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Micro Commercial Components

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# MCQ4503

## Features

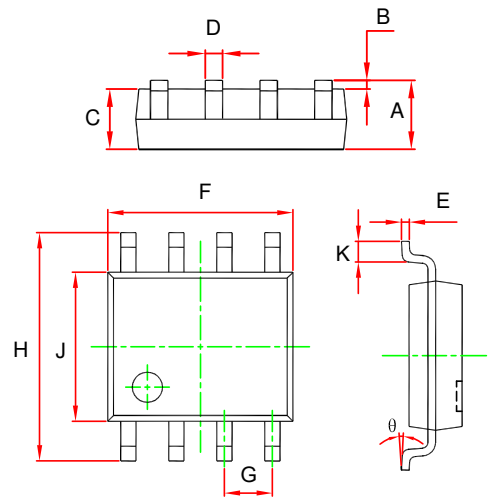
- Halogen free available upon request by adding suffix "-HF"
- Lead Free Finish/Rohs Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Marking: Q4503

## N and P-Channel Enhancement Mode Field Effect Transistor

### Maximum ratings ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	$V_{DS}$	30	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current <sup>a</sup>	$I_D$	6.9	-6.3	A
$T_a=25^\circ\text{C}$ $T_a=70^\circ\text{C}$		5.5	-5	
Pulsed Drain Current <sup>b</sup>	$I_{DM}$	20	-20	A
Power Dissipation	$P_D$	1.4		W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	89		$^\circ\text{C/W}$
Operating Junction Temperature	$T_J$	150		$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150		

## SOP-8

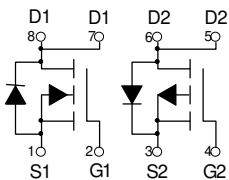


DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.053	0.069	1.350	1.750	
B	0.004	0.010	0.100	0.250	
C	0.053	0.061	1.350	1.550	
D	0.013	0.020	0.330	0.510	
E	0.007	0.010	0.170	0.250	
F	0.189	0.197	4.800	5.000	
G	0.050 (BSC)		1.270 (BSC)		
H	0.228	0.244	5.800	6.200	
J	0.150	0.157	3.800	4.000	
K	0.016	0.050	0.400	1.270	
$\theta$	0°	8°	0°	8°	

### Notes :

- These tests are performed with infinite heat sink.
- Pulse width by Max.junction temperature.

