

## N-CHANNEL POWER MOSFET 50A, 30V N-CHANNEL ENHANCEMENT MODE POWER MOSFET

### DESCRIPTION

The 50N03 meet the ROHS and Green Product requirement with full function reliability approved.

### MARKING

\* $R_{DS(ON)} \leq 12 \text{ m}\Omega$  @  $V_{GS}=4.5\text{V}$ ,  $I_D=1\text{A}$

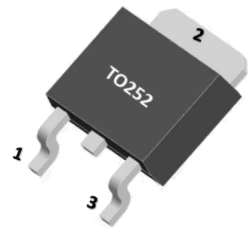
$R_{DS(ON)} \leq 16 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=1\text{A}$

\* Low capacitance

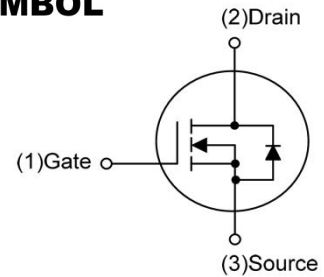
\* Optimized gate charge

\* Fast switching capability

\* Avalanche energy specified



### SYMBOL



### ABSOLUTE MAXIMUM RATINGS( $T_A=25^\circ\text{C}$ , unless otherwise specified.)

SYMBOL	PARAMETER	VALUE	UNIT
<b>V<sub>DSS</sub></b>	Drain-Source Voltage	30	V
<b>V<sub>GSS</sub></b>	Gate-Source Voltage	±20	V
<b>I<sub>D</sub></b>	Continuous Drain Current	50	A
<b>I<sub>DM</sub></b>	Pulsed Drain Current (Note 2)	100	A
<b>E<sub>AS</sub></b>	Single Pulsed Avalanche Energy (Note 3)	66	mJ
<b>P<sub>D</sub></b>	Power Dissipation	40	W
<b>T<sub>j</sub></b>	Junction temperature	+150	°C
<b>T<sub>stg</sub></b>	Storage temperature	-55~+150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3.  $L = 0.05\text{mH}$ ,  $I_{AS} = 51\text{A}$ ,  $V_{DD} = 25\text{V}$ ,  $R_G = 25 \Omega$ , Starting  $T_J = 25^\circ\text{C}$ .

### ■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252	$\theta_{JA}$	50	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-252	$\theta_{JC}$	3.13	$^{\circ}\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

