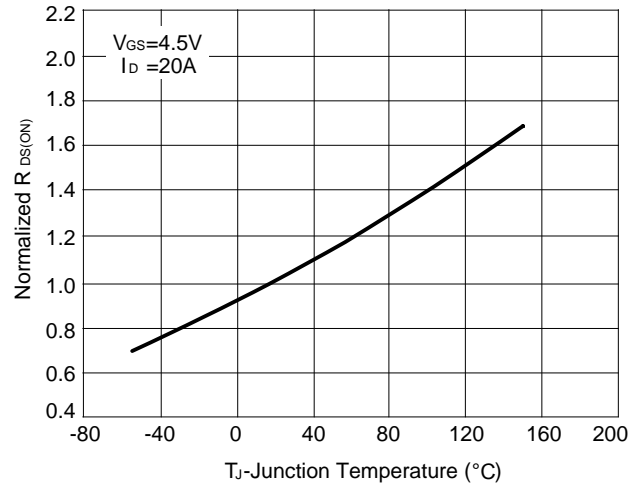


Figure 8: Normalized on-Resistance vs Junction Temperature

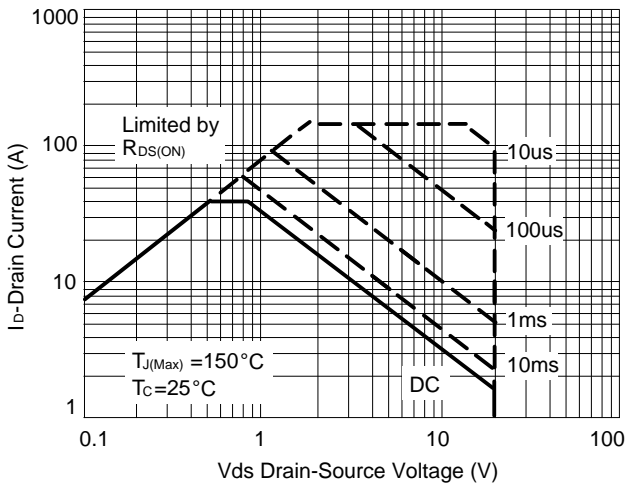


Figure 9: Maximum Safe Operation Area

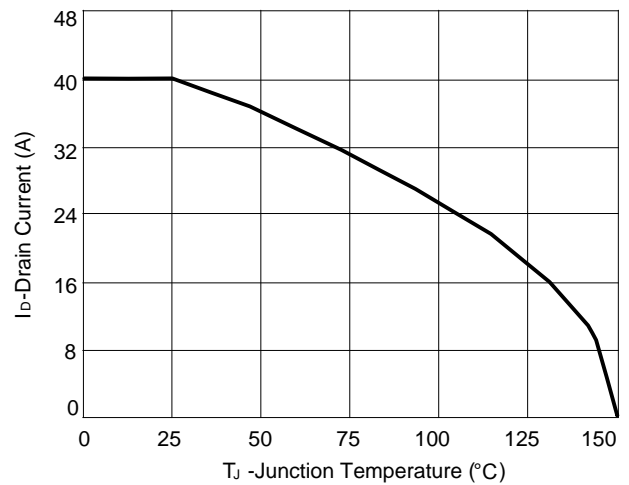


Figure 10: Maximum Continuous Drain Current vs. Junction Temperature

■ TO-252 PACKAGE OUTLINE DIMENSIONS

