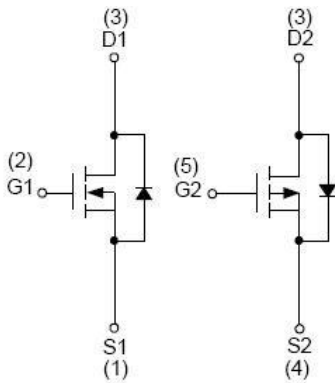
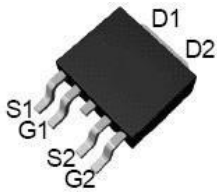


Features

- Low On resistance.
- 4.5V drive.
- RoHS compliant.

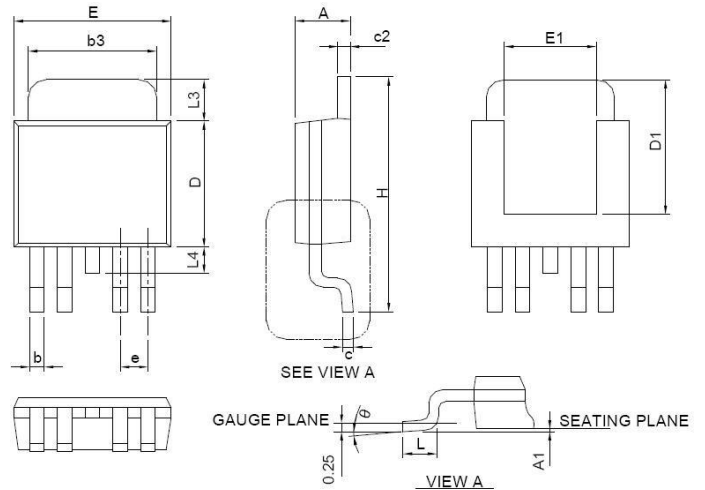


N-Channel MOSFET

P-Channel MOSFET

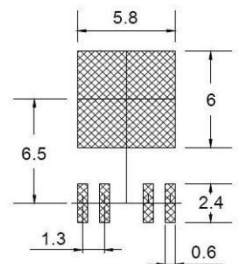
Package Dimensions

TO-252-4L



SYMBOL	TO-252-4			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.2	-	0.008
b	0.50	0.71	0.020	0.028
b3	4.32	5.46	0.170	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	1.30 BSC		0.051 BSC	
H	9.40	10.41	0.370	0.410
L	1.40	1.78	0.055	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



UNIT: mm

Specifications

Absolute Maximum Ratings at $T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	N-Ch	P-Ch	Unit
Drain-to-Source Voltage	V_{DSS}		100	-100	V
Gate-to-Source Voltage	V_{GSS}		± 25	± 25	V
Drain Current (DC)	I_D		8	-5	A
Drain Current (Pulse)	I_{DP}	$PW \leq 10\mu s$, duty cycle $\leq 1\%$	28	25	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (1000mm ² ×0.8mm) 1unit	30	30	W
Total Dissipation	P_T	Mounted on a ceramic board (1000mm ² ×0.8mm)	5	5	W
Avalanche Energy	E_{AS}	$T_J = 25^\circ C$, $V_{DS} = 20V$, $V_{GS} = 10V$	58	58	mJ
Channel Temperature	T_{ch}		150	150	°C
Storage Temperature	T_{stg}		-55~+150	-55~+150	°C