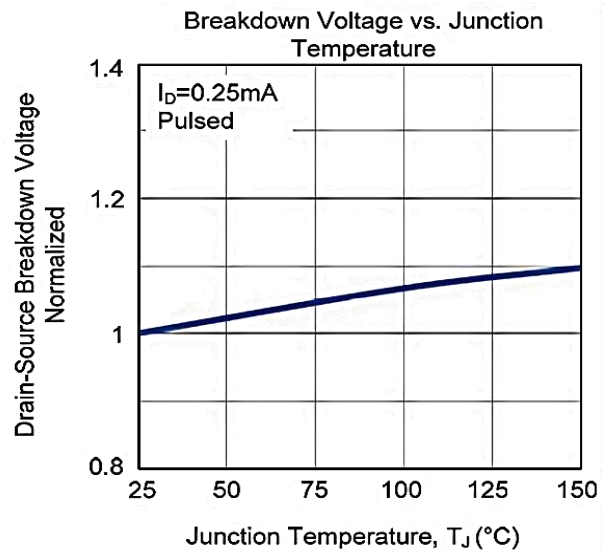
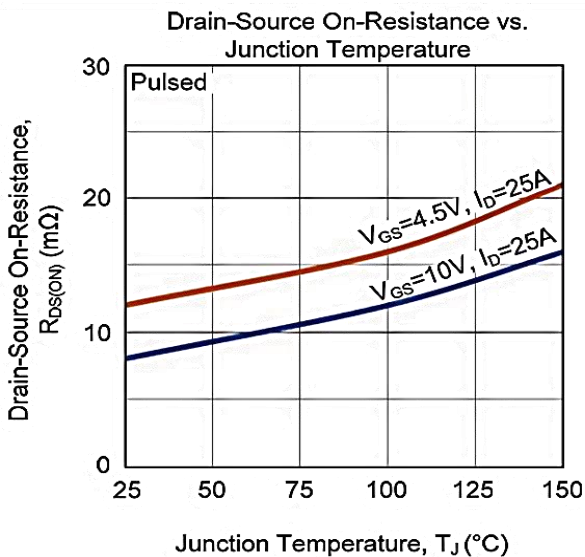
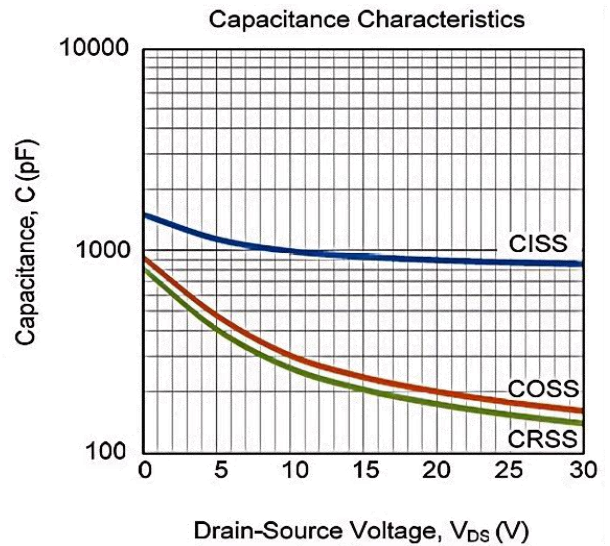
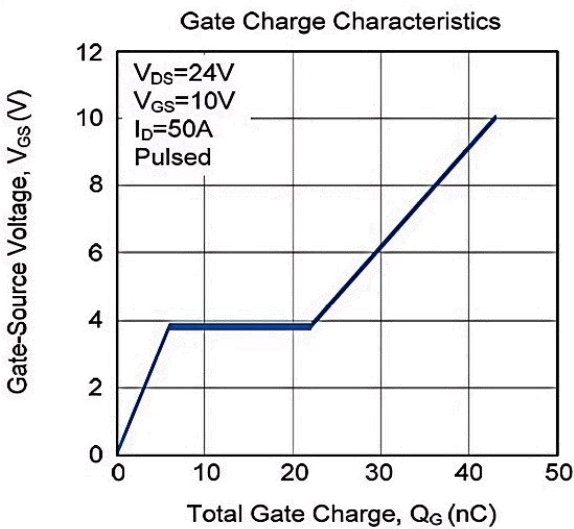
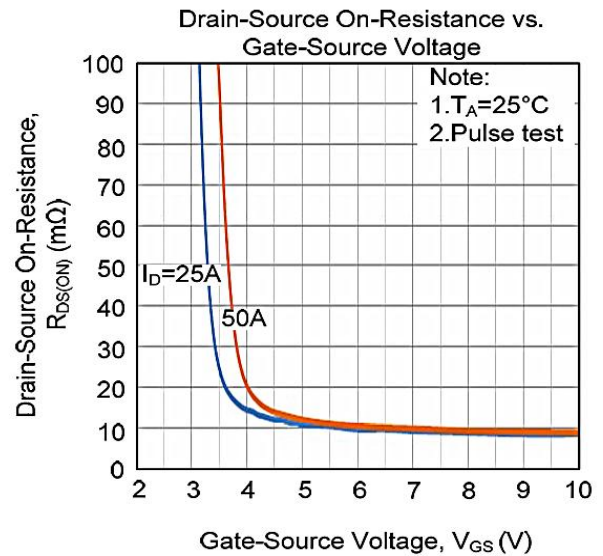
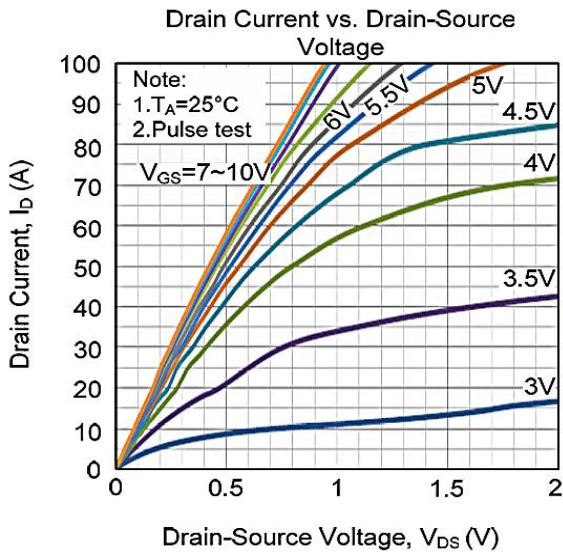
### ■ ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	30			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$			1.5	$\mu\text{A}$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0	1.7	2.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=25\text{A}$			10	m $\Omega$
		$V_{GS}=4.5\text{V}, I_D=25\text{A}$			15	
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=15\text{V}, V_{GS}=0\text{V}$ $f=1.0\text{MHz}$		940		pF
Output Capacitance	$C_{OSS}$			235		pF
Reverse Transfer Capacitance	$C_{RSS}$			200		pF
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=24\text{V}, V_{GS}=10\text{V}, I_D=50\text{A}$		43		nC
Gate-Source Charge	$Q_{GS}$			6		nC
Gate-Drain Charge	$Q_{GD}$			16		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=15\text{V}, I_D=50\text{A}, V_{GS}=10\text{V}$ $R_G=3\Omega$		8		ns
Turn-On Rise Time	$t_R$			17		ns
Turn-Off Delay Time	$t_{D(OFF)}$			25		ns
Turn-Off Fall Time	$t_F$			23		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				45	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=50\text{A}, V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time	$t_{rr}$	$I_S=30\text{A}, V_{GS}=0\text{V}, di/dt=100\text{A}/\mu\text{s}$		164		ns
Reverse Recovery Charge	$Q_{rr}$				300	

