

MY65R380H

650V N-Channel Super-Junction Power MOSFET



General Description

Super-junction power MOSFET is a revolutionary technology for high voltage power MOSFET, designed according to the SJ principle. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

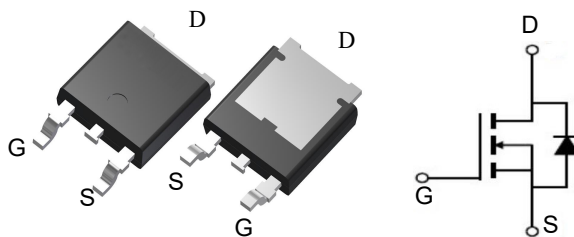


Features

V_{DSS}	650	V
I_D	11	A
$Q_{g,typ}$	19.2	nC
$R_{DS(ON)}(at V_{GS}=10V)$	330	m Ω

Application

- Battery protection
- Load switch
- Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY65R380H	TO-252-2L	MY65R380H	2500

Absolute Maximum Ratings ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate- Source Voltage	± 30	V
$I_D @ T_c=25^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	11	A
$I_D @ T_c=100^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	7	A
I_{DM}	Pulsed Drain Current ²	33	A
EAS	Single Pulse Avalanche Energy ³	210	mJ
$P_D @ T_c=25^{\circ}\text{C}$	Total Power Dissipation ⁴	125	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}\text{C}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1	$^{\circ}\text{C/W}$

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Thermal Characteristics

Parameter	Symbol	Value	Unit
		TO-263	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^{\circ}C/W$
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{solder}	260	$^{\circ}C$

Electrical Characteristics ($T_J=25^{\circ}C$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}$, $I_D=250\mu\text{A}$	650	-	-	V
Gate threshold voltage	$V_{GE(th)}$	$V_{GS}=V_{DS}$, $I_D=250\mu\text{A}$	2.0	3.0	4.0	V
Drain cut-off current	I_{DSS}	$V_{DS}=650\text{ V}$, $V_{GS}=0\text{ V}$, $T_J = 25^{\circ}\text{C}$ $T_J = 125^{\circ}\text{C}$	- -	- 10	1	μA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=30\text{ V}$, $V_{DS}=0\text{ V}$	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-30\text{ V}$, $V_{DS}=0\text{ V}$	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}$, $I_D=5.5\text{ A}$ $T_J = 25^{\circ}\text{C}$	- - -	330	380	m Ω
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{MHz}$	-	852	-	pF
Output capacitance	C_{oss}		-	37	-	
Reverse transfer capacitance	C_{rss}		-	2.0	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 400\text{V}$, $I_D = 5.5\text{A}$ $R_G = 25\Omega$, $V_{GS}=10\text{V}$	-	16	-	ns
Rise time	t_r		-	35	-	
Turn-off delay time	$t_{d(off)}$		-	78	-	
Fall time	t_f		-	39.5	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DD}=520\text{ V}$, $I_D=5.5\text{A}$, $V_{GS}=0\text{ to }10\text{ V}$	-	3.1	-	nC
Gate to drain charge	Q_{gd}		-	8.2	-	
Gate charge total	Q_g		-	19.2	-	
Gate plateau voltage	$V_{plateau}$		-	5.5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}$, $I_S=11\text{A}$	-	-	1.4	V
Reverse recovery time	t_{rr}	$V_R=400\text{ V}$, $I_F=5.5\text{A}$, $dI_F/dt=100\text{ A}/\mu\text{s}$	-	310	-	ns
Reverse recovery charge	Q_{rr}		-	2.8	-	μC
Peak reverse recovery current	I_{rm}		-	16	-	A

Notes:

- Limited by maximum junction temperature, maximum duty cycle is 0.75.
- $I_{AS} = 3A, V_{DD} = 50V$, Starting $T_J = 25^{\circ}C$.