### Equivalent Circuit



**Electrical characteristics (T<sub>a</sub>=25°C unless otherwise noted)**

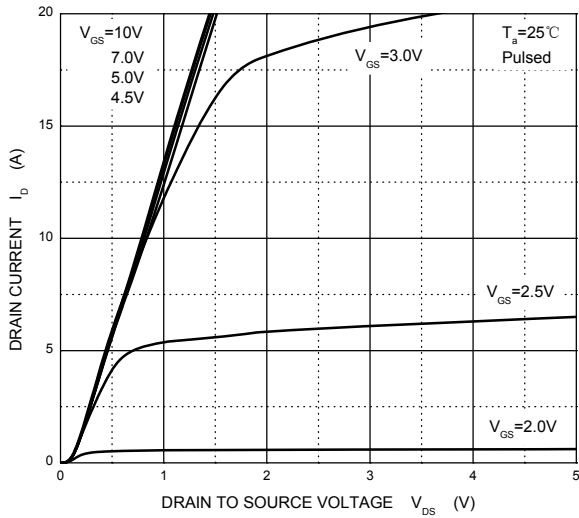
Parameter	Symbol	Test Condition	Min	Typ	Max	Units	
<b>Static</b>							
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0, I <sub>D</sub> =250μA	N-Ch	30		V	
		V <sub>GS</sub> =0, I <sub>D</sub> =-250μA	P-Ch	-30			
Gate-threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	N-Ch	1	1.5	3	V
		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	P-Ch	-1	-1.7	-3	
Gate-body leakage	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	N-Ch			±100	nA
			P-Ch				
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	N-Ch			1	μA
		V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V	P-Ch			-1	
Drain-source on-resistance <sup>c</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =6A	N-Ch		10	28	mΩ
		V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A	P-Ch		16	36	
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	N-Ch		14	42	
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A	P-Ch		25	55	
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =6A	N-Ch	4			S
		V <sub>DS</sub> =-10V, I <sub>D</sub> =-6A	P-Ch				
Diode forward voltage <sup>c</sup>	V <sub>SD</sub>	I <sub>S</sub> =1.7A, V <sub>GS</sub> =0V	N-Ch			1.2	V
		I <sub>S</sub> =-1.7A, V <sub>GS</sub> =0V	P-Ch			-1.2	
<b>Dynamic</b>							
Total gate charge <sup>c</sup>	Q <sub>g</sub>	N-Channel	N-Ch			13.5	nC
			P-Ch			20	
Gate-source charge <sup>d</sup>	Q <sub>gs</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A P-Channel	N-Ch		1.4		nC
			P-Ch		2		
Gate-drain charge <sup>d</sup>	Q <sub>gd</sub>	V <sub>DS</sub> =-24V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-6A	N-Ch		4.7		nC
			P-Ch		7		
Turn-on delay time <sup>c</sup>	t <sub>d(on)</sub>	N-Channel	N-Ch		5		ns
			P-Ch		8		
Rise time <sup>d</sup>	t <sub>r</sub>	V <sub>DS</sub> =20V, R <sub>D</sub> =20Ω, I <sub>D</sub> =1A, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω	N-Ch		8		ns
			P-Ch		7		
Turn-off delay time <sup>d</sup>	t <sub>d(off)</sub>	P-Channel V <sub>DS</sub> =-15V, R <sub>D</sub> =15Ω, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =3.3Ω	N-Ch		18.5		ns
			P-Ch		34		
Fall time <sup>d</sup>	t <sub>f</sub>	P-Channel	N-Ch		9		ns
			P-Ch		26		
Input Capacitance <sup>d</sup>	C <sub>iss</sub>	N-Channel	N-Ch			770	pF
			P-Ch			1380	
Output Capacitance <sup>d</sup>	C <sub>oss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f =1MHz P-Channel	N-Ch		80		pF
			P-Ch		150		
Reverse Transfer Capacitance <sup>d</sup>	C <sub>rss</sub>	V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f =1MHz	N-Ch		75		pF
			P-Ch		140		

**Notes :**

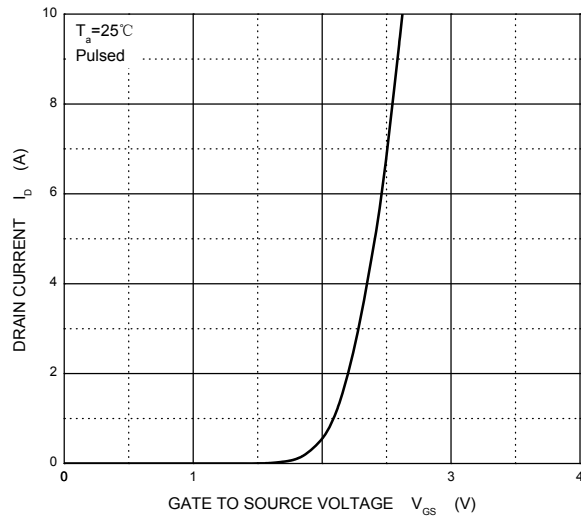
- c. Pulse Test : Pulse width≤300μs, duty cycle ≤2%.
- d. Guaranteed by design, not subject to production testing.