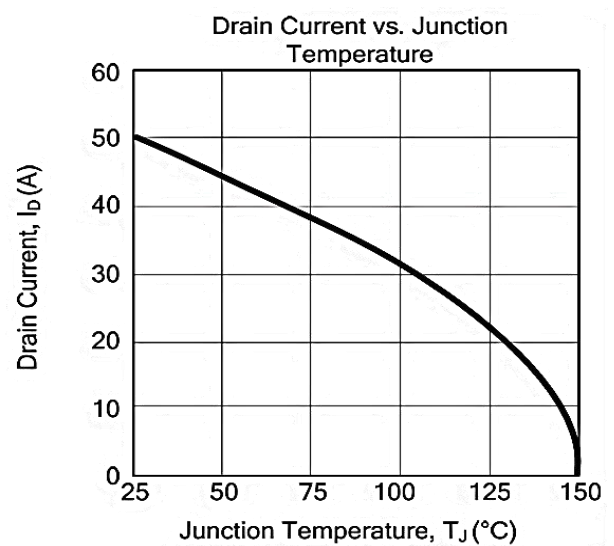
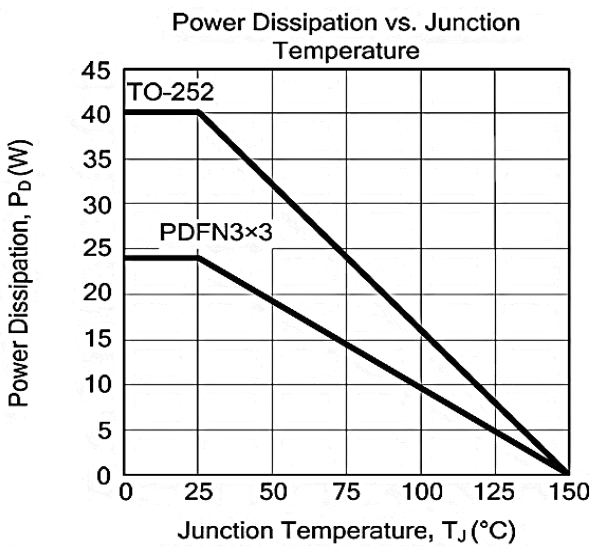
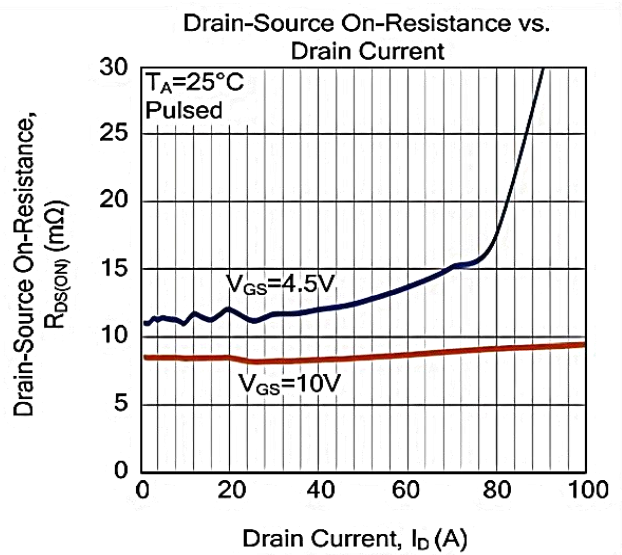
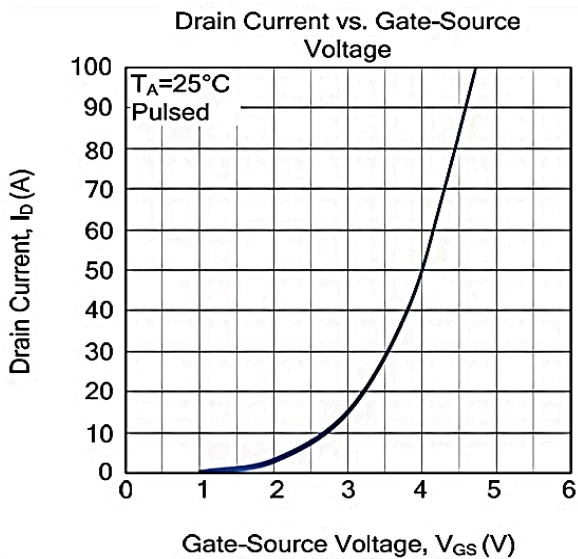
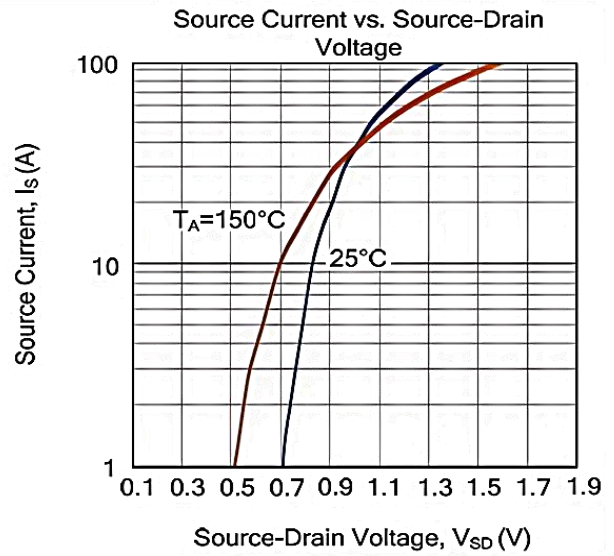
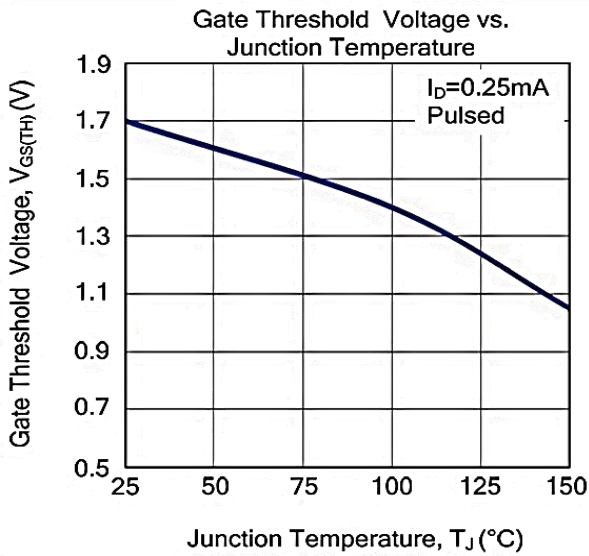
Notes:

1. Pulse width limited by  $T_J(\text{MAX})$
2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycle $\leq 2\%$

■ **TYPICAL CHARACTERISTICS (1)**



■ **TYPICAL CHARACTERISTICS (Con.t)**



■ TO - 252 Package Outline Dimensions