Typical Characteristics

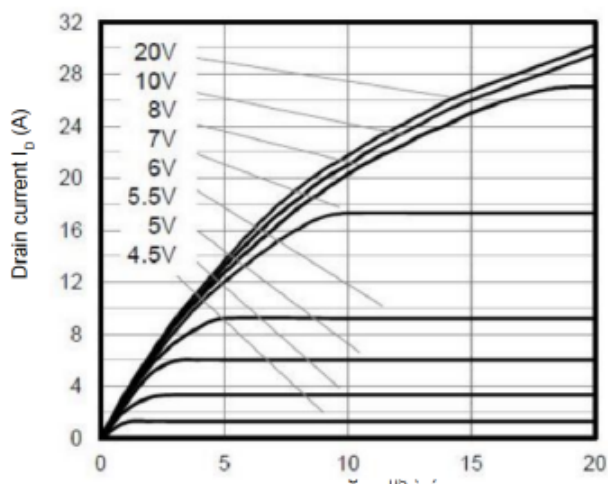


Figure 3. On-Resistance vs. Drain Current

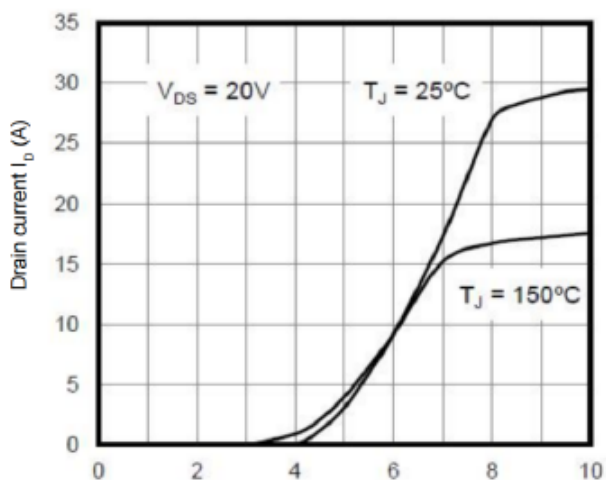


Figure 4. Capacitance Characteristics

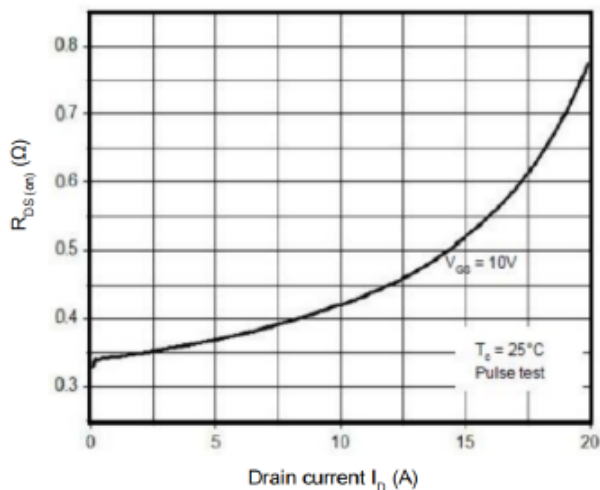


