

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-40V	12mΩ@-10V	-30A
	16mΩ@-4.5V	

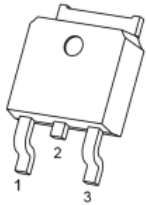
Feature

- High density cell design for ultra low R_{ds(on)}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

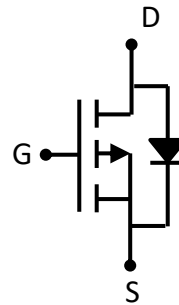
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package

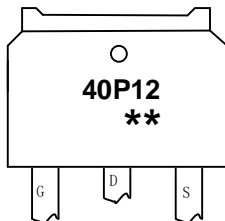


TO-252-2L(G:1 D:2 S:3)

Circuit diagram



Marking



40P12 : Product code
****** : Week code.



Absolute maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-30	A
Drain Current-Continuous(TC=100°C)	$I_{D(100^\circ C)}$	-21	A
Pulsed Drain Current	I_{DM}	-120	A
Maximum Power Dissipation	P_D	52	W
Single pulse avalanche energy ⁽¹⁾	E_{AS}	133	mJ
Thermal Resistance,Junction-to-Case ⁽²⁾	$R_{\theta JC}$	2.4	°C/W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

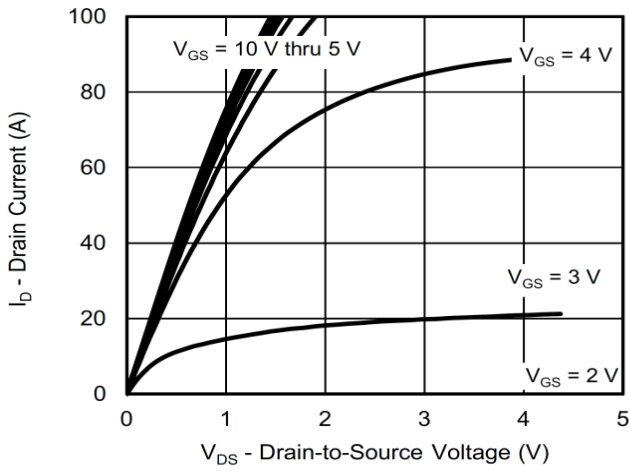
Electrical characteristics (T_A=25 °C, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-40V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.7	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-15A$	-	12	15	m Ω
		$V_{GS}=-4.5V, I_D=-10A$	-	16	22	m Ω
Dynamic Characteristics⁽⁴⁾						
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V, F=1.0MHz$	-	2150	-	PF
Output Capacitance	C_{oss}		-	223	-	PF
Reverse Transfer Capacitance	C_{rss}		-	182	-	PF
Switching Characteristics⁽⁴⁾						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-20V, I_D=-1A, V_{GS}=-10V, R_G=3\Omega$	-	12	-	nS
Turn-on Rise Time	t_r		-	22	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	55	-	nS
Turn-Off Fall Time	t_f		-	34	-	nS
Total Gate Charge	Q_g	$V_{DS}=-20, I_D=-25A, V_{GS}=-10V$	-	31	-	nC
Gate-Source Charge	Q_{gs}		-	6	-	nC
Gate-Drain Charge	Q_{gd}		-	10	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V_{SD}	$V_{GS}=0V, I_S=-12A$	-	-	-1.2	V

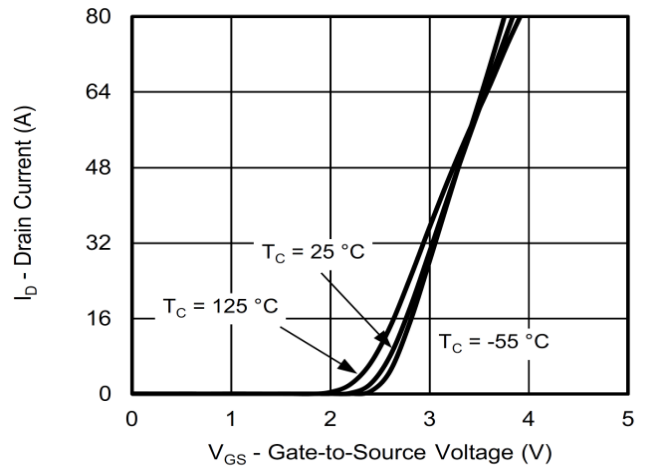
Notes:

- E_{AS} condition: $T_J=25^\circ C, V_{DD}=-25V, V_{GS}=-10V, L=1mH, I_{AS}=-54A$
- Surface Mounted on FR4 Board, $t \leq 10$ sec.
- Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- Guaranteed by design, not subject to production