Electrical Characteristics (N-Channel) at $T_a = 25^\circ C$

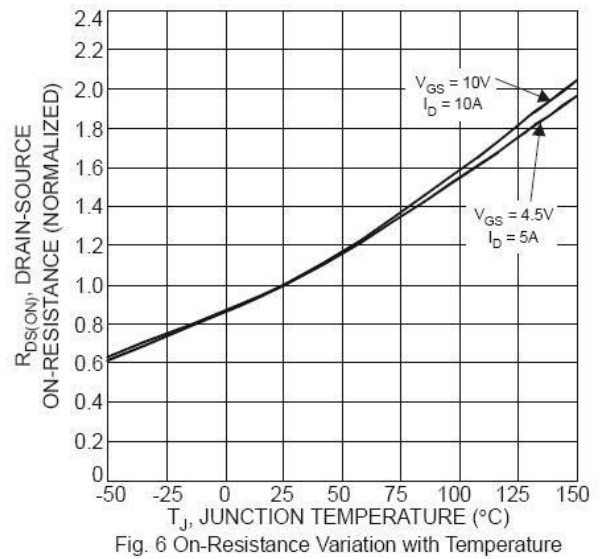
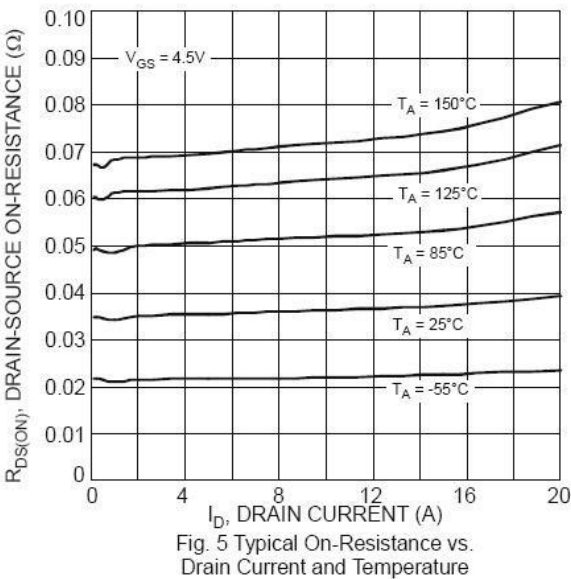
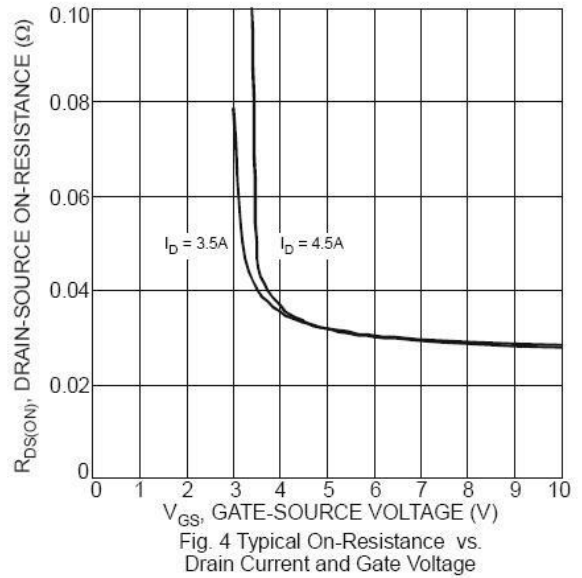
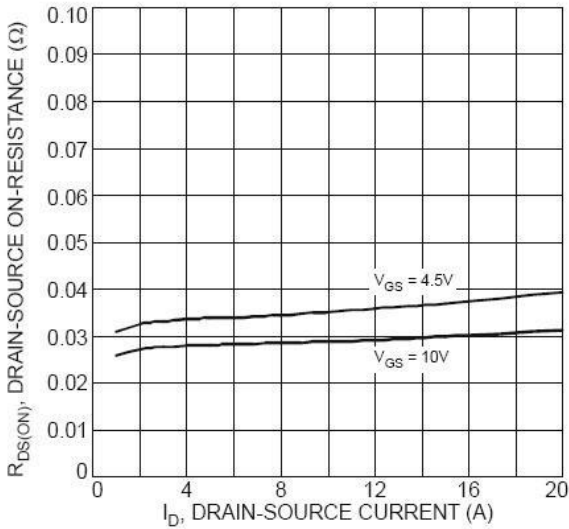
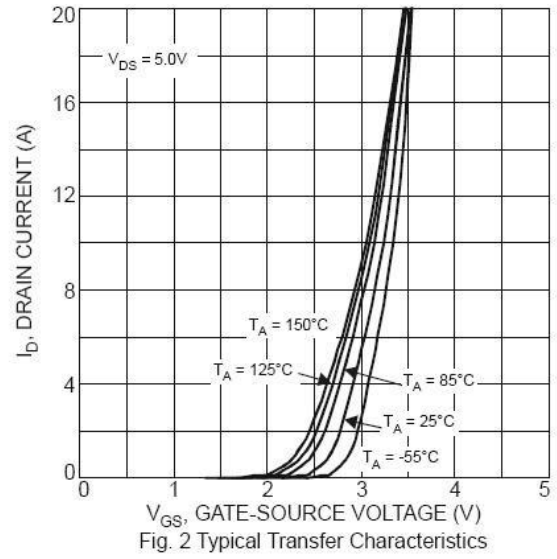
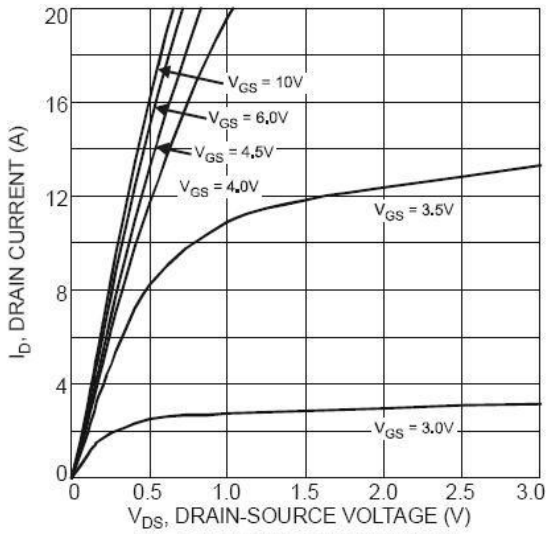
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu A$, $V_{GS} = 0V$	100	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60V$, $V_{GS} = 0V$	-	-	1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	1	2	2.5	V
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	$I_D = 12A$, $V_{GS} = 10V$	-	-	130	m Ω
	$R_{DS(on)}$	$I_D = 7A$, $V_{GS} = 4.5V$	-	-	180	m Ω
Input Capacitance	C_{iss}	$V_{DS} = 15V$, $V_{GS} = 0V$, $f = 1MHz$	-	880	-	pF
Output Capacitance	C_{oss}	$V_{DS} = 15V$, $V_{GS} = 0V$, $f = 1MHz$	-	140	-	pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS} = 15V$, $V_{GS} = 0V$, $f = 1MHz$	-	90	-	pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 15V$, $R_L = 0.75\Omega$, $R_{GEN} = 1\Omega$, $V_{GS} = 10V$	-	13	-	nS
Rise Time	t_r		-	18	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	30	-	nS
Fall Time	t_f		-	11	-	nS
Total Gate Charge	Q_g	$V_{DS} = 15V$, $V_{GS} = 10V$, $I_D = 20A$	-	24	-	nC
Gate-to-Source Charge	Q_{gs}		-	20	-	nC
Gate-to-Drain "Miller" Charge	Q_{gd}		-	27	-	nC
Diode Forward Voltage	V_{SD}	$I_S = 3A$, $V_{GS} = 0V$	-	0.75	-	V