Figure 5. Gate Charge Characteristics

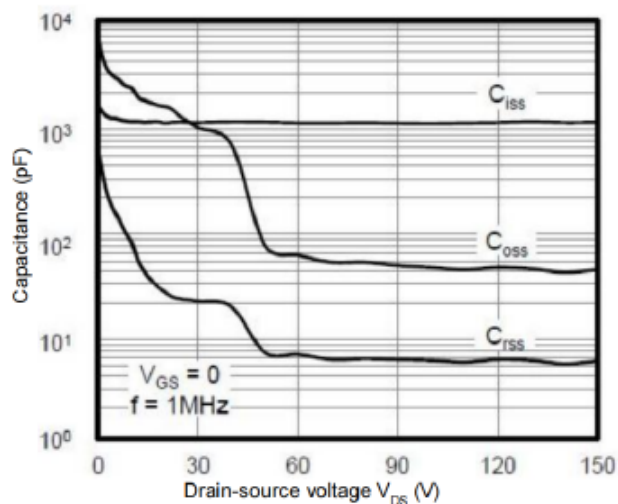


Figure 6. Body Diode Forward Voltage

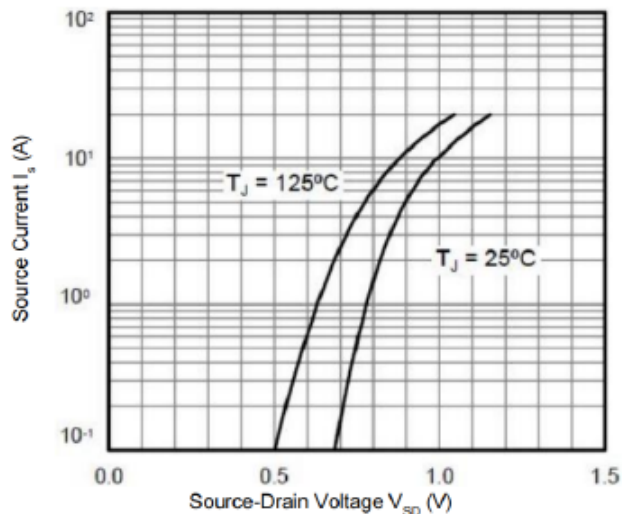
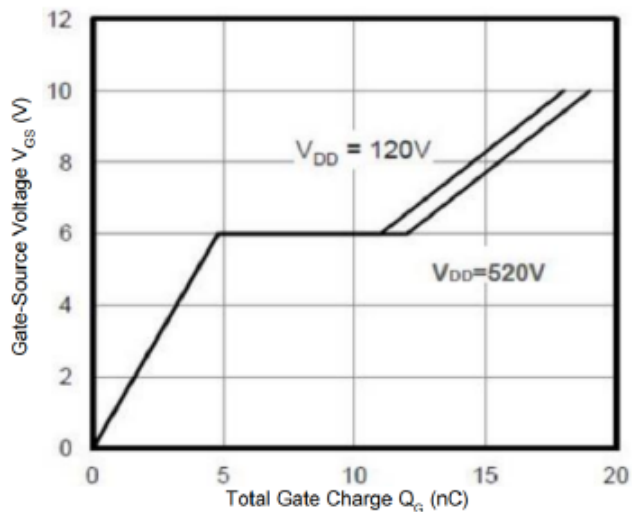