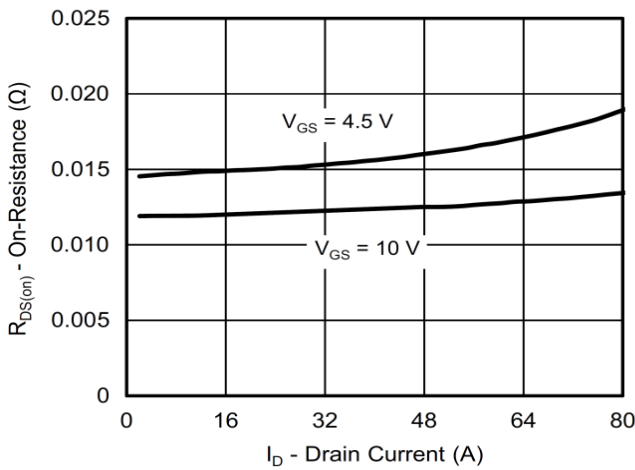
Typical Characteristics



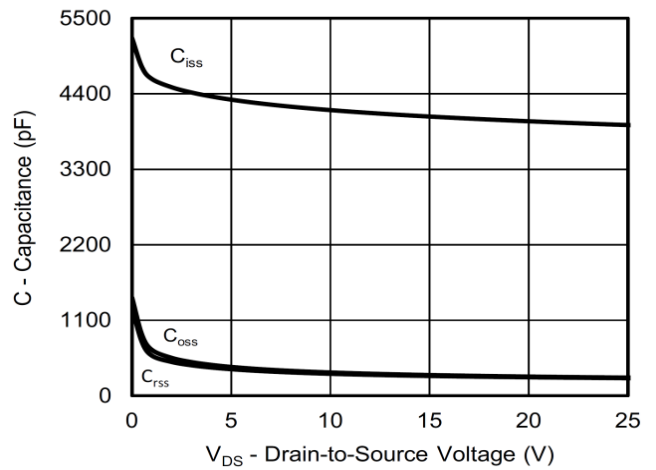
Output Characteristics



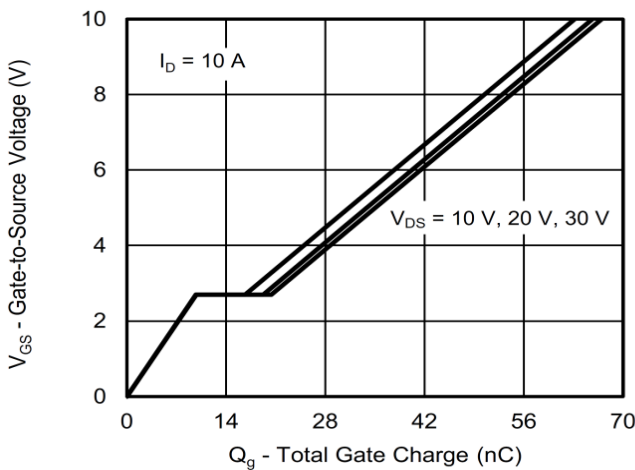
Transfer Characteristics



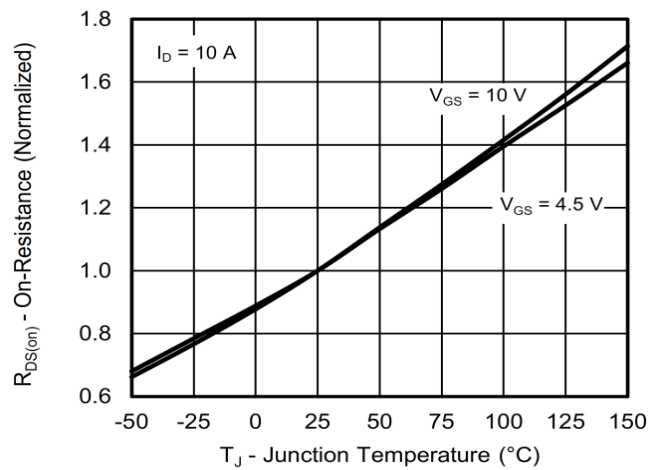
On-Resistance vs. Drain Current and Gate Voltage