Electrical Characteristics (P-Channel) at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu A$, $V_{GS} = 0V$	-100	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60V$, $V_{GS} = 0V$	-	-	-1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	-1	-	-2.5	V
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	$I_D = -5A$, $V_{GS} = -10V$	-	68	170	m Ω
	$R_{DS(on)}$	$I_D = -3A$, $V_{GS} = -4.5V$	-	80	230	m Ω
Input Capacitance	C_{iss}	$V_{DS} = 15V$, $V_{GS} = 0V$, $f = 1MHz$	-	1120	-	pF

Output Capacitance	C_{oss}	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	-	190	-	pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	-	100	-	pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=0.75\Omega, R_{GEN}=1\Omega,$ $V_{GS}=10V$	-	12	-	nS
Rise Time	t_r		-	16	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	40	-	nS
Fall Time	t_f		-	11	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, V_{GS}=10V, I_D=10A$	-	22	-	nC
Gate-to-Source Charge	Q_{gs}		-	25	-	nC
Gate-to-Drain "Miller" Charge	Q_{gd}		-	30	-	nC
Diode Forward Voltage	V_{SD}	$I_S=3A, V_{GS}=0V$	-	-0.75	-	V

Typical Characteristics (N-Channel) at $T_a=25^{\circ}\text{C}$



Typical Characteristics (N-Channel) at $T_a=25^\circ\text{C}$ (Continued)