Figure 7. Breakdown Voltage vs. Temperature

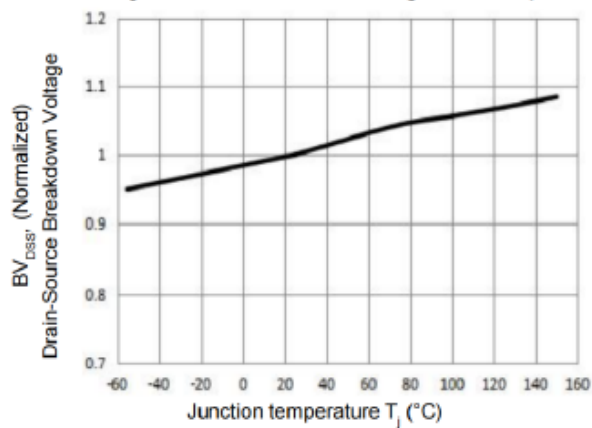


Figure 8. On-Resistance vs. Temperature

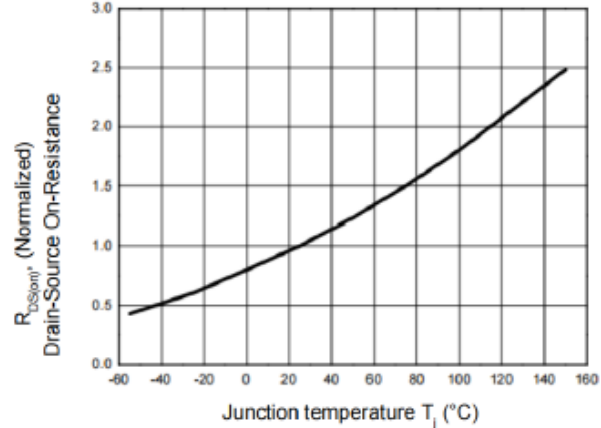
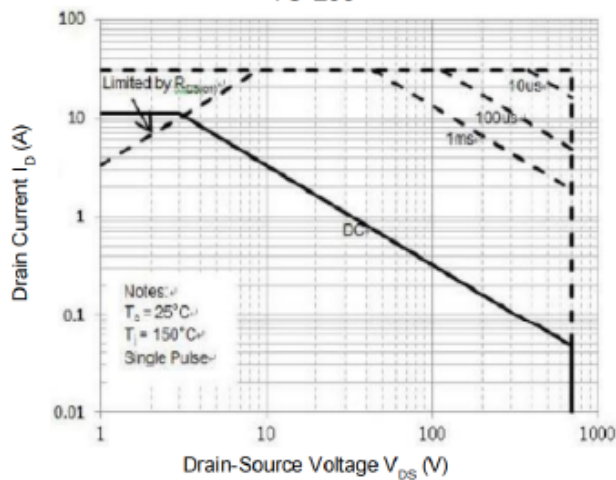
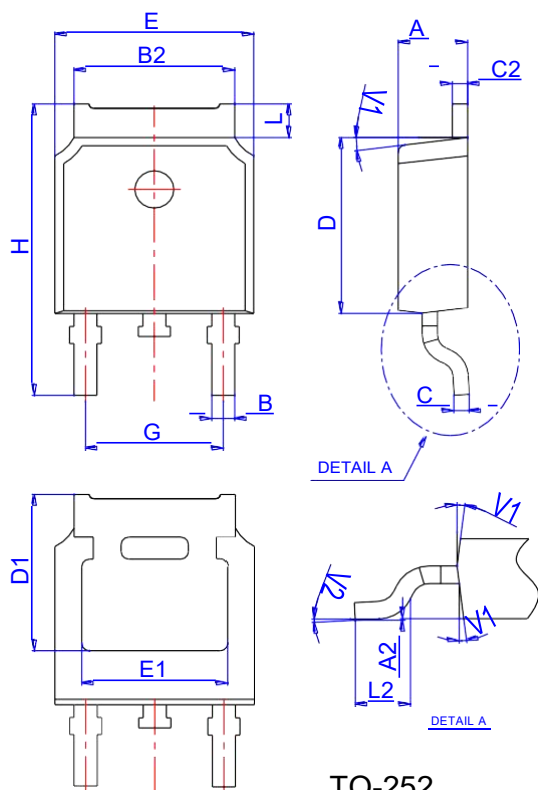


Figure 9. Maximum Safe Operating Area
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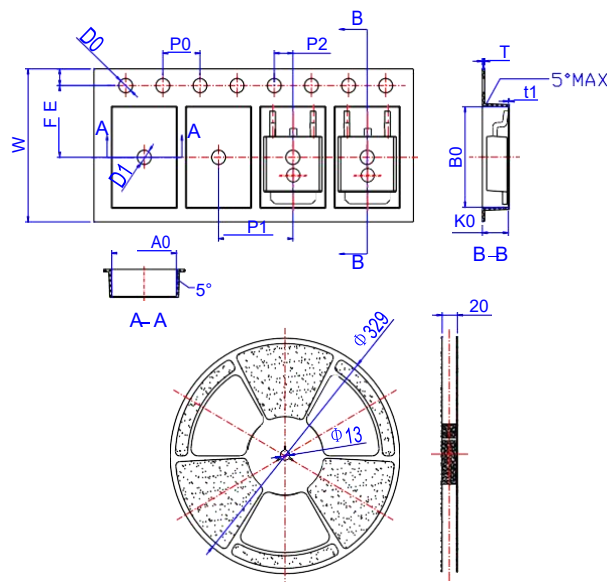
Package Mechanical Data TO-252



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583