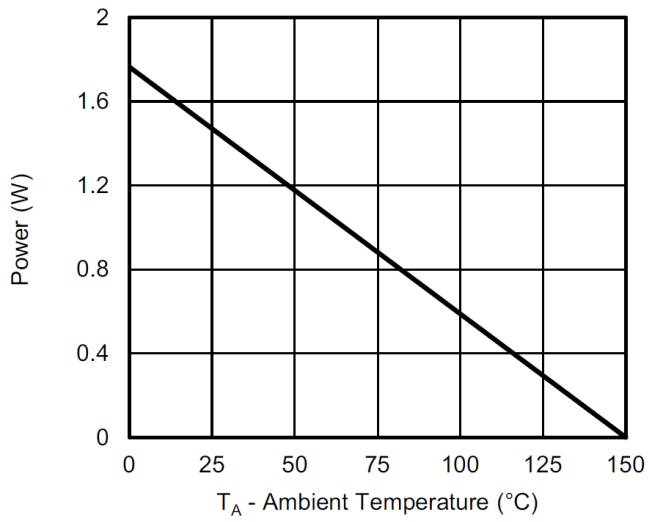
Capacitance



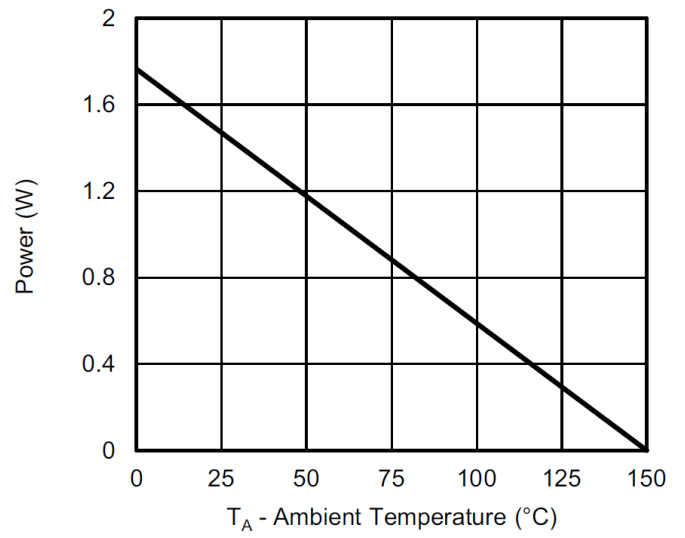
Gate Charge



On-Resistance vs. Junction Temperature



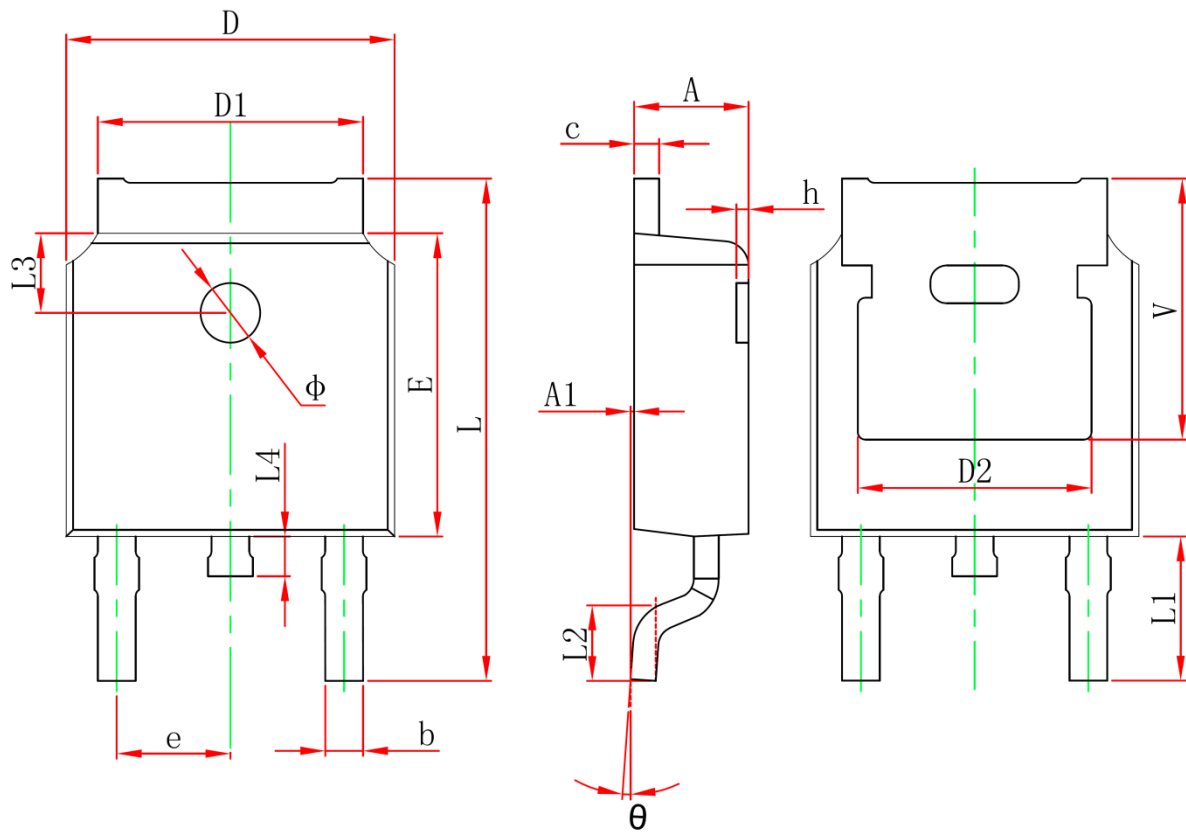
Power, Junction-to-Foot



Power, Junction-to-Ambient



TO-252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	