## Typical Characteristics

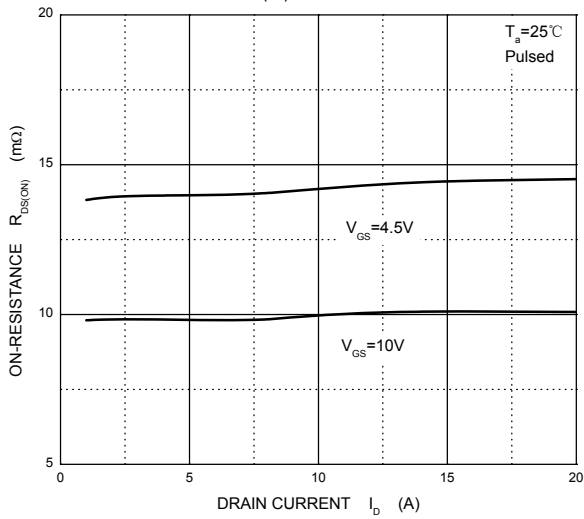
Output Characteristics



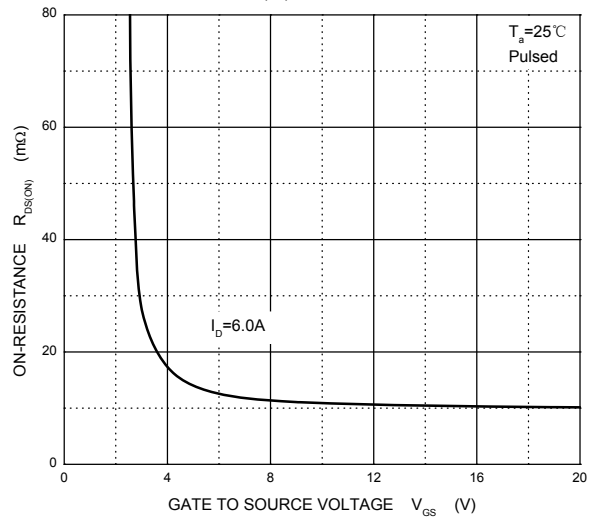
Transfer Characteristics



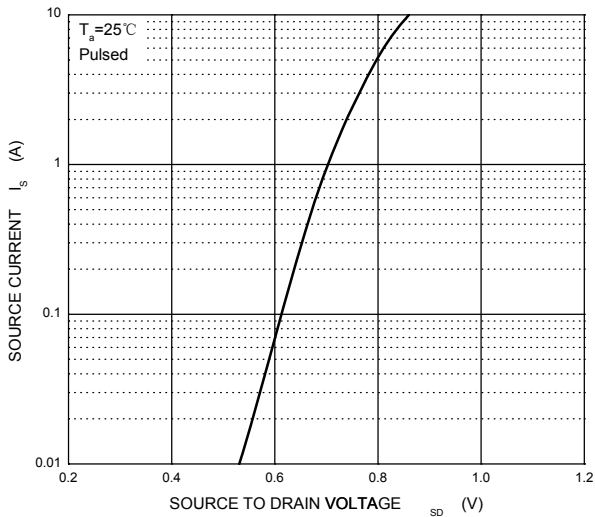
$R_{DS(ON)}$  —  $I_D$



$R_{DS(ON)}$  —  $V_{GS}$

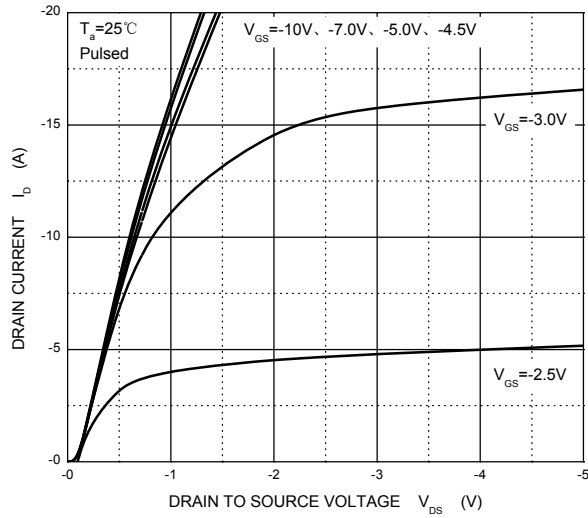


$I_S$  —  $V_{SD}$

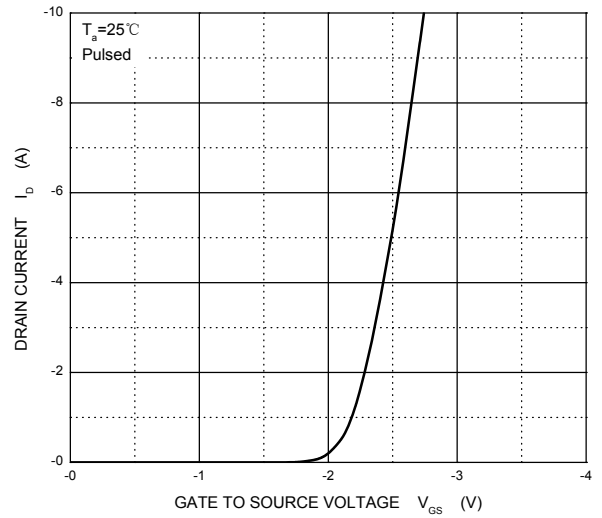


# Typical Characteristics

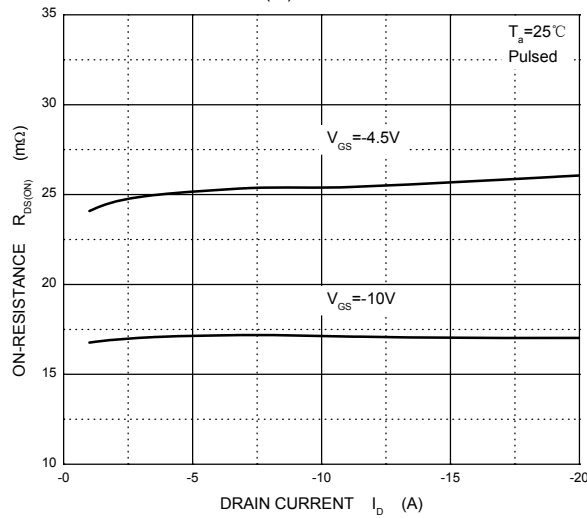