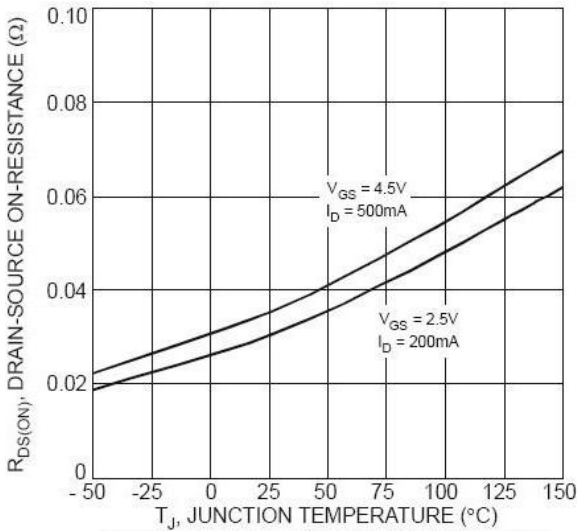


Fig. 7 On-Resistance Variation with Temperature

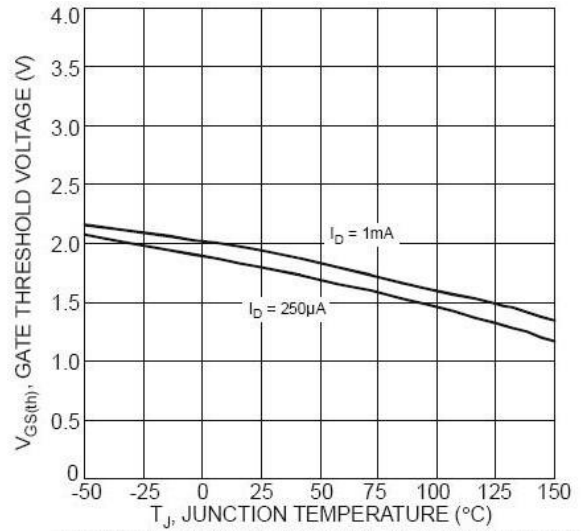


Fig. 8 Gate Threshold Variation vs. Ambient Temperature

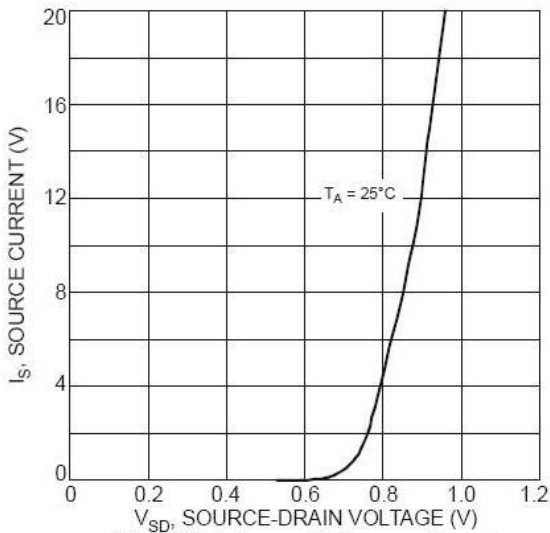


Fig. 9 Diode Forward Voltage vs. Current

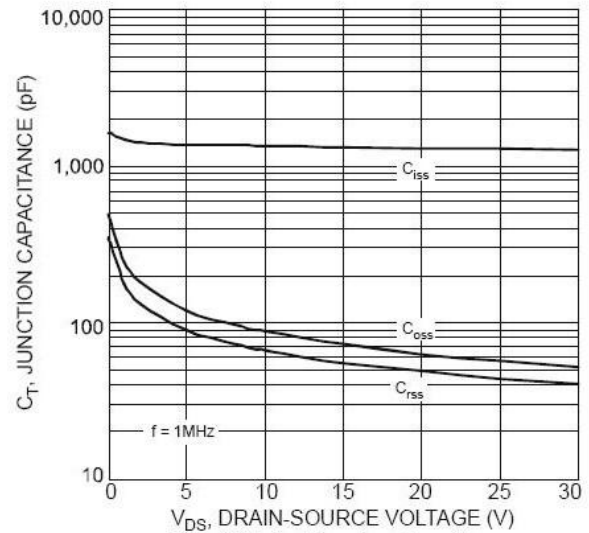


Fig. 10 Typical Junction Capacitance

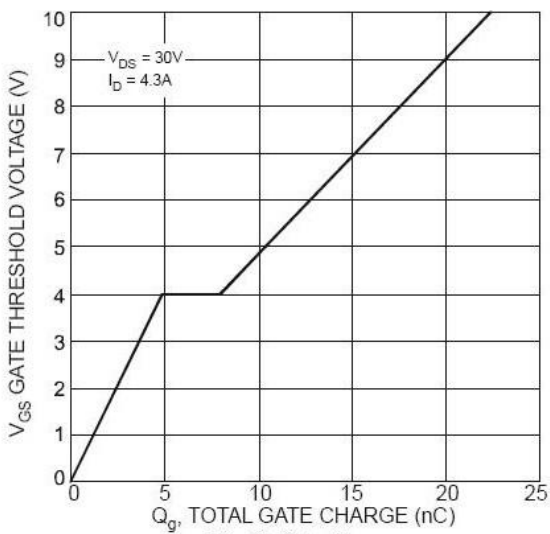


Fig. 11 Gate Charge

Typical Characteristics (P-Channel) at $T_a=25^{\circ}\text{C}$