Output Characteristics



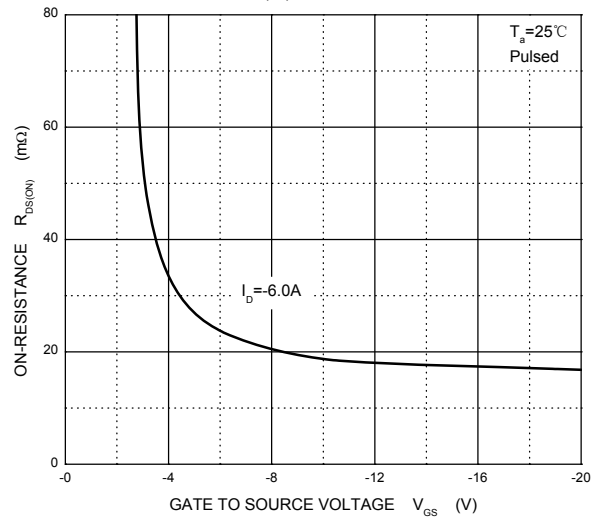
Transfer Characteristics



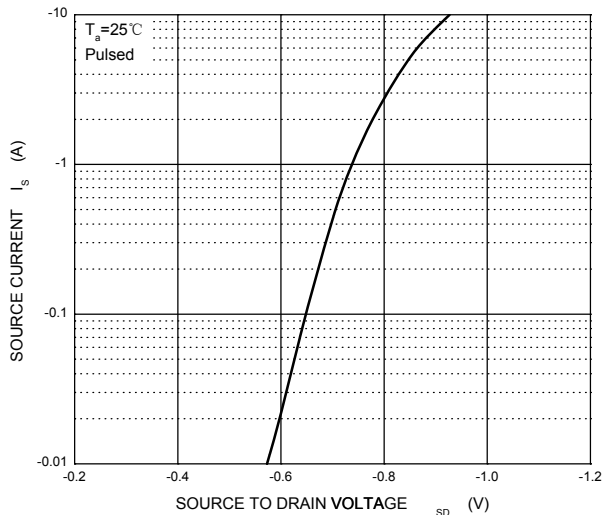
$R_{DS(ON)}$  —  $I_D$



$R_{DS(ON)}$  —  $V_{GS}$



$I_S$  —  $V_{SD}$





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Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel:4Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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